NUCLEAR WASTE TECHNICAL REVIEW BOARD

MEETING OF THE PANEL ON STRUCTURAL GEOLOGY & GEOENGINEERING

ESF/REPOSITORY DESIGN AND CONSTRUCTION

Las Vegas, Nevada
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BOARD MEMBERS PRESENT

Dr. John Cantlon, Chairman, NWTRB
Dr. Edward J. Cording, Session Chair
Dr. Garry D. Brewer, Member
Dr. John J. McKetta, Member

CONSULTANTS

Dr. Clarence Allen
Dr. Donald Langmuir
Dr. Dennis L. Price
Richard Bullock
Alden Segrest
Dr. Jean Younker
Jack Lemley
Antony Ivan Smith
Robert Matyas

NWTRB STAFF
Dr. William Barnard, Executive Director, NWTRB
Dr. Carl Di Bella, Senior Professional Staff
Dr. Leon Reiter, Senior Professional Staff
Mr. Russell McFarland, Senior Professional Staff
Ms. Nancy Derr, Director, Publications
Ms. Linda Hiatt, Management Assistant
Ms. Donna Stewart, Staff Assistant

ALSO PRESENT

Kal Bhattacharyya
Steve Brocoum, DOE
Bill Simecka, DOE
Dennis Williams, DOE
Dean Stucker, DOE
Robert M. Nelson, DOE
Alan Berusch, DOE
Hugh Benton, M & O/B & W Fuel
Larry O'Neal, M & O
Lance Destwolinski/REECo
Lee Renegar
Bob Saunders
Dan Coss

I N D E X

P R O C E E D I N G S

DR. EDWARD CORDING: Good morning. We had some good discussions yesterday. We're looking forward to more today. I think that we realize that the program is at a very important crossroads, a crucial time in the Yucca Mountain program. Many things are beginning to happen, and there is much, obviously, to be done, and I think that this is a feeling that we've had on the Board. This is a time for us to be able to find out what the program is in the time when it is still evolving, but it has to move very rapidly to achieve objectives that are being set.

So we really appreciate the opportunity to have the discussion with DOE and its contractors. We appreciate very much, also, the people that are with us today from DOE.

At the table today, we have Robert Nelson, the Acting Project Manager of Yucca Mountain site characterization project; Bill Simecka, who is in charge of construction for the Yucca Mountain site characterization project; and Dean Stucker, also with the project office. So we really appreciate you being with us today.

And so I would like, then, to introduce Robert Nelson, who will make the presentation on recent management changes at the Yucca Mountain project.

MR. NELSON: Thank you very much.

I'm going to talk about really what has consumed most of my time in the six months or so that I've been with this project in an acting capacity from the DOE Nevada office.

When I came here in November, it was with the understanding from Dan Dreyfus that there were clearly some changes needed in the management side of the organization, and that was really my major focus, to be my major focus for whatever length of time I was here. And I really tried to do that.

We always are faced with the need for changes, and some of them can be very positive, and some of them can be negative. There's always resistance to change, and so in trying to make some of the things I'm going to go through with you happen, there have obviously been people kinds of problems where the resistance to change has to be overcome and in some cases, in most cases here, that's been a very positive thing I must say. The people in the project that I've been able to work with have really tried to make this a win-win for everyone, and I think we're going in that direction.

We have lots of criticisms, and they exist. Some of them are well-founded. Some of them are probably not as well-founded, but that things that I've tried to deal with and that I'm going to talk about this morning really are in

that upper group there, the first four items under program management.

There's a concern with those that I'll try and deal with a little bit, too, and that is we had kind of something that was characterized as the Pac Man syndrome in the management of this organization. There was a lot of fear and concern among the participants that another participant was eating up their work. What that led to was a--oh, at least at some level, a need to defend the institution that you represented so that the funding would continue and your work could continue. And that sometimes got in the way of making decisions, and I think we've tried to address these things through this period of time. And there are a bunch of changes.

I've put a lot of effort, tried to really focus at clarifying the organizational rules, making changes. What the second bullet there really means is pushing the decision making as low as I can in the organization and putting a smaller number of entities in charge of the major pieces of work so that I can do a better job of holding people accountable and responsible for their work. That's really the focus of all of this.

This has been a program where there's been tremendous scientific achievements, I think, over the years. I actually came here to Nevada in 1978 and was the manager

of a part of the Nevada operations office that became this program. So, you know, it was one of those things in a career where you get through with, go onto something else, and think, wow, I survived it. Now I've kind of covered my tracks and go onto something else. And then to have to come back and see it again 15 years later is kind of surprising. Places where there were no roads now have paved highways, and it's really interesting to do that. But it's probably one of the most difficult things in making the changes in the management of the organization, come around to trying to do that without adversely affecting the technical work.

I, from 1990 through a good part of 1993, I was asked to go up to Rocky Flats after the FBI raid and make the changes that Admiral Watkins needed or felt he needed at that plant.

We were not able to do that in a manner which didn't disrupt the work. And so for a lot of different reasons, principally because it affected the health and safety of both the public and the workers, they were things we just had to do in a very severe way. And the result of that was an incremental cost. We made the changes, changed the culture, but it took three years, and it cost an incremental amount of money of about $200 million a year extra, and in those three years we put out zero product.

And so when I talked this through with Dan Dreyfus,

I said, you know, there's a couple ways to do this, and that's the one I would like to avoid. I've got my ticket punched in that style of business.

And so what we went into here was a way which probably will take about the same time, three years, but hopefully will be done in a manner that doesn't disrupt the technical work, and that's a pretty high priority to me.

I'm going to go through a little bit of kind of organizational boxology.

I'm really a believer that almost any organization chart can work if the people want it to work. There's nothing magic about how the boxes report. But this was the organization at the time I came here, and there were really, from my standpoint, some really key problems with it and things that I felt had to be changed.

First of all, there was this dual job of project manager and associate director, which probably was put--I have no idea how that evolved in history, and it probably had a good idea that put it there, but in today's world, for whatever reason, it seemed to me to be overtaken by events and was not necessary.

And so one part of organizational change was clarifying that role, whatever that role was.

A second one was, that was really a void in my thinking, was that there is no professional administrative

organization in here. There is certainly a very good project control function, and that's something that has become kind of the model for the whole national program, but there is no high level expert on procurements, organization, personnel, the functions that really enable the technical work to go. And, also, there is no full-time lawyer, no legal support really that was all to this project, in a project that is heavily--has heavy legal demands on it.

Those were a couple key problems I had. I brought down at the vintage of this chart, I brought down a person who had worked for me at Rocky Flats, a really outstanding knowledgeable administrative expert, Marshall Bishop, who is here today, and I brought down also my chief counsel from Rocky Flats. And in the new organization chart, those two are key players in this chart. We have Kathy Izell, who is also here today, and Marshall Bishop now in the line responsibility of assistant manager for administration.

There is a little typo. I do have a boss here--should have a line. I noticed because I went through those this morning.

But there are a couple of key things that I'll refer back to this chart from time to time. We've tried to firstoff push the responsibilities down to these line managers to get out of the mode of decision making at a very high level and enable these people to really develop

functional organizations from the performer parts of the contractor staff responsive to their needs and their control on the work breakdown structure. And we're just starting at that, and there's a lot to come in terms of pushing that decision making to the real technical expertise.

DR. ALLEN: Could I ask a question?

MR. NELSON: Certainly.

DR. ALLEN: Clarence Allen. The three people on the bottom line, do they all report to Wendy Dixon?

MR. NELSON: No, no, that's another--

DR. ALLEN: Okay.

MR. NELSON: Maybe I ought to ask Wendy that. I'd probably get a different answer. No, another typo.

DR. ALLEN: Okay.

MR. NELSON: Let me step back in a little bit of--was there another question?

DR. PRICE: Yeah. To whom do they report?

MR. NELSON: They report to me, as does Wendy.

If I were to step back and say I were starting doing the perhaps Draconian thing and redesigning the organization today, how would I like it to be? It's more in this model. This is a model I'm much more used to where there is a Federal entity with a Federal responsibility, a landowner, a need for a bunch of work to be done, and the ability to go let a contract to get it done, through a very

large several thousand person organization, and clearly a need for some technical support that I can't hire in the Federal work force, both in number and in talent, and so some other contract able to support me.

Again, if I were to step back and say, how would I build this organization if I were given that charter today, this would certainly be the model I would like to go after.

And pretty much that's what we had to do at Rocky Flats. We put a new contractor in here. We brought in a lot of people in this role, and we imposed that on the organization with very disruptive results for a good set of reasons.

What I've tried to do, and what I'll talk about doing here, is working from where we are today where there are a lot of entities reporting to the entity here and a lot of people in this role that are somewhat intermeshed with the performers to work from that into this model, and this is my objective through the process, and actually it's going much faster than I ever thought it would.

What I've tried to do--what I've done is to take--firstoff, organize the department in the manner you saw. Secondly, or really in parallel, to identify uniquely those contractor people who support us directly, whose function is really the project management. And we've called that, this part up here, the project management organization.

Now, it turns out that many of the contractor people in this contractor support organization work for the same contractors that are here, and that leads to certainly concerns anyway about conflict of interest, communications. Do they have to report everything they do to help me here to their bosses down here? In some cases, these are the bosses of workers down here, and that's not an acceptable way of doing business.

So our first step was, and we're pretty well done with that, to pick out and identify those people, and we've actually gone the step of giving them a unique name tag for their badge that shows when we're in a meeting, that at least I can see what flag they're flying at this point in time.

The next step of this is to really sever the relationship between that group of contractors and this group of contractors, and there's a couple ways of doing that. The simple easy appearing way is to literally make it a new contract for that group, even though the talent and experienced people that we want to keep are there and we want to keep them. We don't want to disrupt that.

So we're working through that. There are other ways to do it under the same contract, and I'll show you one proposed way of doing that. That's kind of the second part of this.

The third part is really to organize the performers

in a way where there are one or two perhaps major--maybe three, but a small number of major entities here, such as the TRW or perhaps SAIC, or whatever, who are responsible for the work in their area, and that means to me totally technically responsible once this group has given them that charter and funded them.

Now, that doesn't necessarily mean that each one of them has to do the subcontracts. For example, with a National Laboratory who's helping in that area, they can give technical direction to that work without necessarily having a subcontract with the laboratory. And that's very important because there are a lot of procurement requirements for doing work with National Laboratories or other Federal agencies that could cause that to cost more if they had to have subcontracts.

I'm not precluding that; I'm trying to keep the options open to do it in the smartest way. I can authorize the TRWs or the SAICs or anybody else to give technical direction to the laboratories or to other contractors and make it to where they're responsible, even though the funding may not flow through that.

And what we're trying to do is pick the best options, and they're probably going to be different maybe from laboratory to laboratory or from contractor to lab, or whatever.

But the point is to get down to where it appears to be one or two major boxes here of performers so that we can keep the talented knowledgeable people that have been involved with the project and yet get down to this kind of a model.

The fourth phase of this thing, the real ultimate goal, is to get all of those performers to be one entity, and we're working on that. There's a lot of work going on between the corporate managements of those large contractors to pull that off, and they've been very cooperative. I've got to give them a lot of credit for swallowing hard and dealing with those issues. But I think by the first of the fiscal year, somewhere around there, we will really be in a point where there will at least be proposals to the department from them for how to do that, and I'm really pleased with the way that's going.

Now, I've kind of divided up, because it's something that my own staff and myself are really--this is where we are. We really need to get to a point of figuring out what are our roles as the Federal entity, what does that project management organization do, and then what are the roles of the performers.

And we haven't done that. I mean, these are the pretty obvious things that I put on these sheets, but on the day-to-day basis, one of the concerns I have is that my

Federal staff probably does more of the doing of work than I'm comfortable with. Now, that doesn't mean I'm right, and I want to learn and work with them in those particular areas and make sure we're doing what's best for the project. I have this kind of sense that I would like our Federal staff to be more in the oversight role than in the doing role, and that's really where we are. We're trying to work through that.

I have an off-site couple days with my key staff in the next week just to deal with those kinds of issues, what level of the WBS structure, the work breakdown structure, do we control that, and what do we turn over to the major contractors to control. And likewise, what is it we're expecting that PMO organization to do for us?

I kind of talked through these as I went through. We really have the Phase I, the construction of that project management organization in place. We're dealing with the roles and responsibilities. We're really working--I love these words somebody made for me--the seamless mosaic. That's wonderful. I would like to see that. I would like it to be one organization, and we're getting there, and ultimately, which will take a long time. A cultural change takes three years. That's just my rule of thumb.

I'd like this to break down the barriers among the performers and really have this be a team.

This is just an example. TRW, I asked for permission to put this up and share it with you because it's really their thing. They have proposed to us a plan on how to separate the PMO from the doers, from the performers, and to have the PMO manager, Glen Vawter, report to a higher level than the Nevada M & O manager in the corporation.

It comes down to employees signing non-disclosure agreements, and I would have that in this proposal, I would have that as an award fee area. If they were not serving me in that manner, they would not get award fee.

So this is one scheme that's out. My key staff is working. There will be counter proposals and one thing and another, but ultimately, we will make that separation.

Here's where we're going. We are having an off-site next week to deal with what are these roles, and I don't fee that each of our assistant managers have to do it the same, but I want them all to understand what each other are doing, and I want to understand it, too, and we're working toward this pulling all of the entities together into one organization.

It's clear that we're going to make some changes, and I think from the people's side of it, it's gone very well so far. There are concerns, of course, whenever there are changes, but both my staff and the contractor's staff have really gone into this with a good attitude, and I think we're

going to pull off many of these changes. And I think it's going to be really helpful to being able to make good decisions on the program.

So with that, I'd like to answer any questions you have.

DR. CORDING: Thank you.

Opportunity for questions. Garry Brewer?

DR. BREWER: Brewer, of the Board.

In your opening comments, you noted that you were proud of various scientific achievements that have been made at some point, and then you didn't specify any. I wonder if you could list those achievements, just what are you most proud of?

MR. NELSON: Well, I guess there are a lot of things. I've kind of watched this project for 15 years. When I was involved with it in the late '70s and early '80s, we knew there was a block of rock, and there were no QA requirements in those days, and there was not an NQA-1 prepared. There were no nuclear waste legislation.

I think being able to get to a point where we understand the boundaries of that block as well as we do and have done that in the manner that the data is acceptable, I think has been a major achievement, I mean from what I've seen.

Now, I think there's--well, I'm not an earth

scientist in any manner, and so to try to talk that part of the science is probably way beyond me. But I've seen this. I've been involved with technical work for most of my career, and I think the efforts that have been made to go and do just that, just get the boundaries of that block and understand what the areas of positive and negative are, has been a big accomplishment.

DR. CORDING: Garry?

DR. BREWER: This is a different question, but I'd like to go back to one of your charts, the reorganized Yucca Mountain site office, if you would, please?

Now, I wonder how many of the people on that chart will not be here in six months. The question is responsibility and accountability, well who's going to be responsible is the question.

MR. NELSON: Well, in six months I would guess Max Blanchard will probably not be here, and I would guess Bill Simecka would not be here.

DR. BREWER: What about yourself?

MR. NELSON: That's a good question. I wish I knew the answer to that. If you saw the paper this morning, you saw that the manager and Linda Smith, who was acting in my place as the deputy manager, are leaving the Nevada field office within two months. And I told my secretary this morning, "We're probably going to get a phone call or two today."

I have no idea. I don't know.

I'll tell you--I'll share with you what I told Dan Dreyfus. I think that if I had my druthers over, say the better part of the next year, I would do better spending my time right here than to go back over there. This is a growing project. There is something that I really believe in here and something I think I know how to do.

In the Nevada office, they're going to go over some really hard times I think in the next year. And, frankly, I'd rather be here.

I mean, so now what Dan Dreyfus is going to do with that or others, I have no idea. So I just don't know.

DR. BREWER: Let me be a bit more specific. We discovered yesterday that the practices in terms of the tunnel boring machine and creating the exploratory studies facility are not industry standard in terms of expectations, performance, cost, or anything else. Our consultants have said that in public.

Where do we go to see who is accountable? You've made the claim the responsibility and accountability has been pushed down. Who is responsible for that?

MR. NELSON: Well, in a very major sense, I expect I am. I mean, there are certain things, obviously, that I am responsible for, and something like that, I certainly am. Getting to the surface, the decisions, for example, with a

tunnel boring machine of do you just run that thing as fast as you can as if it were a commercial hole in the ground, or do you make it artificially go very slowly so that you can do the science along with the way at a very much increased cost? Those are very hard decisions.

DR. BREWER: We heard from Mr. Williams yesterday that the speed of the operation and his capacity to do science are unrelated. If it goes fast, he can still do the science. He told us that. So what's your point?

MR. NELSON: Well, my point is that I'm not sure that that's correct. That's a decision that needs to be made, and how fast we do things to that rock in terms of support, rock bolt, shotcrete, whatever, certainly will affect the ability to be the science.

DR. BREWER: Thank you.

DR. CORDING: John Cantlon?

DR. CANTLON: Yeah, Cantlon, Board.

Could you expand a little bit on the role of the National Laboratory? These are DOE's National Laboratories, and, obviously, a lot of the expertise that has been on a long learning curve for the site are there, and obviously you have a big prior investment and so on in that.

And yet, you were commenting on the intricacies of how one can get real oversight management, when they are not under the manager that you want to be accountable.

Could you sort of flesh that out for us a little bit because it does impose a constraint on management that's unique, really.

MR. NELSON: It really does, and that's probably one of the more difficult things that I think we'll be facing over this period of time. I've worked with the National Laboratories for a long, long time, and I have a great deal of respect for their work.

What I envision happening here is developing probably a different relationship than we've really had before with them, certainly within the capabilities of the business. But I really--if I took what Steve Brocoum has in the site suitability and licensing area, he has the Sandia Laboratories really big time in performance assessment. I don't want to get in the position of trying to recreate the laboratory, Sandia, as a particular capability in computers, let's say, in TRW. That would be tremendously expensive, and I wouldn't gain anything.

So what has to happen here is a relationship between TRW, who I want to put in charge of performance assessment, and Sandia. And at the moment what I've done is asked them to tell me what makes sense to them. I think that the current management of TRW feels--the management--I don't mean to imply anything current. But the management of TRW is used to subcontracting work directly. In other words, they

know how to go do a subcontract with an entity to get a function done, and I think their druthers in that context is exactly to go get a subcontract with Sandia. And that's okay with me.

There are other ways, and the National Laboratories, because of the Federal investment and ownership of their capabilities, have to charge extra fees for doing work for a commercial entity. There's a 40 per cent charge. Now, I'm sure I can waive that somehow because they're not a commercial entity doing commercial work. They're doing my work.

But all I'm saying is there are some hurdles to go through if we did a subcontract, and there may be some contractual pros and cons to that.

Now, there's a lot of experience at the Nevada test site and other places where the National Laboratories are directed by a contractual document through their contracts to take technical direction from somebody else.

And so if it makes sense financially or otherwise, they could continue to be funded through their DOE contract, and I could authorize the TRWs to give them technical direction. And that's okay. Right now it's in the stage of those entities working together. It's going to work better if it's their decision and I can support it than if I direct it. And in either way, I can find a way to make it work, and

there are probably pros and cons to both.

DR. CANTLON: Yeah, let me follow up. I, having been a program director at NSF and a vice president for research in the university, I have been through this a number of times. And if you leave the entities to their own devices, every one of them will put on their markup and overhead and kill you with this multiple-tiered overhead situation.

NSF and universities have long since gotten to the point of waiving indirect so that there's only one indirect cost, one party collects indirect cost.

So it does seem to me there are precedents for handling what is, I think, a historically evolved situation where you really do have the key talent in those National Labs who are employees of another contracting firm to DOE. They'd all like to have their little bite.

MR. NELSON: Well, and we have talked. We have not reached an agreement. I mean, there is precedent within TRW, let's say, to waive their fee on money that's passed through where we reach that as an agreement. That's just what you're saying, and we're aware of that. And we've brought it up in this particular case as if we go that way and pass the money through you, we would certainly like you to waive the fee so that we're not paying extra for that.

DR. CANTLON: It certainly clarifies the accountability line if you can do that, and it seems to me one of the

Board's almost continuous criticisms of the project has been management accountability to get what you really want to prioritize the system.

MR. NELSON: I agree. I mean, in one way or another we're going to do that, and it may work--you know, the National Laboratories, those three in particular are going through some very dynamic times themselves, and they're having to find ways to deal with commercial entities, where before they didn't have to, and they could be very arrogant about that. And now it's survival. There are, obviously, other interests.

And so I'm trying to just let that proceed at a--and it's going at a pretty good pace of discussion, and hopefully, I think we know all the tricks, most of the tricks, and as I say, I brought Marshall Bishop down. He certainly is knowledgeable, and Kathy Izell is an attorney who is a procurement attorney. I think I can bring as much talent to the table in those negotiations as they can. So we're working on it.

DR. CORDING: In this multi-layered system, the not only accountability, but the duplicate of functions, I think you mentioned that, that sometimes groups are doing the same sort of things.

Have you seen opportunities to actually reduce some of the duplication that occurs in a system like this and to

be more efficient in the number and use of personnel?

MR. NELSON: Yeah, we're working on that. You know, I'm not going to claim very much success. At a very low level, things like Raytheon Services, there are a couple of key places where Raytheon--where I'd really want to keep the talented people in Raytheon, such as survey, the electrical grid work, maybe a couple others, maybe some of the engineering talent. But the rest of the structure of those probably will go away very soon.

So it's a matter--I think it would be disruptive to really try and bring in new surveyors and not anything that I need to do.

So that's an area where we have gone through a process between REECo and Raytheon and really identify the number of what may seem to be trivial minor items of duplication, and we're working to say, give survey to REECo at a point--have Raytheon do the survey to say the point at the head of the tunnel and then turn over the survey from that point into what direction the tunnel boring machine goes to somebody else. But to really draw those lines so we're not duplicating survey.

So we're at a pretty low level in doing that, but it's certainly the intention.

DR. CORDING: Okay. Dennis Price?

DR. PRICE: You said you anticipated some hard times for

the next year. Could you expand a little bit why you anticipate hard times?

MR. NELSON: In the Nevada office, anytime--I mean, I went through the Rocky Flats years at a time when the program was canceled, and so at Nevada, you have several thousand workers without a major mission. There's a lot of things to do, but I mean even today in that article in the paper, they're talking about hundreds of layoffs. That's a hard time, and I think there will be more of that kind of thing unless a major program comes along.

And now the down side of that, and one of the things that we need to be very conscious of is that as the Yucca Mountain project becomes more of the project on the Nevada test site, there's certainly the potential of this project picking up more of the infrastructure cost, and we need to be very conscious of that and careful of that. And if, in fact, we have to pick up certain parts of the infrastructure cost, then we have to also be in charge of that and be able to do whatever--I mean, there's a $2,500 vehicle motor pool that a good part of is not being used. And yet there are costs, and our project are not using those vehicles very much.

So it's going to be hard from wherever we are, but there are a lot of challenges in that arena certainly through the next year.

DR. CORDING: Bob Matyas?

MR. MATYAS: Bob Matyas, consultant.

Mr. Nelson, early in your talk, you addressed your mission, and one of your goals was to address a cultural change in this organization. Have you given any thought to addressing the matter of sharpening the responsibilities for the various players and the attendant incentives, payment incentives if you will, for those people? Do you have the freedom to do that?

MR. NELSON: Well, the first part, I think yes. I think we're certainly--to me, the whole thrust of this is to sharpen the understanding of the responsibilities, et cetera.

Now, in terms of rewards for that, this is an award fee kind of contract with our major entities, and certainly I have a lot of latitude in changing that award fee structure around. One of the issues is whatever happens, we will have a separate award fee relationship for that technical support entity, whatever it winds up being called, and that will be totally my call.

There are part of the performer organizations, of course, that get us very much intertwined with headquarters, and so I don't have as much latitude in some of that, but some of it I'm uniquely responsible for.

So we have a lot of leverage in that regard.

MR. MATYAS: Thank you.

DR. CORDING: John Cantlon?

DR. CANTLON: Yeah, you may not choose to comment on this, and I certainly would honor your desire not to. But some of the difficulties that have been encountered among the contractors and so on is the end runs that they've been making with their Congressman.

Have you had candid discussions with upper management and some of the Congressional key leaders so that you can get a handle on that?

MR. NELSON: Yeah, let me comment on that because the answer is I've tried to stay as far away from most of that as possible. I had my days with Congressional staffers and a lot of hard times at Rocky Flats, and I really don't need to do that anymore.

Let me say it this way, because I think this is really a telling way: If the organizations involved are opposed to something we do or are trying to do, the measure of how bad they like it or how much they dislike it, however to look at that, is the activities of the lobbyist. And we do have awareness of lobbying entities do because we get phone calls from staffers about what is it this guy told me, or whatever.

I think this is going very well principally because the upper managements of our principal two contractors, TRW and SAIC, are working together. I think they recognize as

much as I that this is something we need to do, and the fact is I'm not aware of any lobbying efforts countered to that, and that's the measure of success to me. I'm getting no feedback that the traditional lobbying efforts are out to kill this thing some way or another, and that's what I was kind of was saying in the beginning when I said it's going much faster than I had even hoped for. I think the players involved have shown some real maturity.

I've dealt with some very high levels in both corporate structures to explain what I'm after and tried to put it in a non-threatening mode. I don't want to get rid of the people. This is a growth time for the program. I want to keep the talent and expertise and knowledge that we have, and our challenge is to find a way to do that. And I've had tremendous support from both contractor managements at very high levels.

DR. CANTLON: Thank you.

DR. CORDING: Dennis Price?

DR. PRICE: A couple days ago at the transportation coordination group meeting, I think I've got--the TCG anyway, right? They mentioned that the rail spur might be funded jointly by NTS and Yucca Mountain, that that was a possibility. And you just mentioned that Yucca Mountain might pick up some of the infrastructure costs involved at NTS. Is there an integration of NTS with Yucca Mountain in

the works here?

MR. NELSON: I don't think so. You know, that could change in an instant by people far above me in the pay grade, so, you know, nothing that I'm aware of is aiming at pulling those two together at this time. There's no real incentive from either side I don't think right now, other than perhaps someone could say, with the manager and the acting deputy leaving, NVO may be--you know, there's a reason.

But I don't think it's in Dan Dreyfus' best interest right now. Field offices in the DOE system get to be fairly autonomous, and this is a project that really can't be autonomous from the headquarters' project.

On the other hand, it could work. I mean, if that were a decision the department made, we could set it up in a manner that it would work. But right now, I don't think anybody's leaning in that direction.

I don't know what is said about the rail spur. I don't know of any interactions among NVO and our folks really in any substantive manner. I've been involved with thoughts of building a rail spur since the day I got here in '78 I'm aware that in the '60s and early '70s, there were plans for rail spurs to support the nuclear rocket program. So there's been an awful lot of history on that, and until something really gets cast in a role where somebody can deal with it, I kind of don't pay much attention to those things.

DR. CORDING: We need to move on. We have a schedule. It is relatively flexible, and we'd like to, I think, continue discussing some of these items further during the open sessions this morning as well. And one area that I think would be of interest to us would this be area of the procurement, particularly thinking at this point of the support for the boring machines, additional machines that might be required, for example, to do alcoves. And because much of the underground work, all of it leads--the critical path leads through the tunnel and much, I think, of the technical scientific work also is the same way, I think there's an interest here as to what can be done to efficiently acquire the resources needed to move the project forward.

So that's one issue that perhaps you might want to comment on this point.

MR. NELSON: Yeah, let me say one thing. Right now, probably the biggest decision in that arena that I see happening is a decision on the conveyor. I would like very much to have a conveyor as soon as I possibly can to be able to make the boring machine operational, what I would call operational.

We can buy one, we can lease one, we can get a new one, we can get a used one. We have all four, or whatever combinations available to us.

There are a lot of people who have history, some of it good, some of it bad, in one of those options or another, and then you overlay that with what we have to work into in a procurement system with some cultural, perhaps, history of how things are done.

I, frankly, think we have a lot of latitude in those decisions, and I don't think we need to really say that because it takes 60 days for this, or took 60 days for something, to do something or other, than the history, or 90 days, or whatever, that that's the way we have to do it.

I think we have knowledgeable, more knowledgeable people in this business on our side than we've ever had before. I spent a good part of yesterday over at the Nevada field operations office talking with their acting assistant manager for administration to assure that, in fact, we had the right priorities for making things like the new or used decision in a contractual sense.

And Marshall Bishop, my assistant manager for administration, has done likewise to where we have some agreements for like a one-week turnaround on things like that.

So I think we're going to have a lot more latitude and a lot more ability to do what makes the most sense for us.

So, you know, that's one that's right at hand right

now and probably one of the most important procurement decisions as far as the future goes that we'll make. The boundaries of that are delivery of a--I mean, an operation of a conveyor system somewhere between February at the earliest and June at the latest, and I'm certainly aiming at February. So I may fail at that, but that's my goal.

So there's a lot of pressure in the system right now to be able to make those kind of procurement decisions in our best interest.

DR. CORDING: Okay. Thank you.

Let's go forward to the next presentation, then, and I think we'll able in the discussion to come back to some of these other items.

Bill Simecka will be making the next presentation. He is the assistant manager, engineering and field operations.

MR. SIMECKA: Well, I just got introduced. I have fashioned an agenda after your questions, and I will go through those one at a time. But because the biggest event that we've got going on ESF right now is the assembly of the TBM, for those of you that have not been out there, I thought maybe I'd spend a few moments to discuss and show you some photographs of where we are.

This, of course, is an artist pictorial of our entire train of the TBM, starting, of course, the head end

over here, control area here. Right behind the grippers and so forth, we will be putting in the ground support, lunch room.

This is a long mapping platform that allows us to map the tunnel as we go without slowing down the TBM, and then the connection to the ventilation and the conveyor and so forth out the back.

Now, it's been mentioned that we are not going to be operating this TBM up to commercial standards. Let's examine that a little bit. This machine cuts the rock the same way, regardless of whether it's on this project or on a commercial project. And we have operators that are commercial operators. We hired Kiewit to do that, and they're going to push the buttons the same way and et cetera. So I don't understand this argument that we're not going to be operating up to commercial standards.

Well, what you're saying is that we delay for some reason, and when we have to delay because we cannot go beyond a certain point otherwise we will lose data, we will delay because that's why we're there, is to get scientific data.

Any other time, if there's no constraint, we ask that machine to go as fast as they can damn well do it.

So I don't believe this argument that we're not operating up to commercial standards. I'll show you some delays that we have to look at later that we're trying to

minimize, and we will have people that will be glad to consult with us, and we will have them on board, that can say, hey, you're not operating that machine as well as commercial standards would dictate. But I don't believe that will ever happen.

So this is a commercial machine. We've added some things to it. We've mitigated the chance of leaking fluids by putting pans and so forth under it so that we don't leak fluids into the soil. That's not a big deal really.

We've added this mapping platform to allow the scientific mapping to go on without slowing down the machine. Beyond that, it's about a commercial machine.

This is sort of the status of it. The name of the machine is an interesting story. Among the employees we ran a contest, and this was the--and we had an impartial group of people, no managers involved, and let them select the one. And they brought this forward as the best one.

Now, we had some people that don't like the sound of that too well, but on the other hand, Bob says, who's going to change the name "muck." So since we're not changing the "muck," let it stand. So that's the name of our machine.

I'm just going to run through some pictures. This is the control booth right here. This orange platform is where they'll do the rock bolting and so forth, right behind the grippers.

This is a picture on the top showing--this is the conveyor run, the ventilation connections and so forth. This is at the back of the machine, I believe; putting on some of the beams. I'll go through this pretty rapidly.

This is the control booth. This shows the grippers lying on the ground. They're about to be installed right now.

And that shows you that the progress is pretty good or essentially on schedule as far as the assembly is concerned, and we don't expect any difficulty. As you know, we assembled the machine up at CTS. They assembled it, so we know it does go together, and so we don't expect any difficulty.

The first item you showed interest in was the construction management. Before I get into that, I want you to understand that from my viewpoint, the construction management that we are going to have in the future is exactly what we envision when we first set it up. There's some clarification that we have gone through to make sure people understand what their roles and responsibilities are, but the basic approach that we started on construction management is holding.

And the issue had to be with what authority does the construction manager have over the constructor. And we expect the construction manager to give technical direction

to the constructor.

If the issue requires a contractual change, we involve the DOE in making the decision on that contractual change. Other than that, he has full technical direction authority over the constructor.

So here are the words that say what I just said, that the construction management organization has been modified, modified by clarification to be a more effective owner, constructor, construction management organization to improve those interactions.

And the roles of the primary participants have been more clearly defined in the CMO, has been empowered to operate more in the manner of a classic construction manager, except in that area where construction--I mean, the contract has to be modified. But on the other hand, the CMO should not, and we'll ask them not to shy away from if a contractual change is required, that they bring it forward right away, and then the DOE will get in there with them to make that contractual change, if indeed it is desirable.

Here's just a list that DOE, as the owner, we have these following functions. Here are the requirements that we still have as an owner. Here's the construction manager's roles, and here's the constructor, which is REECo supported by its subcontractor, the Kiewit/Parsens-Brinkerhoff organization, and here are their roles. These are, as I

know, classic roles for those three entities.

The current status of that activity is that we reinforce that the M & O should assume the full responsibility for the technical direction of the construction on April the 15th. They started to add additional personnel. The construction management plan was revised with some work changes, and the administrative areas, that is the scheduling, cost tracking, cost estimating and so forth, will phase in the April 30 - July 1 period as soon as personnel come on board. They will be doing cost estimating of all the constructor activities and to provide the DOE with an independent look of whether what the constructor is saying is reasonable, based on the experience of the CMO office.

Next subject is ESF design review schedule. This is pretty standard. I'll just flip through this. I think you're all aware of most of these.

The north portal surface facility, Package 1D, June 20th is the 90 per cent review.

Package 2C, the north ramp, we had the 90 per cent review May the 2nd, and we expect to release that for construction around August the 1st.

We have Package 8A, which is the main Topopah Springs level drifting. The schedule for those reviews are 50 per cent September the 26th of this year, and then 90 per cent in February.

The 8B, that is the north ramp extension, February the 1st next year, and 90 per cent review in July.

Package 3A and 4 are, of course, subject to the amount of funding we get in the next year, and the south portal pad and access road, Package 3A of course, will be February the 1st for the 50 per cent, July the 1st next year for the 90 per cent.

Package 4, south ramp, surface to Topopah Springs should be reversed, TSL up to the surface, those dates.

We have some other near-term ESF design activities. Working on the integrated data control system. The 50 per cent review happened June the 7th. Alcove design, that is the north ramp test alcoves, the Ghost Dance drifts and the heater test drifts, 50 per cent review is planned for next August.

We are also doing a mechanical excavation methods study where we are looking at all the different mechanical excavators that are available for alcoves, heater drifts, et cetera, et cetera, and we are--that includes some drill and blast approaches. Hopefully, by the end of this fiscal year, we'll be able to decide whether we're going to buy some additional micro machines or mini machines or whatever, but we don't want to ignore some of the techniques that are being--or some of the machines that are being made available.

And, of course, the Calico Hills access alternative

study, we will do that in earnest early next fiscal year. Dick Bullock presented yesterday one of the alternatives. We're going to be looking at others to make sure that when we go into Calico Hills, it is the preferred way.

As far as the schedule for the north ramp construction, the TBM operations are expected to begin August the 8th. We think we can meet that still.

The initial operations we characterize as start-up testing phase. This is where we've put the machine up against the face. We've put it under load. You cannot determine whether the machine is going to operate properly until you put it under load. So that's the start-up testing phase.

There will be a shakedown phase where you start to operate at a greater number of shifts and so forth, really a production run, if you will, and that will go on until we get the conveyor and the mapping platform. And I want to point out that we've heard criticism about not having the conveyor. We never did intend to use a conveyor for the first 450 feet because you can't get the conveyor in there. We have to always muck that with muck cars until we sink the whole machine, before we can put the conveyor system on. So our initial phase was always using muck cars.

So, as Bob pointed out, we are going to urgently try to get the conveyor on board, and when we do, then we

will declare that the operational phase.

But during this first phase of the start-up testing and the shakedown phase, the advance rate will be low. Obviously, we will be training the crew to operate this thing in a more effective manner, each day getting better hopefully. We've got to test all of the various systems, fix whatever has to be fixed if we do. We also, in the early phases, we will encounter the Bow Ridge Fault at 190 meters, and as you know, the Rainier Mesa material behind the Bow Ridge, there's quite a few feet of that. There's, let's see, 80 meters of it, and there has been concern that that material would slow us down.

What we've seen so far, the constructor is fairly pleased with the fact that this material, while it's friable, does stand up. We did a lot of trenching of deep trenches, and they have stood up significantly. So we don't expect that to be a problem, but we have the contingency to handle it, if indeed there are some short or some small pockets of running material. We don't expect to find it, but if we do, we have ways to work ourselves through it. We will be using steel lagging all the way through that because of that material.

Rail haulage until the conveyor installation. Mid-'95, that's the latest. We're trying to move that ahead to February. We hope to complete the north ramp early in '96.

Now, the Rainier Mesa material is in this area here, and I just included those in your package because I thought maybe you'd want to look through that. I don't intend to go through that unless there are some questions.

The last topic is the strategy of ESF within the proposed program approach. That is Scenario A. As we see it now, this is sort of a situation with exploratory studies facility. There's a lot of flexibility on the dates that it will take to get through that complete loop, and I'll try to walk you through that, get you to understand that we will be making real time decisions that could affect that. But basically, we are going to try to get through that and get all of those, the north ramp extension and so forth, at the most efficient rate that we can.

The other thing I want to point out, that we have moved the MTL over to the north--off the north ramp extension. We intend to put a few drifts around there, that north ramp extension, to get those heater tests started early.

And you can see that we can complete the north ramp early, fiscal '96. And for this whole loop, we have 508 days of operation, but there's some adders. There's two turnouts; one for the north ramp extension, one for the Calico Hills. There's one--we may not go down to the Calico Hills in the north ramp, so we could eliminate one of the turnouts.

Switchgear niches; we have, I believe, while we designed niches to sink the switch gear into the wall so we can get a walkway, we've decided not to implement that, and we're probably going to put that switchgear, the transformers and so forth, just onto the wall, and maybe defer the walkways until later.

As a matter of fact, the approach we're taking is-- and I know people have been kind of critical that the design seems to be a Cadillac design. Well, the approach we've taken is we've designed all of those features in there, but we have the choice of whether we implement them. But we at least know that if you have to go back later and put in those features, you've allowed a place for it.

So I think what we'll be doing, and it will be a decision that we make as we go along, that if we see no reason to sink the switchgear niches for the exploratory studies facility, or make the walkway, we'll leave those out. Later on when we design a repository, if we get that far, they can sink these things in there if they want, make it more of a permanent situation.

Six alcoves. It will take us some time to install the conveyor once we get the conveyor on board. There are a number of sumps and refuge, and then there's a program delays. I look at that as contingency. You know, we don't know whether there's going to be a program delay, but if

there is, we've allowed a little bit for it.

The excavation sequence, we will complete the north ramp with TBM #1 and Alcove 1, which is existing, and 2, 3, 4 and 5 concurrent with the TBM operations. That's what we're hoping to do.

We will acquire a second TBM, lease or buy, new or used, TBM #2, during next fiscal year.

We'll begin the excavation of the north ramp extension with the TBM 2 just as soon as the bigger machine gets around the north ramp bend and has done a stub for us. We will hopefully have the smaller machine, TBM #2, ready to start the north ramp extension, which means we have two headings simultaneously. And the purpose of that, of course, is to try to get the heater test started as soon as possible.

Then what we will do on the excavation of the north ramp extension, we have a lot of flexibility, but we'll probably run that north ramp extension machine, probably a three-shift operation because we want to get down there as fast as possible.

As soon as we pass the area where we're going to put the side drifts for the heater test, we could, if money was a problem, we could slow that down to a single shift and put our money elsewhere because that 18-footer could be used to go up to Solitario.

On the other hand, if we need that for Calico

Hills, it will go on until it gets to the end. We'll dismantle it, take it to the Calico Hills.

But TBM 1 proceeds with the main drift excavation in parallel with the north ramp extension, and the reason for that, we'll probably operate that money allowing as fast as we can because we want to get to Ghost Dance as soon as possible, because that's a key to our Calico Hills decision.

After we've made the Calico Hills decision and did the Ghost Dance drifts, we could slow that one down and let it go ahead and finish out the loop. There's no urgency for it--to finish it very rapidly.

So you can see we have a lot of flexibility. I've just said this one. I think I've talked about all of that.

That's all I have. Any questions?

DR. CORDING: Okay. Thank you.

On the schedule on the heater test drifting, what date would that be completed, then, or the schedule, the present schedule?

MR. SIMECKA: I can't answer that one. See, there will be four--right now we're thinking of four heater drifts off the north ramp.

DR. CORDING: And that would be done with the same machine backing and--

MR. SIMECKA: No, those will be smaller drifts.

DR. CORDING: Oh, I see.

MR. SIMECKA: Could be smaller drifts

DR. CORDING: Good.

MR. SIMECKA: If we had our mini machine or the micro machine, we may use that. If we can't get one of those on board for whatever reason, we'd do drill and blast if we had to.

DR. CORDING: It sounds like it's going to be--by the time that's completed, it's going to be close to 2000 or something. Is that--

MR. SIMECKA: No. Can you help me, Dan?

MR. MCKENZIE: Yeah, Dan McKenzie. We would certainly want to be getting the drifting done off of the north ramp extension that would house those heater tests probably in fiscal '97. That's the whole point of driving that one in parallel with the main drift so that we can get something started down there as soon as possible.

DR. CORDING: Well, that would be the completion of those or the start of those?

MR. MCKENZIE: Being kind of wishy-washy. We could start them, I would hope, in fiscal '97. I wouldn't want to speculate because we don't even know what they look like or how long they are yet. The heater test has to be better quantified.

DR. CORDING: Yeah, I mean, you may have several thousand feet of it certainly to deal with.

MR. MCKENZIE: Conceivable, right

DR. CORDING: Yes, Lee Renegar?

MR. RENEGAR: I'm Lee Renegar.

What's been talked about, I've talked to Ned Elkins about it some, and the initial idea is that they'll be as short as possible. We've talked in terms of a couple hundred, say 400 feet. Talked in terms of two pairs of drifts to do the testing out of.

So it's possible that they could be finished in '97. You're not talking about real long term excavation sequence.

DR. CORDING: And possibly using something like a two meter machine or--

MR. RENEGAR: We're talking about possibly a two meter machine, and then we've looked at equipment that will fit through that and then drill and blast at the end to slash it out and do the drifting out of--or do the drilling out of, excuse me.

This is all preliminary. We're just looking at this and trying to fit the machinery together and trying to fit the schedule accelerated as much as possible. So it's very preliminary.

DR. CORDING: Jack Lemley?

MR. LEMLEY: If you could go back to this viewgraph for a minute, please?

The question that I had--Jack Lemley, consultant. The question I had starting with the values listed below the 508, the 36, 140, 47, 26 and 20, why are those additive to the duration? I certainly agree the 85 is probably worthwhile as a contingency, but that work could all be done concurrent with the TBM continuing to operate. So why is that?

MR. SIMECKA: Well, because you have to get off of the main tunnel to provide a niche, and if you're going to use drill and blast, you can't operate drill and blast while doing drill and blast behind the TBM.

MR. LEMLEY: I think if you challenge your contractor, you'll find they can. We built 450 rooms off of the Channel Tunnel while we operated 11 tunnel boring machines and a double track railway to support it all. I just don't accept that you can't build those and have to ship the TBM.

MR. SIMECKA: Well, we're looking at that now, but the first few feet, we believe that you probably will not be able to operate the TBM.

MR. LEMLEY: Well, I have done it.

MR. SIMECKA: Well, it's a safety issue, so we will be looking at it. If it's safe, we'll do it. But right now, we don't believe it is. And as a matter of fact, how quickly you can get off of the tunnel sufficiently far so you can resume the operation will be looked at. The TBM will--when

there's maintenance down time and everything, is the time to do those sort of things to offset the delays, minimize the delays. We'll be doing that. But we aren't going to potentially do anything that we don't have to do.

Any other questions?

DR. CORDING: Yes. Dennis Price?

DR. PRICE: What is the relationship between your state of information about gaseous pathways and plans to drill and blast?

MR. SIMECKA: Dennis, can you answer that?

MR. WILLIAMS: Dennis Williams here, DOE. I don't think I understand the question on relationship between drill and blast, pneumatic pathways.

DR. PRICE: Gaseous pathways.

MR. WILLIAMS: Do you mean the relationship between just the total excavation and the pneumatic pathways issues or--

DR. PRICE: And creation of, yeah.

MR. WILLIAMS: Oh, the creation of pneumatic pathways with the drill and blast effort?

Maybe I'll call on Bob Craig, U.S. Geological Survey, our technical folks.

MR. CRAIG: I'm not real certain if that was a fair punt to me or not, and I guess I'm not much clearer than Dennis was on where we're going.

Do we anticipate the drill and blast operations in

the alcoves and such will open up things, we won't get a representative set of data? I guess maybe that's the question.

The answer is not based on what we've seen previously in G-Tunnel. If you look at our testing plans, you know, one thing we're trying to do is one, get away from the effects of the TBM operation in the main drift itself, or the ramp, away from that 25-foot opening. But if we've still got, obviously, the alcove opening, but our drill holes are designed such--you know, they're typically on the order of 30 meters in length, which we feel is far enough to get away from the effects of the drill and blast operation. We've looked at some hydrochemistry impacts from the explosives in the first alcove, trying to minimize those.

I guess at this point, in going back to your question relative to gaseous pathways, near to the alcove, certainly it's going to induce some effect. But we think we're far enough way from the effects of the excavation in our planning. We'll continue to look at that as we test, but right now, we're relatively comfortable with it, I believe.

DR. CORDING: Garry Brewer? Oh, I'm sorry.

Tony Ivan Smith?

MR. IVAN SMITH: Yes, Tony Ivan Smith.

You made a comment. Mr. Simecka made a comment relative to the classic role of the contractor manager

engineer, and I would find that this role here is somewhat unique.

In his definition, Mr. Nelson has said in changing the hierarchy in some other components, REECo sits kind of anonymously in this situation here. Do the employees employed in the tunnel actually work for Kiewit or actually for REECo? What is this--for the definition of this REECo supported by Kiewit as constructor? We do know that the tunnel boring machine was purchased through REECo with this--I understand a large G & A cost to it, and all equipment being purchased by REECo will also have this G & A. So this is the two questions I have.

DR. CORDING: Well, Bill had an emergency, so he just left.

MR. IVAN SMITH: Yeah.

DR. CORDING: Maybe Dan--Dan, could you answer that--McKenzie, or is that the proper--

MR. IVAN SMITH: Well, we could reserve the question until later on.

MR. CARLSON: I'm Dan Carlson with REECo. Of course, Kiewit is our subcontractor, and they will be handling all the underground operations, full responsibility for TBM operations, and it will be Kiewit personnel operating the TBM.

MR. IVAN SMITH: And all purchasing will be done

through--by Kiewit will be done through REECo?

MR. CARLSON: It depends. On the major capital equipment procurements, REECo will be doing that. Some of the smaller stuff, Kiewit will be procuring materials.

MR. IVAN SMITH: Thank you

MR. MCFARLAND: Would you clarify that? REECo is the DOE procurement, provides procurement services for the DOE?

MR. CARLSON: As for all major procurement activities.

MR. MCFARLAND: Now, how will you make a distinction, then, between what the construction contractor buys and what REECo buys?

MR. CARLSON: Well, in the case of--let's start out with the big one, like a tunnel boring machine. If we're talking a second TBM or a mini bore, REECo would be doing the procurement.

Materials I think supplemental to the tunnel itself, the ground support equipment in the tunnel in support of the tunnel operations, Kiewit will be doing some of the procurements.

MR. MCFARLAND: When Kiewit purchases equipment, is that purchase as a private contractor obtaining materials from commercial markets, or is it as an agent of the government, as REECo is?

MR. CARLSON: Yeah, they're actually in our behalf.

MR. MCFARLAND: Then they will have to function by

government procurement regulations?

MR. CARLSON: That's correct.

MR. MCFARLAND: They can't bring equipment to bear on the job, that is through Peter Kiewit?

MR. CARLSON: They could if, you know, the need is justified.

DR. CORDING: Dan, the start-up phase here, shakedown phase, is prior to insertion of a conveyor, is something on the order of 7 to 10 or 11 months. And from what I've seen in the tunnel boring projects, the shakedown phase is usually where you see slow progress in one shift operations. It's usually in the order of a month or two.

And the opportunity to make significant progress and to have a long enough line to justify the conveyor belt could be--would seem to me to be much earlier than seven to ten months. And so I'm wondering if, is there some way that this first run on this could be done in a more rapid approach or more of a full mobilized approach? It seems to me that there's a long time here when you're not mobilized and not able to operate the machine to the capabilities it has. And I'm not talking about delays for science, I'm talking about delays because of procurement.

MR. CARLSON: You're absolutely right. There's probably two things here. One is the--we initially had a funding program in getting the procurement started for the subsurface

and the surface conveyor systems, and another, which you alluded to, the words "shakedown," which have some political implications, which I don't think I want to address.

MR. CORDING: We're talking about--you know, we're talking about six more months on a schedule that is--you know, I mean we're working on deadlines that are of site decisions, and, you know, to me, this is an extremely important issue, and the Board is going to be asked in a few years to say that we agree that the site is suitable or that the work has been done.

And I just think that we've got to be very careful about making sure that we are making reasonable progress with the resources that we have.

MR. NELSON: Could I make a comment?

DR. CORDING: Please.

MR. NELSON: I'm Bob Nelson. I think we have a lot of latitude we haven't explored in the procurement process, and I noticed as a couple of the comments were being made, my AMA right down the line there, Marshall--stand up a minute--was shaking his head no. So I guess I'm not convinced we've explored all of our options there. I can't say they're wrong, but I think we have, we the DOE, have a lot of latitude. Certainly, I think there's a benefit to us in having a centralized procurement, rather than have multiple contractors doing things in different ways. But on the other

hand, I think we have latitude to do what makes sense, and I also think we have ways to cut the time. And that's, as I mentioned in my comments, that's something we're, Marshall in particular, is exploring, and hopefully we'll be able to make some changes.

DR. CORDING: I think some of this is, in terms of having the things to support the operation and make it efficient is some of what I think has been what I've interpreted that our consultants are saying that we aren't meeting the standards of the industry. It's not that there isn't good equipment on the job and good people on the job and capable organizations, it's that I think that they're being hamstrung by not being able to do the things that they're capable of because of some of these constraints that I know that are tough issues that you're trying to deal with.

MR. SIMECKA: Could I make a comment there?

DR. CORDING: Please.

MR. SIMECKA: We are not putting artificial constraints on our people to work as fast as they can, et cetera. There are a lot of problems that take time because we have to go through certain procurement regulations, et cetera to make sure we do these things. There are DOE orders that we have to respond to, et cetera, that you normally may not have to do on a commercial job.

And all I can say is we're not holding up these

people from moving as fast as they can. We make decisions as quickly as humanly possible. We don't have to wait for decisions from headquarters on a number of these things.

So I think that what you see as a potential schedule is worst case. We're going to beat that a number of ways. We intend to do that, and the real test is after we've operated a little bit, we will have consultants come in. I intend to have consultants that will talk to the DOE and advise us whether we can make things go faster in one area or another.

And so I think if you give us a chance, we'll show you. But the attitude is not to do this business as usual, so to speak, because we understand that the cash flow that we have here is high, and if we delay for unnecessary reasons, it costs us money. And that's not--DOE cannot do that.

DR. CORDING: You know, the thing that--we'll be interested in seeing what's happening once the TBM is operating and is going, but the decisions have to be made now. To be efficient with these operations and to integrate all the things that have to be done in this facility, it's got to be done now.

And, you know, they're already beyond the time when a contractor would, you know, coming on a job, the first thing he does is make sure he can get his equipment in there, you know, as soon as he can give his portal developed,

equipments ready to go. And so that's part of, I think, what this--it just seems to me these decisions are the things that take away from doing the scientific work that needs to be done on the project. And that's where it is, in addition to this cash flow issue.

So I'm pleased that you're looking at this, and I think it's an extremely important issue. I think this is about the last chance we're going to have to really have an impact on it in the project because it really seems to me it's got to be done now.

MR. SIMECKA: Yeah, absolutely. We understand the urgency.

DR. CORDING: Thanks. Any other questions on--I've been talking and not listening, doing my job as a moderator here.

DR. BARNARD: Bill Barnard, Board staff.

Bill, do you have any comments on a geoengineering board?

MR. SIMECKA: I'm getting together some names right now. As I said, as owner, DOE owner, we ought to have a board that can advise us as to whether all the contractors and so forth are doing things that maybe they're not aware of, or whatever, that we can do better. So I intend to put together one that is advisory to the DOE.

DR. BARNARD: Do you have any schedule for that?

MR. SIMECKA: ASAP, so to speak, but I don't know how

long it's going to take me to put it together with all the paperwork and everything. The M & O is right now getting all of the paperwork in place for a number of people that we can call on, and I'll just have to look through those to decide which ones I think are most efficient.

I don't intend to have more than three or four people. We may call in other people from time to time when we need expertise, but in general, I think you have about three good people, and I'm willing to take advice on that from people who know more about these kind of consultant boards. But I intend to do that.

DR. CORDING: Tony?

MR. IVAN SMITH: Yes, Tony Ivan Smith.

Yesterday there was a comment made about the conveying system, which I want to address.

The tunnel boring machine requires a mucking system or conveying system, and in the case of the English Channel, we selected a rail-mounted system. Here you selected a conveying system? We brought it up in a meeting here in this room here, a year and a half ago November.

It seems to me the importance of the TBM and its conveying or mucking system is rather like an aircraft carrier with its airplanes. To delay the project up until this following summer, to actually be able to complete the

installation of the conveyor belt relative to the schedule might have a much higher cost in delay than a--for example, for PDQ to be authorized to lease, purchase as a part of their contract immediately.

I think this has become a level of criticality, and this is the comparison we have between the commercial practice and the so-called scientific program. There seems to be a wall that needs to be resolved a little bit later in the discussion, and I think these decisions are very imperative.

Well, anyhow, yesterday it was mentioned that one of the concerns was the segregation of material for future utilization of the project. Well, this is a decision to be made multi years from now, and the cost of that, let's say a million or two million dollars just to be able to segregate the material on the surface, is minimal, but it has a maximum cost on the project today.

So I feel that maybe in this conveying decision, to utilize it for a dual purpose is going to be an extremely negative factor for you.

MR. SIMECKA: Can I have some help on that one? The requirement to segregate is not mine, so I don't know who--do we have anybody that can address that?

Thank you, Dan.

MR. MCKENZIE: I can't say that it's my requirement

either, and it's more of a performance assessment type of concern to segregate the welded tuffs from the bedded tuffs, for whatever reason. It has to do with decommission, and you're right, it's something that happens a long time from now.

But that is being worked, and it's not a done deal that we're going to do that, at least in my knowledge of the project.

MR. IVAN SMITH: But it has the most negative effect on the project right now, anything that I can see. It totally constrains the performance of the machine. A tunnel boring machine typically operates, let's say national average 41 to 51 per cent of the day. And so now this machine is being restrained for a year to an adoptive technique of mucking. It will not be able to go through a full cycle. And so what you're doing is reducing that, I'll just say 41 to 45 per cent down to 20 per cent, which is why we're making these comparisons to commercial practice.

MR. MCKENZIE: I don't think there's a direct comparison. Maybe either I'm confused or maybe you are. There's no impact. I don't think whether we're running on a conveyor or running with muck cars has anything to do with the muck segregation.

MR. IVAN SMITH: Oh, no, no. But the decision to make muck segregation now has a greater effect on the performance

of the machine. It's the greatest driver, and it should be ignored at this time.

MR. SAUNDERS: I can add a few words. I'm Bob Saunders with the subsurface design.

The decision to separate the muck, welded and unwelded, came about from a letter that Sandia wrote to us, and we investigated that. Our conclusion was, basically there was no point in separating welded and unwelded tuff. We thought we'd put that one to bed.

However, they came back at us recently and asked us if it was possible to separate some of the unwelded tuff. And the only place that we're going to see any amount of unwelded tuff is in the upper part of the ramp where we would be mucking with--or removing muck with rail cars, or the conveyor won't be installed in that point. And that's in the Bow Ridge Fault area.

Beyond that, that is just too complicated a process to try and separate it. However, they have asked us to see if we can separate Calico Hills from the rest of the material, and we're saying we're looking at it.

Now, since then, there have been other developments, one of which is a concern from performance assessment. The material, if it's going to sit out on a muck pile for 100 years, is likely to be so contaminated with organic materials, is to be unfit for backfill. So that's

another issue that's being looked at at this point.

DR. CORDING: Thank you.

All right. I think at this point I'd suggest, perhaps, we'd take the break ahead of Dean Stucker's presentation. Let's do that for the 15 minutes here, and we'll get back to the session at 10 o'clock.

(Whereupon, a recess was taken.)

DR. CORDING: We're ready to begin. Let's begin our session now.

Our next presentation is by Dean Stucker, and Dean is lead project engineer of the repository/waste package/MPC, and we're looking forward to his presentation on focused ACD strategy.

MR. STUCKER: All right. Well, thank you. I guess we saved the best for last here this morning.

I hope to discuss with you this morning some things related to our ACD process. I wanted to talk a little bit about our strategy, talk a little bit about the requirement documents that are related to our advanced conceptual design efforts, and the key assumptions which are tied in with the strategy and the requirements documents hierarchy, and then separate a little bit and talk to you about what our management strategy is related to the thermal loading, and then talk a little bit about the ACD schedule and what our summary report is looking like, what the initial content is

going to be.

I've talked to you in the past about our strategy, and I put together this cartoon to depict it a little differently. Because of the MPC decision and the baseline changes that the Department of Energy made early this year, we've been able to take a strategy that focuses the repository waste package efforts even further, and that strategy is kind of contained in this viewgraph.

We've got a requirements hierarchy that we baseline, and within that requirements hierarchy, there's a lot of, let me say uncertainty. There's a lot of to be determined, to be verified, or to be resolved, items related to 10 CFR 60 and other requirements.

Our strategy is to, as I mentioned before, is to make some good judgments, some basic assumptions related to those items and control them in a document we call our control design assumption document. Along with the requirements, we want to make some assumptions related to the concept of operations for the repository, potential repository, Yucca Mountain, and the waste package, and we will develop those through a functional analysis and list those in the control design assumption document.

And then there's some site data that we have not yet generated through the site characterization efforts that we'll make some basic assumptions on and also control those

in the CDA document.

And how all this thing works is this part right here, the substantiation, separate from getting people together and assuring that we're making the best judgment at this point in time, we want to take each one of these assumptions, develop some plans and then substantiate those, whether they be in the scientific design basis area or just in good cost trade-off or health safety benefits, go back and substantiate that, indeed, those assumptions were the correct assumption to make, and once they have been substantiated, feed them back in and make the baseline changes to our requirements document or back to our RIB as we substantiate those.

If during this process we find out that that assumption is wrong or needs to be changed, we'll come back, make a quick change to the control design assumption document, look back into our architecture, our design effort, and see what impacts and changes that requires.

Now, along with this control design assumption document, the DOE team that is responsible for the development of this process felt that there are some key assumptions, there are some key elements, either in the requirements or in concept of operations and possibly in the site data that are important enough to pull out and control at a higher level, or to assure that you don't change those

key assumptions unless this administrative panel within DOE is aware of it and basically gives it blessing to say, yeah, go ahead and change that key assumption.

So there are a certain set, a small set that we've pulled out and we've elevated to the next level. And that's kind of highlighted in our document requirements hierarchy.

This is our technical baseline where we control through the QA process all our requirements. And for us in the disposed waste here at Yucca Mountain, we're guided by the MGDS requirements document at the program level, which is highlighted here. This is the program level. This is the project level. These are the documents that we develop that tie back into the program documents, and then this is the AE level, the M & O level, and this is where currently we're carrying the control design assumption document.

And these items are assumptions that we feel are important, the key assumptions. What we're saying is we're pulling those back up and saying, gee, the project wants to have some say in changing those.

And this morning I want to review with you where we are with those key assumptions because that is a major driver to the advanced conception design as we go forward.

We divided the key assumptions into two categories or two groups. Group 1 were assumptions that we felt affected other project elements or program elements and were

important enough, again, to raise to a higher level, but we felt that these assumptions, through whatever decisions or processes had gone on in the past, were already made. We felt that we were already here for whatever reason, whatever rationale, and that we wanted to just identify these, assure that we had made the right assumption along the way and list them separately.

And I'll go through these very rapidly over here and just talk about them. In Group 2, then, we'll talk a little more detail, which are the ones that we felt we needed to bring some specialists together, and I'll get into that in a moment.

For the first one, tunnel excavation method, we felt the assumption definitely has already been made, that we're going to excavate mechanical, and that where it's impractical to use mechanical methods, drill and blast may be used. I think that fell out of the ESF alternative study several years ago.

Rod consolidation. Although currently in our technical document hierarchy, back here we're currently carrying that we will consolidate at the repository. We need to change that, we're in the process of changing that right now, in the fact that we won't consolidate at a potential repository site, and that we will remove it from the technical baseline.

Emplacement mode. Because of the MPC decision and where we are right now in our process, we're assuming the waste package will be emplaced in-drift in a horizontal mode.

And I caution people just to realize that, again, these are our first shot, these are our first--our best judgment at this point in time of what these assumptions should be, and as our process continues on through ACD, we may very well change these assumptions and look at what the impacts are and adjust from there.

Underground transportation. Because of the MPC decision, the large waste packages, we're looking at an integrated rail transport for the subsurface, and rail will be used for transporting supplies and personnel to the extent practical underground.

For criticality, and I could spend a lot of time on this one, I'll just say that we're going forward assuming that to some degree we'll receive burn-up credit, and that will be the major emphasis for our criticality concerns. We are looking for alternatives also, but that's our primary assumption at this point.

Waste package shielding, we're looking at the containment barriers will provide sufficient shielding for protection of materials from radiation enhanced corrosion, additional shielding for personnel protection provided on a transporter and in surface facilities. So we're going to

provide some additional shielding in the transporter to get the waste packages underground, but the individual waste packages themselves will not be shielded for personnel limits.

I think this is an important one, although it doesn't look like it. The repository horizon, of course, will be Topopah Springs, the TSw2 unit, and in this part, we are only looking at continuing the design in the primary area. The SCP defined the primary area, and it was later adjusted somewhat with the ESF alternative study, and this is the area that was laid out in the SCP. And because of the recent changes in the MPC decisions and the ramp slope changes, we have a new primary area, which is outlined here, with the new layout.

But what we're saying is we're going forward to assure that any of the designs that we do stay within that primary area. We're not looking for an area beyond that at this point in time.

Retrieval strategy. We developed a retrieval strategy. If you look at the SCP, there's a strategy that was developed back at that point in time. We had a strategy paper that was identified in the early requirements document, OGRB-2, and basically we've picked that back up, made a few changes to it, but we're following the strategy that was identified at that point in time.

The repository will be designed, proof of principle, for a retrievability period of 100 years after initial emplacement of waste. This was one element that was changed. It used to be 50 years, but because of the PPA approach, we have now changed that to 100 years.

The retrieval of emplacement waste will be performed for two reasons: Failure of the site or waste package or some other system causing a possible risk to public health, and two, if it was determined that there was a need for economic considerations.

The repository design will not preclude the possibility of constructing facilities for a temporary lag storage of the retrieved waste packages, if required.

We have the details on what that strategy is, and we'll be releasing it with the initial ACD report, which I'll talk about when we get into the schedule.

We have an assumption related to the fault stand-off distances for subsurface. Basically we're saying that it's a 60-meter stand-off distance except for the Ghost Dance Fault, and I think we explained why here. Exception: 120 meter offset will be used on the west side of the Ghost Dance Fault because of the ESF Topopah Spring main drift will be excavated before the Ghost Dance Fault is fully characterized.

But these are the assumptions that the designers

felt that we needed to list to go forward to do the next phase, to get into the advanced conceptual design. For suitability, complete containment strategy. What we're saying is basically live within the 10 CFR 60 words, and we want to do a design goal--we want to achieve a design goal with a mean average waste package lifetime well in excess of 1,000 years. So for a mean average, we're looking at a waste package in the 4 to 5,000 year range.

A fraction of the waste packages will be breached at 1,000 years, is less than 1 per cent. This is a driver back to the design on how we proceed.

And that leads us into--I want to spend a little more time with this Group 2. As I mentioned, we felt there were some areas, some key assumptions that we need to make, that we wanted to call in some specialists in both the technical and the program area. We wanted to make sure that we made the best judgment related to some of these type assumptions, and we had a workshop over the last month where we did bring in specialists from the program, brought in some university people to help assure that we're making the best judgment possible at this point in time with our knowledge, to assure we meet the technical requirements from our knowledge right now, and also the program requirements, our program needs of cost and schedule.

And so we made some assumptions related to waste

type and quantity, which is a driver of the design, backfill strategy, and I'll go through these.

As far as our initial assumptions related to waste type and quantity--and this was worked with the accept waste people out of headquarters and the people here at the project. And our current assumption, then, is related that rail shipments total approximately 3,800, 3,300 MPC, and high level waste 500, with three spent nuclear fuel train cars per rail shipment.

Truck shipments total approximately 1,900, all uncanistered spent nuclear fuel.

Receipt at the repository starting in 2010, if the site's deemed suitable, and ending in 2033.

Receipt and emplacement rate in accordance with the repository requirements document Table 3-3, which is really a steady state rate of 3,000 MTU per year spent nuclear fuel, and 400 metric ton units of equivalent high level waste glass.

I've got a viewgraph here that maybe puts that into some perspective.

I think it works out that the 3,000 MTU per year, and I showed this before, this is a 21 PWR/MPC. It's basically one of these a day when you're up to that unit--to that level.

Total capacity would be 63,000 MTU of high level--

or spent nuclear fuel, and about 9,000 MPCs and some uncanistered spent fuel packages.

Average spent nuclear fuel, 22.2 years old with 42.2 gigawatt for MTU burn-up for PWR.

We've expanded these in some areas to cover the other spent nuclear fuel elements.

No repackaging of the MPC for purposes of head load tailoring.

And total high level waste, 7,000 MTU equivalent in 14,000 high level waste glass canisters of the Savannah River/West Valley design.

Another area, a key assumption, that we sit down and talk. At this point in time, we're saying that we think we can meet all the technical requirements and the program requirements by saying we'll develop and go forward on a strategy where we will not backfill the emplacement drifts. We feel that we can meet the requirements without backfilling, so we're going to proceed down that road, try to substantiate this, that we do meet the requirements without backfill.

Surface facilities location we wanted to re-look at, assure that we had the right surface facility identified in the SCP for characterization reasons. If we now wanted to change it because of the different ramp slopes and the changes in the program, now would be the time to identify it.

And we're basically saying there's no real change in the area for the surface facilities. The ramp on the north side is still the least inclined, and that would be the rationale for leaving it there for future repository considerations on emplacement.

Operation of generated waste disposal, at this point in time we're saying that the generated waste would be taken care of basically on site in the geologic repository operations area. We're looking at what are the designs to handle the generated waste at the site and what would we need to do to assure that it stayed there on the site. Whether that be on a surface burial or back in the repository, yet to be determined.

Subsurface robotics, we're basically--we're basically saying for subsurface, we're wanting to limit the use of robotics. We want to use remote handling where possible and limit the use of robotics because of the concern for large, very hot, heavy packages. We want to make sure that we're not trying to go beyond the state of the art on our technology. So that's basically what the idea on this one was.

And this is probably one of the most important ones, the driver. We'll spend a little bit of time here, and then a little bit later, talk about what our decision strategy is.

Our current repository thermal loading assumption is this: That we're going to develop--basically go forward on one surface/subsurface concept, one surface/subsurface architecture or configuration that will accommodate a thermal loading operation range of a high 80 to 100 MTU per acre, and an alternative lower thermal loading range, operating range, between 25 and 35 MTU per acre.

So we're looking at, and again, one configuration that you can operate in two different ranges. We felt that at this point in time, we can meet the requirements for the full range from here to here, but we felt that there were some advantages when you look on the programmatic side to say, let's look at the lower range and the higher range of the range that we feel that we can live within. And so we have a primary now operating configuration that would be at the high range, and an alternative configuration that you'd operate at a lower range.

Develop a waste package EBS design to accommodate the primary and the alternative thermal loading ranges specified above. And that basically means we may go forward with a single concept surface and subsurface that you can operate at a higher or a lower range on thermal loading, but the design of the waste package will have to be separate. You're going to have a different design of the waste package for the lower range because of the environment it may see,

and I'll get into a little bit of that in a moment.

I'm going to go through the rest of these real quick.

We're saying that a preliminary decision on how you're going to operate the repository would be made both in 2001 of the potential license application, and then at 2008, which is a license application amendment to receive and possess.

So at both those points, you'd make some preliminary determinations on what range you may submit that you're going to operate, but the decision would not be made until well into repository operations. You could back out of one of the operating modes and look at operating in a different configuration, if you felt you weren't going to meet the requirements or program needs.

And that we will design an area for performance confirmation for the alternative approach, whether it be the primary alternative. We will design a performance confirmation area that we can operate for whatever the thermal loading range is that we're not going forward on.

So you have the information for both high and low, depending on what that decision or that preliminary decision might be.

And this waste package containment barrier materials, based on the assumptions for the thermal loading

identified here, we had a week long meeting with all the participants, especially Livermore, to develop what our assumptions should be related to the barrier--the number of barriers and the material. We're sure that we're following the thermal loading assumptions and that the material for the primary or the higher range would be an inner containment of alloy 825 and an outer containment barrier of carbon steel.

And the assumption for the alternative, the lower range is three barriers, an inner, a middle containment barrier and an outer containment barrier of these materials.

Now, as we go forward in the testing program, we will be testing other candidate materials, the number of which I think is dependent on our budget, but we are definitely carrying a number of other materials in our site characterization testing program. Should we find out for some reason that we want to adjust these, we can hit the ground running, and we'll have the information on those.

That can probably be highlighted as to what some of our current working concepts are for the waste packages. I mentioned last time I met with you that we're looking at four waste package designs, the first one being a 21 PWR, this being the primary case, which has two barriers, and this being the alternate case, which has three barriers.

And the level of detail that we've been able to generate on these now is quite significant as we go forward.

So that's the 21 PWR.

Here's the current working concept of the 12 PWR/MPC. Again, for the primary thermal load case, two barriers for the alternate thermal load case, three barriers with the material listed.

And the same with the uncanistered concept--I think the primary case. An inner barrier that we would load at the repository with an outer barrier, an inner barrier with a middle barrier and an outer barrier for the alternate case.

And then for the fourth design, the high level waste glass canister. Again, the same kind of approach, two barriers with the four high level canisters, two barriers--three barriers on that concept.

And that kind of leads me into some discussion, then, on what our management strategy is at this point in time related to thermal loading. It has preliminary on here because we are still in the process of assuring that we're integrating this from a design perspective with all the rest of the participants in the site characterization, and we're still going forward on this to make sure we're on board.

The yellow area really kind of looks at what the decision points are for DOE, and the initial design assumptions we show being made in '94. This important substantiation of the design assumptions, we have some status checkpoints along the way that you really have data input to

ensure that you're making the right preliminary assumptions as you go forward, just kind of checkpoints; and the operational assumption, again, which is tied in right now, this is how we may operate it with a preliminary look at it before license application if the site's determined suitable, and then another strong look at it before you do the license application update. But the point being that you're not going to make any kind of final decision until sometime way out in the repository operation. I don't know what the date is out here, but it's sometime well into repository operations where you really have actual site data from the performance of a repository to say, yeah, these preliminary decisions were right, or no, we want to change it and reconfigure the underground, the subsurface area for different thermal loading range.

We're looking at information needs to go back up and support some of these early preliminary decisions. I broke it down into two areas, engineering and PA. The tests that are identified here are the tests that were identified over the last year for thermal loading, and these are listed here. I think as you heard earlier, we're looking and reviewing to assure that this, indeed, is what we need to support some of these decisions. And it's interesting that most of the information that we're getting out of these thermal loading tests are related to the long-term, post-

closure, or the PA aspects, and not really the engineering needs right now to go forward and design a waste package or a repository.

There are some needs, though, however, that we do have, and we're looking at a very aggressive, very encompassing materials testing program for the waste package. and I put TBD here, and it really shouldn't be TBD, but the constructability aspects that we're looking at from a design perspective are really tied in to some of these tests, and I wasn't able to articulate them and understand them to the extent that I want to. So this probably should be to be verified at what the constructability aspects are that we're using to drive the design from these tests. We want to go back in, and we're in the process of reviewing what those might be.

So that kind of covers what our management strategy is related to the thermal loading decision as we go forward, and that then ties into our current advanced conceptual design schedule. We're proceeding on this. I put preliminary because there's two areas here. The key activities of the design are really tied to the multi-purpose canister, and I'll talk about those, to the control design assumption document, which again is the major driver to the design process as we go forward, the substantiation plans and how we review to assure that we've made the right assumption,

and again the summary report for ACD, which we really have three of them. We have an initial report the end of this fiscal year in September. We have an interim report the end of '95, fiscal year, and in '96 the final report.

And the reason I have preliminary on here is we're looking at the rail spur, although it's just one small component of the overall advanced conceptual design. We're looking at what--where does that--what kind of activities do we need to support the project and the program related to EIS development and in the future. And right now we're looking at maybe a workshop this year to look over all the past history. I mentioned that there was work that was done in the '50s and '60s. We want to have a workshop to make sure that we understand all the requirements and where we are and then possibly some meetings with effected units of government to look at what are the attributes that maybe we want to really concentrate on to help focus a corridor selection or a number of corridor selection processes, and then start looking at what the routing concepts might be in those corridors.

The yellow area identifies some of the other project activities that are closely tied to the design aspects. The interim site suitability report that was mentioned over the last two days, we need to have the design

aspects developed enough to support some of the aspects of the interim site suitability. Of course, the development of the annotated outline for license application. Site characterization progress reports, there will be feeds in for these. And, of course, one of the drivers is our total life cycle cost. When we finalize or get the final advanced conceptual design report, it will be a major driver into our new TLCC.

And this gives kind of a little outline of what we're looking at right now as we're developing our initial advanced conceptual design summary report. We're looking at breaking that report into these 12 areas: An introduction area, a project scope and methodology, design input, QA, site description, a waste package design description, surface description and a subsurface description, some closure and decommissioning aspects, cost estimates, which are very important to comply with some DOE requirements and DOE order 4700, schedules and milestones and the uncertainties, issues and recommendations.

This outline very much follows what the project needs to comply with DOE orders and other outside program needs for a conceptual design report.

This first report that we're planning on having complete in September will, again, be very, very initial. It will be used to update the site characterization plan

conceptual design that has been superseded with the baseline changes for the MPC. Some areas may be in much more detail than other areas, but, again, it's going to be our initial concept as you go forward.

And that pretty well covers the material that I had brought with me. I probably went through it a little bit fast, but the morning goes quick. So are there some questions that I might entertain now?

DR. CORDING: Clarence Allen?

DR. ALLEN: Yeah, I appreciate that at this stage of the game you have to bite the bullet and make some assumptions about money things, although the fact is the more you get down in black and white now in details, the sort of harder it is to maintain flexibility in the future, particularly in terms of psychology and public relations and so forth.

I'm particularly concerned about the subsurface fault standoff. I really don't have any--I don't know where these numbers came from, and it seems to me we're trying to solve a problem before we have any idea of what the problem actually is. It's quite possible, for example, the Ghost Dance Fault will be found to be inactive. It's even possible, I suppose, it could be found that it is not a conduct for water at the depth of the repository. And to now talk about 60 meter offsets from the main face of the faults, I just don't quite understand.

For example, if we can show that one meter away from the main face of the Ghost Dance Fault, that rock hasn't broken in 12 million years, which is actually quite likely. I'm a little bit worried about getting this kind of thing down in black and white now that later we'll have to sort of back away from, or we might want to back away from I should say.

MR. STUCKER: And that's true. Again, it's an assumption. For instance, 120 meter offset right now is what our design shows, and it's a very conservative approach to say, gee, we really haven't got the details of the fault, so let's have a standoff distance of 120 meters, and that's what the current concepts show for both the ESF and the repository. As you get down there, you may want to adjust this, and this may be--this may be way too conservative as we go forward.

DR. ALLEN: Why 60 meters offset rather than one meter? I don't understand that.

MR. STUCKER: I might have Kal comment on it. I think it's to maintain some flexibility and--

DR. ALLEN: Well, you indicate reduce the flexibility.

MR. BHATTACHARYYA: Okay. I think the numbers came initially from USGS estimate at this time. The Ghost Dance Fault may have about a 700 feet wide traces, if you will. You have identified you're primarily concerned that the west

side of the Ghost Dance Fault--you have identified something called the Ghost Dance main face and the West Fault--and the West something--something, I forgot, the perimeter of the boundary.

So if you took the trace of Ghost Dance Fault and went west, the maximum span is about 400 feet, because that's the estimate--the last year I talked to Rick Spangler and the people like that.

So we figure that you said about 400 feet away, we are basically safely out of the Ghost Dance Fault and its traces. We don't want to go too far away because then we are really cutting into the repository--potential repository block that is available. And, again, we want to find the characteristics of the Ghost Dance Fault, so we are running parallel right now--planning to run parallel on that ESF so that we can make--into the Ghost Dance Fault, say maybe 400 feet or so several times and find the characteristics of that.

But that's the current thinking, Dr. Allen. We want to--we don't know exactly where it is, but the best information we have shows that at 120 meters, we're away from that.

Now, when you look at Sundance Fault, that is cutting at, you know, kind of a northwest angle, and there's no really way that's correct, no way you really truly can

avoid and put a set-off distance and then expect to excavate it by TBM. So in those cases, we would probably avoid emplacing waste packages in the fault traces. That's the rationale at this time.

MR. STUCKER: I think it's a good example you bring up, and from an engineering standpoint, it was our first shot at trying to quantify what it is we're doing and what our needs are. And now as we go forward, we can start looking to some plans of how do we substantiate that that's a good number, and is it totally erroneous, and should we go to a two-meter standoff? Now we can start focusing some of the scientific basis to say, how do you get to the number? What is it that's important and the driver of this number?

And so it's really a focusing tool that we can use to get to what the right number should be

DR. ALLEN: Well, I appreciate that. I just worry about the fact that we're going to get underground and find a lot more complication than we ever thought. That's almost inevitable.

MR. STUCKER: That's true.

DR. ALLEN: There are going to be probably many faults down there. Having somehow gotten the 60 meter offset into the black and white here, we may easily--any fault, not just a fault with a millimeter displacement, not a fault on which any activity has been proposed. I'm afraid we may find

ourselves very much reducing the flexibility, particularly in terms of public relations and what the public visualizes we're backing away from eventually.

MR. STUCKER: I think it's a good point, and that's why I caveat that these are working assumptions, and that's why they're kept, except for these key assumptions, are kept at the AE level for quick changes. As soon as we find a reason and the rationale to change, to assure that we're meeting the requirement, not necessarily exceeding it, but at least assuring that we meet the requirement, we can rapidly change. It's a rapid response. And that's really the reason we developed this system--the system that we have set up really doesn't allow--if we would try to control it at either the project level or the program level, the system doesn't allow rapid changes.

And so that's one of the reasons that we developed this CDA process, to have a rapid easy change at the AE level, the M & O level. And that's why I caution everybody, these numbers that you see, again, are our first shot, our preliminary shot, and as we go forward looking at some of the substantiation, the plans, the site characterization, we may indeed change many of these. And the idea is not to limit our flexibility, but to increase our flexibility, and to have documented why we are doing what we're doing right now. And again, the standoff distances really document what our design

is right now and why it looks the way it does.

DR. CORDING: Leon Reiter?

DR. REITER: Yeah, I just want to follow up on the same point that Clarence pointed out about the standoff, and it has to do with the decision which you've heard today and yesterday that you're going to decide about going into the Calico Hills once you've reached to see what's happening at the Ghost Dance Fault.

And I just want you to think about the logic behind that. I mean, if you're really going to avoid the faults, then if, indeed, the Ghost Dance penetrates the Calico Hills, that might be a good thing for the site because you're avoiding--you're really avoiding the water, and it's a good thing to have a quick drain. If you're worried about groundwater travel time, we've heard before that DOE is pushing to have significant kinds of--to bring into travel time the idea of significance.

Performance assessment, at least the studies that I've seen, seem to indicate that rather than being concerned about single large fractures, there's a lot more concern about lots of little fractures that could occur.

So, again, I'm questioning why is this waiting, the decision about going into the Calico Hills, based upon what you find at the Ghost Dance? It could be that that would be really a non-important problem, but there could be other

problems associated with the Calico Hills.

MR. STUCKER: Let me ask Dennis to elaborate on that, integrate with the site people.

MR. WILLIAMS: Dennis Williams here, DOE obviously. I got in on the last--what we're going to find at the Ghost Dance Fault may bear on our decision to go to the Calico Hills. Is that the essence of--

DR. REITER: The question is why is that the critical issue, given the--I mean, just postulating very things. If you're going to avoid the faults, then the existence of a through pathway from Ghost Dance through Calico Hills may not be such a bad thing after all. It may have a quick drain for the water on the site.

On the other hand, again, performance assessment seems to argue similar type of arguments, that the single fault is really not a big problem. You're much more concerned with lots of little faults hitting lots of little packages and going through.

And so I'm just kind of questioning why the whole decision on the Calico Hills is dependent upon the Ghost Dance.

MR. WILLIAMS: Well, I guess the scientific programs is we don't depend entirely on what we see on the Ghost Dance Fault for our decision to go to Calico Hills. We're in the process of putting together a position on that.

What we're looking at is what we can get from the drilling program with regard to the Calico Hills. We really haven't had any good exploration efforts at depth on the Ghost Dance Fault yet. Hopefully, some of the drill holes that we've got underway right now we'll encounter on the Ghost Dance Fault, we'll understand a little bit more about it. But I think we're in a position where at some point here in the very near term, we're going to have to make the decision on going to the Calico Hills. If we can get an encounter out of--or an intercept out of ESF on the Ghost Dance Fault, that helps us on the decision.

We combine that with all the other information that we've got on the Ghost Dance Fault from surface mapping, from any drilling intercepts, and, of course, our drilling on down to the Calico Hills, evaluation of the Calico Hills, synthesizing all that information, then I think here in the very near term we can make a decision on whether or not to go to Calico Hills. But you have to have your design process rolling in that direction so you know what kind of opening is best to go down there, and really have your designs in place to do that.

But it takes a lot of iterations with design and, of course, PA in order to make all these determinations. But we don't want to miss the train here in the early part.

DR. REITER: As I told Gene yesterday partially, I guess

what I'm questioning is total reliance upon--or it seems to be great reliance upon what you find at the Ghost Dance as the key decision about going to the Calico Hills.

MR. WILLIAMS: Okay. Well, I don't think that we can totally rely on anything on this program to make a final decision. It's a synthesis of a lot of things.

I'll let Steve continue on PAs.

MR. BROCOUM: Well, I was out at Sandia, and we used this PA program a couple weeks ago, and we had talked earlier with the scientists. And one of the big issues, one of the key decisions we have to make in it is the Calico Hills. There are a lot of aspects on that. One is that the NRC has continually told us since the SCP, the draft SCP, that we have to adequately characterize at Calico Hills. They never told us how to do it, but they said we need an adequate characterization.

Interesting enough, when you ask the scientists, the "ologists," most of them seem to think we have to go to Calico Hills. I mean, it's just kind of an informal survey.

However, when I posed that question to the PA people, it wasn't a very obvious answer for them. They kind of hesitated, said, well, no, we're not so sure you need to go to Calico Hills.

So what I'm trying to say is as a blanket question, it is not a clear position among the scientists, both on the

"ology" side, the hydrology and geology and the PA that we ought to go to Calico Hills. The one thing that everybody seems to be in agreement is if we get to the Ghost Dance Fault and there's a lot of young water running through the fault, then we ought to go to Calico Hills. That we agree on. What other criteria for going to Calico Hills, we don't agree on yet.

So I think that's what you're seeing here in this debate, okay?

MR. WILLIAMS: One of the things that I go back to, and I talked a little bit with Bo Bodvarsson from LBL with regard to modeling of fracture flow in the unsaturated zone, and it's a pretty elusive thing. I mean, some of the diagrams on that show that if you had a plane and then you punched a drill hole through there in one spot, it would be dry, but if you punched it through in another location, it would give you an indication of some flow.

So how do we know for sure when we have that first encounter out of the ESF whether or not we're in a dry spot of that particular zone or whether we're in a part of that zone that has fracture flow? I mean, then you can get to the point of how many intercepts do you want on it--two, twenty, two hundred--before you make your decision.

But, again, we have to synthesize that information, and, of course, sometimes we don't get a whole lot of help

from PA, but we have to cover that base anyway.

MR. STUCKER: To maybe tie this back into the standoff distance, I think the standoff distance from a pre-closure design perspective, we're not so worried about what that distance is for the pre-closure. There's some concern for the post-closure in the PA side, so we're looking at a very conservative approach right now because PA and some of the long-term stuff is still being developed. So I think we're being real cautious as to what standoff distance it might be for the long-term, post-closure aspects.

DR. ALLEN: I still say if the rock hasn't broken in 11 million years and you can prove that, which is probably going to be the case, 10,000 years is a very small part of 11 million.

MR. STUCKER: I would agree with you.

DR. CORDING: Bill Barnard?

DR. BARNARD: Bill Barnard, Board staff.

Dean, are you assuming that the canisters of glass will be mixed with the canisters of spent fuel, or are you segregating the glass in the different part of the repository?

MR. STUCKER: We're assuming at this point, and again, it's very early in the concept development--let me see if I've got a viewgraph here that might better show it. Again, depending on what thermal loading we want to operate on,

we're assuming that in an emplacement drift--let's say we have an emplacement drift here, that we intermix the high level waste with the spent nuclear fuel. You may load an MPC and a high level waste and an MPC, but we are looking at intermixing it and getting some type of a thermal loading management strategy with that.

DR. BARNARD: How do the people making glass feel about these high thermal loads?

MR. STUCKER: I think it's one of the interfaces that we just really have started to concentrate on, and we're really not--we haven't done a very good job in the past, but we're at the point in the level of resources to start looking at that next year and really start driving it from that standpoint. And it could come back and drive the design. We may want to say every other drift now is a high-level waste class. So it's still real early in the concept.

UNIDENTIFIED SPEAKER: Dean?

MR. STUCKER: Yeah?

UNIDENTIFIED SPEAKER: On the glass, that has a thermal limit of 450 degrees versus 350 for the interior of the spent fuel container, so that's not a problem.

DR. CORDING: Yes, Dennis Price?

DR. PRICE: Was there much skepticism as you approached this subsurface robotics issue on no human entry at all? Are there any contingencies where you will see the need for human

entry?

MR. STUCKER: At this point in time, with what the MPC's look like and what our shielding assumptions are, we're looking at no entry. And so we're going to look to see if we can develop a concept that is realistic with that approach. So, right now, we're not looking at human entry. It would have to be--you'd have to do a retrieval and a shielding process and then place it somewhere else to get back into that drift, or to look at some maintenance on that drift or on that package.

DR. PRICE: So if there's a failure of monitoring equipment in the 100 years, or something like that, you're going to try to do this all remotely by robotics? You don't see a human being being required to get in there at all?

MR. STUCKER: That's our current going in assumption. We want to see if we can put together a concept that would allow that, a design that would allow that.

For equipment failure of monitoring devices, robotics, though, we feel that might be one use of robotics that we may use. But for the actual handling of a waste package, we're trying to steer away from the robotics.

DR. CORDING: Yes, Don Langmuir?

DR. LANGMUIR: Langmuir, Board. Looking at your waste package containment barrier materials list, it's clear the assumption is being made that corrosion is greatest at low

temperatures. And my guess is you've been talking to Livermore folks, not to LBL people.

The latest thinking at Berkeley is that there may well be contact between water at high temperatures and quite a few canisters at the fringes, at the edges, and the interior of the repository. And given the higher temperatures of that system, of those conditions, you may, in fact, need the Monell at the higher temperatures as much or more than you need it at the low temperatures.

I'm looking at your--I can't read all the numbers of the overhead, but--

MR. STUCKER: Yeah, I know which one, I just haven't found it.

DR. LANGMUIR: --it's kind of in the middle.

MR. STUCKER: Let me just put up one of the drawings I have, just to highlight it that way, say, take a 12-PWR. But I think the possibility--it's true, there is some possibility there. That's why these are our going in materials, but we're looking at other materials in our testing program to possibly change.

And when we identified these, it was a long, drawn out process. But we did get some uniform convergence of the specialists to say, "This is probably our best shot at this point in time for what we know, to meet the requirements, the substantially complete requirements, meet the technical

requirements, and the program requirements, which are cost and schedule." So some of this is cost and schedule driven, assuring that we feel right now we can meet the requirements.

So that's probably why we are where we are right now is, when you put all that in a bag and you get the specialists together, this is what they came out with.

DR. LANGMUIR: Well, but some of the specialists, perhaps, the Livermore people, are convinced that there will be uniformity of thermal load, or reasonable uniformity, across the repository. The Berkeley folks are arguing recently that that's not likely to be the case, that there will be quite a bit of water getting into the system, ponding under high thermal load conditions, and making it down to some of the waste packages. So I think it's premature to decide that you're going to avoid the Monell at high T. I'm sure these will all be checked in the thermal tests.

MR. STUCKER: Yes. That, again, ties back into the substantiation process, which really are tied back into the study plans for site characterization. As we go forward and we get information that starts to say no, what we thought two weeks ago really isn't some of the data, and the information that we're getting in, we need to start maybe looking at changing our thinking. We may adjust that. So, as I say, these may change.

But again, if you did change the material, it

doesn't really necessarily change your concept. It might change some of the well techniques, it might change some of the handling techniques, and that's what we'll go back and look at. What does that impact on the design that we're carrying forward, and what do we need to change.

And by no means is any of this absolute concrete that we made a decision on this. This is just to help focus our efforts, and this is our best shot at, again, meeting the technical requirements and the programmatic requirements at this point in time.

DR. LANGMUIR: What are the cost differences between these two approaches?

MR. STUCKER: Let's see if somebody can help me. I've seen the list, but I'll tell you, I don't remember them. Can you help a little bit there, Hugh?

MR. BENTON: We have not yet developed definitive cost estimates for each of those. That is a near term project, and we will be working on that this year. Obviously, the Monell will add costs. We are attempting to increase the cost effectiveness of the total system by making the inner and outer barriers the same, and the design be the same as much as possible, and then just add the Monell if that turns out to be necessary. And we are considering the Monell as a potential outer barrier in a wet environment, whether that's caused by a low thermal load or whether it's caused by a high

thermal load. And it may be that even though most of the repository is dry, we're still going to have a problem at the edge. I think this is a conservative approach which will give us the two designs, and then we can decide where to put them.

MR. STUCKER: The costs that we used to come up with the assumptions, I think, were very general. There was a list that they were identified that they were at a very high level. As he said, we're starting in the process of really getting, you know, into looking at some hard numbers and some better facts.

DR. LANGMUIR: One more.

DR. CORDING: Yes, Don?

DR. LANGMUIR: An unrelated question. This is the first time I heard about this, but obviously you're going to have operations generated nuclear waste, presumably low level and intermediate level. I have not heard about this--don't think I have, anyway, forgotten it. How much, and what would you, on the scale of the repository? Is it a significant volume of material to deal with?

MR. STUCKER: Let me ask Larry. This is a major concern to him that he's been pushing and identifying, and I'll let him--

MR. O'NEAL: My name is Larry O'Neal with the M & O Service Facilities Design. I don't have those numbers. I

can get them for you. We have some reports that have been written in the past making estimates about the amount of low level generated waste. But that was prior to the adoption of the MPC decision, and now we really believe that having the MPC and not making the individual fuel element transfers and surface facilities is going to significantly decrease the amount of low level waste that we generate.

So one of the things that we want to do in the upcoming years is to go back and reevaluate that based on new designs of the surface facilities based on the MPC decision. And we're not there yet, but I can show you what we think as far as estimates. But they're not substantiated at this point.

MR. STUCKER: Some of the assumptions that we have--for instance, receiving burn-up credit assumes that we're not going to have to reopen MPC's at the repository and maybe add filler material and the reclose. That is an alternative that we're carrying in our back pocket, as well as other alternatives. But if we had to do that, that would greatly affect the site generated waste that we may see. So some of these assumptions, you know, all interplay with each other and how the design may go forward and what affects what assumption.

DR. CORDING: Dean, I understand that even with the low thermal loading, there's some above boiling temperatures in

the rock. And I was wondering if you're looking at the possibility of a low thermal loading scenario, perhaps with aged fuel or something, that would give you no boiling in the rock. Is that an option that you're going to look at or not?

MR. STUCKER: I think it's out there. Again, this early approach would be that you could operate a potential repository either at the higher range or the lower range, but I guess part of our assumption is, at this point in time, if both of those would be above boiling skin temperatures on the waste package, there are some possibilities.

For instance, if we made the determination or preliminary determination that we wanted to load this at the lower range, it appears that for this primary area, we could only get, say, 40 or 50,000 MTU in that area. We have a lot of options at that point in time if we wanted to continue and say, "Yeah, it's the lower range." We could thermally age for some additional years that it appears. And Hugh may have some of the numbers there. But for a period of time, we could age this, and we could get the full 70,000 MTU into that primary area with some aging within that 100-year period that we're looking at.

We also have the option where we could--you might want to at a later date say, "Hey, I want to characterize some additional ground to see if potentially we could open up some other areas." Or you may just limit it to the 50,000,

move on to the second repository, if that's what they deem they want to do sometime in the future.

So there's a lot of flexibility built into this strategy. We're looking at trying to maximize our flexibility and get the best data we can before we make any real decisions.

DR. CORDING: Okay, thank you. Thank you very much. One more question here. Don?

DR. LANGMUIR: Just a clarification for me. I'm looking at the individual waste packages point that you're not going to shield in the personnel limits. How does that impact, or does it impact, your options in thermal load? If you've got a bigger package with more shielding, does that lower its skin temperature significantly?

MR. STUCKER: I don't think so. Hugh, do you want to address that?

MR. BENTON: Hugh Benton with the M & O. No, sir, we would not expect that the--whether or not we had shielding around the outside would materially affect the thermal characteristics, because we are assuming that if we do use shielding, it would probably be metallic. Now, we have considered some concepts of concrete or some other type of shielding which might be lower cost, might give us also some benefit in buffering the environment to maintain high pH. But we have not yet developed those concepts to the point--so

far, when we've looked at shielding, it's been metallic shielding, and the thermal conductivity is good enough so it doesn't affect the thermal load.

MR. STUCKER: As we were saying, we would transport the waste package underground in a fully shielded transport cask rotated on a turntable, open a door--this is our concept right now. I went through it before. But we'd open a door, then insert the waste package, close the door, and then for the thermal loading, we're looking at--again, this is the first shot at it, and this definitely will change. What we're looking at, then, for the thermal loading, you could place these at whatever distance you want.

And right now, we're looking at possibly a drift spacing of 20 meters, with a waste package spacing of 20 meters for a high thermal loading range. And if you wanted to drop to a lower thermal loading range, you could skip every other drift, go to a 40-meter spacing on the drifts and a 40-meter spacing, then, with the waste packages.

So that's looking at some of the flexibility you have with a single concept, single design, but you're going to operate it differently.

DR. BARNARD: Does this mean that you have to cool off the drift before you move them? Bill Barnard, Board staff.

MR. STUCKER: If you wanted to adjust it, I think that's part of the design, is that in advance we would have to look

at do you need to cool it? We're looking at trying to assure that we have a concept that you wouldn't have to spend a lot of time cooling it, you could run in and make the changes. And that's why I say we're looking at remote handling, not robotics, to the extent we can. I'm pushing to look at perhaps in these drifts we don't really use rail cars, but we use some kind of skid mount technique where we skid mount them and we use a very massive system to insert and retract. So this will definitely develop, and we'll keep you informed as the process allows.

DR. CORDING: Okay, Clarence?

DR. ALLEN: Clarence Allen. Just one further comment on fault displacement. If you really do go ahead and have no backfill, then the problem of fault displacement almost becomes irrelevant, because you can have up to several-- perhaps even meters of displacement and still not prejudice the containment, depending on how they're anchored.

MR. STUCKER: That's a good point.

DR. CORDING: Okay, thank you very much.

MR. STUCKER: Thank you.

DR. CORDING: Appreciate your presentation.

We're going to move directly, then, into our final period here of approximately one hour, where we can have discussion of the issues and items we've been discussing that have been presented to us and have been covering the last day

here.

I would like to continue with one of the items that we began earlier today, the discussion of some of the schedule and the equipment options, a setup of the underground work, and I'd like to do that. Perhaps we can come back to some of the management issues, and then have further comments from our consultants also in this period.

But I wondered if we couldn't start with looking at the scheduling of the TBM and get a little more understanding of some of the things that are possibilities for doing alcoves, integrating the system, and integrating that into the operation in such a way that you get a lot of the science done and also get progress to the other scientific goals on the site. So if perhaps we could go into that. And I wondered if we had some comments from people within the organizations here, perhaps the contractor, or the M & O, might want to discuss some of that, have some comments on that. Lance, do you have some things for us on that, what some of the plans are you're thinking of at this point?

MR. DESTWOLINSKI: Lance Destwolinski. I'm the Product Manager for Kiewit/PB. Some of the earlier figures you saw were from a schedule we put together for REECo. It's been passed on to DOE. Since then, we have gotten some additional geological information on, really, what kind of rocks and the extent of rocks that we're doing. We're in the process of

basically updating that schedule to be submitted to the program.

The concept that we're kind of pushing is basically to try to get the system to buy a second eighteen-foot machine as soon as possible, starting early next fiscal year. We believe that could be on hand within, let's say, a one-year time period. We're looking at a used rehabbed machine. There are a number available in the community that could be used for this.

For those who don't know about tunnel-boring machines, the best productions of that are basically made out of used machines that you rehab. And you really rebuild them, but you take a known product that you've basically got all the bugs out of and use it again and make it better. So those kinds of things like leak mitigation can be put into those types of machines, just like we have with the new machine that was bought.

The other thing that we're pushing is what we kind of named a mini mining machine, 2.5-meter machine, just slightly over 8 foot, to do alcoves. Also, it would be to do like the exploratory out to Ghost Dance, to do the heat test alcoves and things of that nature. Here again, by adapting a machine like that, we can minimize the impact to the 25-foot TBM operations. We get it down to where we're talking about maybe a shift or a few shifts and a set of days.

Typically, right now, the alcoves are in high-strength rock in the range of 15 to 20,000 psi. They are drill-and-shoot. If you look at taking normal commercial-type equipment in there, scoop trams and drills of that nature, you are going to interrupt the TBM operation. If we had the softer materials, where we could hand mine it or use roadheaders, yes, it would be a minimal impact, which is what Jack referred to from the English Channel. We had the same thing in Denmark and a job we're doing at Great Bell Crossing. We were able to basically do those without interfering.

But if you can buy machines early, some of the questions that were asked later, and what I have in front of me is basically the draft of the new schedule, we think we could have the heater test basically completed--it depends on whether you want to go with a five-day work schedule or a seven-day work schedule, starting next fiscal year. But you could be looking at having, basically, a heater test available and completing the first one on a five-day basis, let's say November of '96. If you go to a six-day, you'd probably be looking, say, May of '96. The second one would follow shortly thereafter.

DR. CORDING: The November would be the completion of a heater drift, you say?

MR. DESTWOLINSKI: Correct. Of two. Really what

they're talking about is a pair of drifts. What they're looking at is two parallel drifts. One would be for the heaters, the other one would be for testing. So you're talking about a combination. Generally a range of 200 to 300 feet long. One would probably be drill and shoot in order to allow--or at least be so you mine it with the TBM, and then slab it out to allow for the drilling equipment and the testing. The other one, then, they'd install the heaters in and basically seal the unit.

DR. CORDING: So that you're saying November of '96?

MR. DESTWOLINSKI: Yeah--

DR. CORDING: That would be in place?

MR. DESTWOLINSKI: If you get everything going and you get the materials and the equipment in there.

DR. CORDING: That means you have to also have some of these alcoves--this alcove or the 2.5-meter machine?

MR. DESTWOLINSKI: I need two things. I need the 5.5-meter machine, or 18-foot mining machine. You know, start procurement and have it by the end of Fiscal Year '95. I also need the mini mining machine by that period of time. We think that's doable.

DR. CORDING: When do you think you'd be able to be at the bottom of the ramp? I mean, what are you assuming?

MR. DESTWOLINSKI: Right now, going back, here again, it depends on--the 2C package we're looking at right now, it's

five days. We're looking at about April of '96. Seven days a week, we could be, let's say, the 1st of December, '95. There are a lot of if's in that.

One thing we've assumed in all our schedules, basically, we've looked at commercial rates. We've taken, of course, our experience with conveyors, both from supercollider and Boston, where we're using them. We've taken basically the penetration rates that were worked up by the manufacturer, CTS, and also the rates that were worked up through the Robins Company in their proposals.

Now, there's basically about five major types of rocks that we're looking at that we will mine. The Topopah Springs W2, if you look at the test data, it will tell you that you get an instantaneous penetration of about 7.4 feet an hour. If you take that and take it back with our experience from supercollider, we think that's an average of 75 feet a day mining period. And that's in the same range as utilization that Ivan talked about before. But we're using this 50 percent based on a 20-hour mining period, where we spend four hours every day doing maintenance. We've found that to basically maximize our production.

You get into softer rocks, we can see some of them up into the eleven- and fourteen-foot-an-hour range. The thing that we have a problem with there is the support design as it exists now will really control the mining operation.

We're looking at Williams bolts. There are basically eight to a pattern on a meter and a half spacing. They want to drill a 2 1/4-inch hole. When you do that, basically, the ground support limits your mining. That's Category 1. Category 2 goes, basically you double that. What they call Category 3 goes to adding shotcrete to that. Category 4 and 5 are steel sets, depending on how much lagging we put in.

Those kind of things, and the things that have to do with the program, delays for mapping, we call problematic delays. And right now, our schedule has a fifteen-percent allowance for those activities in it. That's kind of a number that all the parties--and I say the M & O, ourselves and REECo--agreed on back late last year. In fact, can we do that? We don't know, and we won't know till we actually get in and start working. But we thought it was a reasonable assumption to make.

DR. CORDING: What's the effect of the conveyor situation? If you don't get a conveyor in the next ten months or so--

MR. DESTWOLINSKI: We think it's going to cut our production not quite in half, but it surely is--we're figuring about 38 feet a day, with basically muck cars--the problem is, if we could set up for full muck cars, we could get much better than that. We're limited basically with the machine, as it is designed for the conveyors, of being able

to only get three muck cars underneath the conveyor system. You'll probably fill two and a half of them. You're basically limiting yourself to a two-foot cycle. So, you know, if you look at 30, that's about--we'll make an average of about a cycle every less than an hour.

DR. CORDING: So your '96--

MR. DESTWOLINSKI: So we're not really set up for it. We don't have the California switch right behind or built into the thing like you would if you were doing it that way.

DR. CORDING: Yeah.

MR. DESTWOLINSKI: To put in the conveyor was strictly due to funding. The funds available for this year for REECo and ourselves to do work was $38 million. Our estimate to do the work that we thought we could do this year was about 54, is that right? Do you remember, Dan? And so, what really got to be a point is, what do you trade off? Do you do anything, and do you mine at all, or do you put things off? Basically, the choices were made by all that you put certain things off. The conveyor got to be an easy thing to put off. It's a big dollar value, particularly when you look at the underground conveyor system and the outside conveyor system.

So, yes, I'd like--normally we'd mine about 400 feet here and put a conveyor system in and go. That's what we'd like to see, and I think the program is trying to get us back to that. But it will be early next year before it

happens.

DR. CORDING: But the '96 date for getting to the bottom of the ramp, that's based on this present--

MR. DESTWOLINSKI: Right now, we're figuring we will not have a conveyor until May of next year.

DR. CORDING: And that also includes--

MR. DESTWOLINSKI: And that's built into the schedule.

DR. CORDING: --the time for four alcoves, I think it is?

MR. DESTWOLINSKI: Yeah. Right now, I think three of those get done drill and shoot. We're saying the fourth will actually be done with the mini mining machine as soon as it's bought. And that's built into the schedule.

DR. LANGMUIR: Question related to the conveyor belt. You couldn't purchase with the money available, but couldn't you rent it? Isn't there sufficient funding to get it on board as a rental?

MR. DESTWOLINSKI: Well, you won't find a manufacturer that will rent you one. You'll pay exorbitant rates for it. There are two used ones existing right now, and as we told the program, it just depends on timing. One of them is owned by M-K, and the other one's owned by a joint venture that we happen to be a partner in. But the timing gets to be that there's other work out there, too, and if the work comes before the purchase, it will go someplace else. But you

won't find commercial conveyor people that want to rent you these kind of belts on a rental. Unless it's at quite an exorbitant rental rate.

DR. CORDING: Tony?

MR. IVAN SMITH: It goes kind of back to the comment we had about the outside conveyors. In terms of purchasing, all that would be required for the first year's schedule would be a magazine unit--the first booster, and so it's only a fragment--

MR. DESTWOLINSKI: That's correct.

MR. IVAN SMITH: Pardon?

MR. DESTWOLINSKI: That's correct.

MR. IVAN SMITH: We brought this up in discussion a year and a half ago, when I made a comment which I think you might agree with, is that the total cost of the backup system could exceed that of the machine. In this case, it couldn't, but at that time, typically, a conveyor system might be $7 or $8 million. But you'd only need to purchase $1 to $1.5 million of that the first year. Was that considered at all?

MR. DESTWOLINSKI: Yeah. I think basically, if I remember, we were looking at buying enough conveyor for the 2C package, which is roughly $9,050. If you get someone into this government procurement system, what you have to commit to and what you have to then add onto, it's all intermixed with this. It's quite complicated and quite time-consuming,

and we're trying to work on it with Bob's help. But it is not our normal type of thing. I would love to buy things like I normally do.

MR. IVAN SMITH: Well, I think I brought that up a little while ago, is that the fact is that if you procured the conveyor belt, it would not affect the product at all, but it would certainly affect the schedule, which this whole project is schedule driven, so you would improve the schedule if you were able to effectively purchase an item, actually. Probably in the order of a million, million and a half dollars will get you underway.

MR. DESTWOLINSKI: If you can get through the federal procurement system in a reasonable period of time. And buying a used belt actually is a longer period than buying a new belt. Don't ask me why, there are other people that have to answer that question. That's what they tell me.

DR. CORDING: Is there a way that the contractor can purchase a belt and lease it or rent it?

MR. DESTWOLINSKI: Yes. I mean, right now, we are renting--the muck cars here are basically cars that we already own and basically they are being rented to the system for a temporary period of time. A lot of what you see out at the temporary shop facilities are being rented.

DR. CORDING: Well, why can't the conveyor--

MR. DESTWOLINSKI: Would I want to buy a conveyor system

and rent it here? No, because it's not economically to my advantage to do that. If I owned the system, yes, I would consider that.

DR. CORDING: If you owned one, then you could do that.

MR. DESTWOLINSKI: And the joint venture would be willing to lease the conveyor system. And I'm sure M-K would be willing to lease the conveyor system, as it exists right now. But then you get back into the design has a lot of bells and whistles on it that neither of these two systems have, and then what's the lead time to upgrade that conveyor system here to meet the specification requirements of the program? Because the conveyor they're buying is not one that I would buy. It's a much more complicated system. It's got a lot more controls on it and, you know, basically information gathering systems than I would buy as a contractor.

MR. IVAN SMITH: What additional items does it have on it?

MR. DESTWOLINSKI: Well, it's got computers that I am totally objected to. I don't want conveyor systems that are monitored and controlled by a computer system. It's got a number of other things that don't exist in a commercial market --fire suppressing systems, monitoring systems, weight systems. You know, we could go on and on.

MR. IVAN SMITH: Well, I think this is a comparison that

has to be made to what's done in commercial practice and what is done in this scientific facility. And I think that the aspects of the commercial business have to be applied for an improvement in scheduling and improvement in cost. The fire suppression equipment is--in the mining industry, the coal industry, conveyor belts are the primary means of extraction of coal, and it's a very sensitive environment.

MR. DESTWOLINSKI: The thing is, we run into all the time, and it's always been an argument on our side, we basically fight for economics and keeping things simple, because those are systems that I can operate effectively. When you start adding PLC's and things of this nature, our experience is basically we're going to have down time because of them, fixed utilization. That means I mine less than I normally would. Then you get into the program here, and all the basically outside influences, from a safety point of view, from a number of other points of view, that basically are driving the requirements. And how do you get by those? It's very difficult. There always seem to be more reasons why things are in than we can find reasons to get them out.

DR. CORDING: Are you involved in the design of the conveyor?

MR. DESTWOLINSKI: No, we're not. That's basically M & O's responsibility.

DR. CORDING: Who's going to make the decisions for

support in the initial support that goes into this tunnel as you advance? Who makes those decisions? How are they made in the heading?

MR. DESTWOLINSKI: Basically, right now, we're looking at five categories of support. It will be a joint decision between our walker and basically an M & O geologist that will be on the machine.

Now, the way the system's set up, Category 1, we can easily go to Category 2. We can easily go to Category 3. If you remember the picture of the machine, we have drills--or will have drills--right in the TBM. We also have a secondary ground support platform that's also a cleaning platform to clean the rock for the photography. But we have a choice there of adding additional bolts. There are also some bolts that we can't reach up at the TBM, and we have to put those in, the ones that spring lock. So, we can change things as we go along.

If for some reason later on, let's say we find a stretch of ground that needs additional--we will also have a rail mounted drill jumbo and basket we can go in and do basically maintenance type bolting later on. I think the system is designed so that you can increase the categories as the conditions--

DR. CORDING: You have a shotcrete option, not a requirement in all cases, but you have it as an option in one

of the categories.

MR. DESTWOLINSKI: It's a line I talked about here recently, and we're looking at right now, would be modifying the third platform. It's almost at the very end of the training gear, basically mounting a robot boom on there to put wet shotcrete in. That's something we've finally got negotiated with the M & O and come to an agreement on this.

A lot of this has been a lot of give and take, like the ground support, the Williams bolts. That's not what I would choose, but they're looking at 25-, 50-, 100-year life designs. You know, they have reasons for doing what they do. I don't totally agree with them, but here again, I'm not the designer, so--

DR. CORDING: Yeah, those are mechanically anchored bolts that are later grouted, I understand.

MR. DESTWOLINSKI: That's correct, yeah.

DR. CORDING: Do you grout them later?

MR. DESTWOLINSKI: We'll grout them later. We'll do the testing and grouting off the machine so we don't basically impact our mining operations.

DR. CORDING: Other comments or discussion on this? Yes, Lee Renegar with the M & O?

MR. RENEGAR: I'm Lee Renegar, the construction manager. A lot of what Lance says I agree with. I want to clarify a few things on the conveyor issue that he was talking about.

The clarifications on that are that there are some requirements for PLC's, there are some requirements for monitoring systems, there are some requirements for control systems. Those are part of the integrated data system which comes in later on. We are in the process of discussing and trying to modify so that we can phase these things in so that Lance doesn't have to deal with PLC's, so that we don't have to deal with them. I agree with him in terms of if you can do it simple, keep it simple.

These things are ongoing. We've talked. He gave some indication that there's been some talk back and forth. He does have some input, so does REECo, in terms of constructibility to the design, not the original design. And we have been working the talk up front.

The way I see my job is to keep between these two and keep things going back and forth, the designers and the constructors. And I come down foursquare on the simple side, but the designers do have requirements, and we have to abide by them.

I'm just trying to make it clear that discussions are ongoing to try to solve these problems. One of the areas that he talked about was procurement, and we have some issues that are on the table this afternoon to discuss about those to try to speed this up and keep things moving ahead.

DR. CORDING: John Cantlon?

DR. CANTLON: Cantlon, Board. Could we get a comment from the designers as to why they need the Cadillac version?

MR. SAUNDERS: Bob Saunders. Cadillac version is mainly because of requirements that are imposed upon us. There are a number of requirements in the ESFDR, which we are obliged to follow. We've had a number of comments and criticisms from some areas, the NRC, Technical Review Board in the past on the way the design is being done. In general, we've tried to respond to those.

The question of the PLC's, that is being actively discussed right now. We hear the argument that they want to keep things simple, and we agree that we should keep things as simple as much as possible.

The other area that's had a lot of discussion on it is ground support. And there are a number of factors there that we've looked at. Category 1, which is primarily rock bolts, we see that as being majority of the ground support in this tunnel. And that should have very little impact on the TBM progress.

Another issue that has been discussed in terms of delaying TBM progress is the scientific work. And again, we've sat down with both the constructor and the testers to figure out how best to do that, and we came up with this mapping platform concept. The idea there is that--this may change, too--originally there were two production shifts, one

maintenance shift, and the system was designed so they could do all the mapping on the maintenance shift. At the same time, if it was necessary to map on production shifts, they could do that as well.

These are some of the reasons why the design has gotten as complicated looking as it has. Primarily, we're responding to requirements that others have imposed upon us. We've been asked on a number of occasions to challenge some of those requirements. That is easier said than done. There's been a lot of thought went into those requirements, particularly those in the ESFDR. We are challenging some of them. Some we happen to think for the kind of facility we're designing, they're a good idea.

DR. CORDING: Thank you.

MR. STUCKER: I might add a comment here. From a commercial standpoint, I think that the Department of Energy, on a health and safety basis, is going well beyond what is commercial practice. And I think you need to note that. In I think it was 1978, the German exploratory shaft facility that was being constructed had a fatality. And it's my understanding, I think they're still down today because of the public sentiment on the fact that here's an Exploratory Studies Facility that you can't construct without an accident. How can you expect to operate a major system? And our lessons learned from that point from a problematic

standpoint, came back and said, "Wait a minute, we're going to go well beyond commercial practice on the health and safety aspects. And I think our requirements show that.

And if you look at DOE, DOE requirements, especially related to the health and safety, we do things that we would never dream to do when I was in the commercial end of things--the reporting, the review of why something happened, how it happened, how we can make sure it doesn't happen. We never went into any kind of the extent that I see within DOE from a commercial standpoint. So I think it's important to note that, that we're going well beyond commercial practice in the health and safety areas.

MR. IVAN SMITH: I just don't see how that affects the purchase of a conveyor belt. The health and safety practices as performed in the industry today has absolutely no implication as to the purchase of this conveyor belt here at all.

MR. STUCKER: Well, it could be dealing with the fire suppression, those type of related aspects. You know, I'm sure well beyond what--

MR. IVAN SMITH: To me, in a situation where any type of fluid is being prevented from being placed into--for example, oil and waters and such and so forth--to go ahead and place a fire suppression system that could inadvertently flood the whole tunnel seems to me is incongruous.

MR. SAUNDERS: Just one more comment on that fire suppression system. Basically, we're following what is standard practice on that. We also have not only commercial tunneling applications we have to follow, but also there are DOE orders which direct us in certain directions as fire suppression systems go. One of those was an eight-inch main, a requirement for DOE facilities. I think we've got that reduced down to a six-inch now. But we've also had people saying, "The six-inch looks a little small. Maybe you should go back to an eight-inch," given what we have to do there.

DR. CORDING: A DOE facility, that was designed for, I would assume, DOE facilities which would be above ground structures.

MR. SAUNDERS: That's probably the case. However--

DR. CORDING: Why would that be applied to an underground structure?

MR. SAUNDERS: There's nothing that differentiates between the two. I don't think DOE has many underground facilities. I don't think anyone does.

DR. CORDING: But I mean it seems to me that that's an area where one can look at this, and safety underground is different than safety above ground in terms of what one has to do. It seems to me that those are some of the issues that you can narrow down things a little sooner in some of this and not have to go through all of those, because it really is

not--that regulation was not designed for an underground facility.

And there's been a lot of work in past years in the underground industry to improve safety. You go on a job now, it really takes quite a bit to get on the job and to make sure it's drug free and all sorts of things that they're doing now. And there's a lot of safety that's gone in. OSHA is in there, the government is involved in this. Sometimes I think some of the safety issues--some of the things one can do that might be a safety issue above ground is actually detrimental underground. And so I think that there needs to be a perspective on that.

MR. SAUNDERS: Yeah, we agree with you. We don't agree with everything that we have to do. However, trying to get a relief from those requirements is sometimes a little difficult.

DR. CORDING: I think we've seen that in some of the process and some of the presentation Alden Segrest gave yesterday of how to simplify some of that and all. I think that that's an area where there needs to be a look at this in terms of some of these things may be coming down from portions of the organization that don't have the experience in these areas, and there's some responsibilities at other levels that maybe aren't at the levels where they can effectively understand the issue or be able to make

decisions. I think that's something that the program needs to look at.

Dan Coss?

MR. COSS: Just on the matter of eight-inch fire line. For example, when I was a Field Operations Manager out in Area 12 operating DOE facilities and tunnels, a four-inch water line sufficed. So, you know, we question that type of stuff.

Also, Bob, you made one statement that the ground support would not impact TBM advance rates.

And I'm reading from Lance's document that he gave me this morning. He's saying that a bolting period of 34 minutes is required for a Category 1 Williams bolting pattern that allows a maximum TBM rate of 2.65 meters per hour, or 8.7 feet per hour, is a limitation imposed by your ground support. So if we had an opportunity to go faster, the ground support would restrict us.

DR. CORDING: I think that's something, again, that is one of those coordination areas that would be good to look at.

I know some of our people are having to leave early, particularly--specifically, rather, Robert Matyas. I'd like him to provide us with just a few of his views from the meeting he was with us eighteen months ago, and he's seen changes. And before he has to leave, I was wondering if you

might, Bob, summarize a few of your thoughts at this time.

MR. MATYAS: Thank you. In the eighteen-month interval, I can happily say I see a lot of improvement. Eighteen months ago, in my report, I did mention that there are a lot of talented people on this site. There still are. And it appears that there have been some additions.

I'm particularly impressed by Mr. Nelson's approach. In his mission, I wish him well. At least I agree with the direction he's taken in trying to define the problem. All I can do is pray for you, and I will.

The matter still exists of a lot of players on the field, and you've all got a very complex task to do. One of the phenomenon of human activity is--let me paraphrase it--if you were dealing with a Board of Trustees that numbered 45 people and you were trying to get something done, that can be a tough task compared to a 5-member board or committee. Without pointing fingers at anything, there are a lot of players on this field, and just the subconscious obligation to keep track of them all has got to have a deleterious effect on you, the various management, just because you're only human.

The matter of the number of companies that are out at this site in various roles, I still think I need a guidebook to the players. I would encourage discussions. For example, when we talk about the performer contractors, if

there were some way to review the existing contracts, and see if they could be converted or transmuted into a conventional joint venture, then you'll be dealing with one contractual entity.

Those of you who heard me last time around, and even yesterday, you know that I'm a believer in incentives. I'm not very fond of award contracts. With the experience I've had with the underground community, this is an unusual group of folks. It's a very sophisticated business, but the human beings involved are very committed to attaining their goals. First of all, they want to know what's going on, and they'll join you in your engineering, scientific adventure if you'll allow them. They love challenges, and they generally are very successful at it if you give them enough credit to challenge them. I hope there's some way that you can move toward a more free market kind of arrangement in dealing with your suppliers and your customers.

Another thing that I--one of my pet concerns is just the fact that there are DOE regulations and DEERS and what have you, and various federal procurement rules doesn't mean that they can't be attacked. I don't mean attacked in a very negative way, but they should be evolving. You don't just buy them because they're there. You say, "Well, okay, we have no choice." If the senior management owns up to their responsibilities, part of the responsibility is to

evolve rules and regulations.

Let me conclude by saying, the basic simple rule is, get your money's worth out of this thing. It's always easy to complain about the availability of cash and cash flow, but it's the effective employment of that cash. I, for one, don't believe that you folks need to own any of this excavating equipment. It exists, it's out there. Try to employ it and challenge the people who own it.

Thanks.

DR. CORDING: Thank you. Perhaps, also, from our other consultants we could have some comments. I know that, Tony, you've been having some discussions on and are interested in the discussions on the equipment, the machines, and wondered if you had some concluding remarks.

MR. IVAN SMITH: Well, having been involved with the program for some time as an outsider looking inwards, it has always been schedule driven. And when I started with Sandia, seemed to be cost driven, and one of the inputs at that time was to always look at scheduling contingency. Well, what sort of is happening right now as we're pushing this thing up to actually starting to excavate is this contingency is being pushed forward and continuing to be pushed forward. So certain activities become, I think, much more critical.

This is where this conveyor business has come up. And there will be other activities. There will be, maybe,

problems with the tunnel-boring machine, problems with the ground. These are conditions that are going to have to be met to improve this contingency problem.

Bill Simecka made a comment earlier, which now he's back, he commented this as being a classic role of engineer and contractor and manager and owner. Maybe it's classic at the test site, or maybe it's classic in certain government activities, but it's not classic to the industry. Typically, contractors such as Peter Kiewit is well represented here, and Morrison-Knudsen as well, can perform to very tight contractor specifications and engineering drawings and meet those as a normal part of their daily business. So there's no uniqueness as far as this project's concerned in that aspect.

So there's no recourse under these situations. There's no real incentive for performance, because typically a contractor will be paid by his productivity and the quality of his work as a normal basis. We're getting on to the fact in the purchasing of this machine that we have right now some incidences in Canada, for example, the CN railroad. The large tunnel machine was specially purchased, identical in terms of concept of this machine, and it's now stuck underneath the river. It has some serious problems. What recourse does the owner have for that situation? As the DOE does here. The machine has been purchased through REECo, by

their specification, and from a reputable manufacturer. But when there are problems with the machine, what recourse is there. And this has also happened in Magma Copper. They purchased their own tunnel machine, and they're meeting difficult ground conditions, and the contractor is a reputable contractor out of Evansville, Indiana. But we have a conflict in terms of what real problems exist. So there's a danger in the future of this overburden of who bears these responsibilities.

The next comment is really task for task. I think that gets up to the critical thing as far as schedule, is the tunnel-boring machine and the performance of the machine. I've got some charts here, which I don't really need to bring out, but I can just comment that in my calculation of, say, approximately 600 meters a month, that would very much meet with what the performance schedule that Lance just presented. Traditionally, in conveyor operations, it's nearly double that. But that 600 meters a month would meet, basically, what occurred in Chicago. So, it's below average, but an acceptable limit. But right now, you're limiting to under 400 meters a month for the next year. That is a significant amount of time that is being lost on this schedule.

And then the other comment was the purchasing of the machine, which is not really to try to go backwards on it, is the fact that this machine did cost a great deal of

money, in terms of approximately $12 or $13 million. And I don't know what the change orders were to that, but I'm sure there have been some adders to it. But in the marketplace today, a typical machine of this size should range in the $8 million range. A used rebuilt machine should be around $4 million, $4 to $5 million. And so there's a tremendous difference of burden in here. So if leasing is an option in the future, that's going to make a tremendous savings in terms of cost.

Looking at what Jean did yesterday, and she presented in terms of site suitability, once again is entirely dependent upon performance of the machine. So once again, schedule becomes the driver.

So I'd just kind of like to end in saying, to echo what Bob was saying, is that I know a lot of the people here. They're excellent, they're professionals, and it just needs to be tied together, and hopefully there will be a shorter management leash between the DOE and the actual man digging the rock can be reached. Thank you.

DR. CORDING: Okay. Jack Lemley, do you have some comments for us?

MR. LEMLEY: I think I'd like to start by agreeing with Bob Matyas and Tony Ivan Smith in their remarks. I particularly want to emphasize the positive impression that I had of Mr. Nelson's presentation and his efforts to improve

the management structure of the project. I think that's the one single aspect, if it's successful, that will give assurance to the program and the schedule and assure a value for money effort.

Just one other comment. Underground work is not necessarily enhanced either in terms of safety, productivity or any other way by oversophistication. You're dealing with people who have experience at a certain level with the types of equipment that are being purchased. And to raise that experience level is going to be very expensive and sophistication in a hostile environment sometimes can prove to be not an enhancement to safety but an increase in hazard.

Relative to whether or not certain rules and regulations should be applied blindly, I can't agree with that at all. I think there are proven risk analysis techniques that should be applied to all of these decisions, and not necessarily a blind following of a regulation that doesn't necessarily apply in a given circumstance. But whether or not the regulations apply, a risk analysis process is something that I would recommend for all of these various activities. But the simpler the systems can be kept, I think the better prospect of success you'll have.

DR. CORDING: Thank you. I wondered if there are any closing comments, remarks from the DOE. Bob Nelson, did you wish to add anything to our discussions at this point?

MR. NELSON: If I could just say a couple of things. I certainly appreciate the comments this morning on all of the aspects. We're certainly going to try to do some things in the procurement arena. I don't know what those are. I've been an assistant manager for administration in past years, and there are ways through and around some of these things, but it's also a matter of picking the targets. We can't take on every one every time, or we'll just die. But certainly what I have in mind is taking on the conveyor as one thing that we can certainly try to do that and see if we can be successful. And we can fail. I mean, there is a bureaucracy that has to be dealt with.

I must say, I'm very sensitive to the safety issues. I've been what's called the test controller. I have fired some 35 nuclear explosives at the test site. And in doing that, I killed a REECo person at one time, and I didn't feel real good about that. So I'm very sensitive to the safety issues, and certainly they are not going to be overlooked or lessened or whatever, at least in my way of doing business. But I do think there are a lot of positive things we can do to improve that schedule, and certainly I'm going to try to do that.

But again, we're going to pick the targets, and we've already started through that. I don't know quite where that will lead us, and I don't know if we'll be successful,

but certainly that's something we're going to try.

DR. CORDING: Thank you. Any other closing remarks from our Board that they wish to make?

(No response.)

DR. CORDING: At this point, then, I'd just like to--Dennis, did you have--I'm sorry.

DR. PRICE: Yeah, I'm just going to make a closing remark related to the remarks in closing that have been made. Many of them are basically human factors and safety engineering and system safety analysis and hazard analysis and this kind of thing. And there's a number of things that could be applied to the design of the TBM, to the procedures that are going on and so forth. The Board has called for human factors and for system safety a number of times, and these things as yet are not being done. However, we're making progress.

DR. CORDING: Thank you. John, did you have any statements?

DR. CANTLON: Cantlon, Board. I would just commend the DOE for being candid and open with us. As our Board meetings have shown over the years, some of the discussions are a little sharper probably than they need to be, but I do think the process is a good one, a healthy one, and it helps us, I think, when we put our reports together. We can sometimes help solve some of your problems by bringing to light

unnecessary impediments, unnecessary additional costs and so on. So, hopefully, we're all headed in the same direction. And I must say it's been a useful exchange. Thank you.

DR. CORDING: Thank you. I also would echo some of the comments that have been made. But just to close, as we looked at this program today, in talking with the DOE and the M & O about scheduling, it was a relatively short period of time. We felt it was important at this time because there were so many things that were really critical issues that were being dealt with right at this time, and we wanted to be able to at least participate in learning about it and discussing it at this time.

And I think that it is a critical time for us to be able to have one last look at some of the plans for the initial construction. And we see that that is so much tied to the real goals here of assessing site suitability, and I'm very pleased that DOE and its contractors are interested in looking at this and finding the most effective ways of accomplishing those goals that are so important underground, things such as looking at the faults, the thermal testing and doing that work. So we're really hopeful that in the months ahead there will be a real working together here with the various organizations to be able to accomplish this effectively.

I want to thank you all for your attendance here

this morning, and we'll now, then, close the session. Thank you.

(Whereupon, the meeting was adjourned.)

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