UNITED STATES

NUCLEAR WASTE TECHNICAL REVIEW BOARD

- - -

FULL BOARD MEETING

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Key Bridge Marriott

Potomac Ballroom

1410 Lee Highway

Arlington, Virginia 22209

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WEDNESDAY, JANUARY 8, 1992

8:35 o'clock a.m.

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NWTRB:

DON U. DEERE, Chairman
CLARENCE R. ALLEN, Member
JOHN E. CANTLON, Member
PATRICK A. DOMENICO, Member
DONALD LANGMUIR, Member
D. WARNER NORTH, Member
DENNIS L. PRICE, Member
ELLIS D. VERINK, Member
WILLIAM D. BARNARD, Executive Director
DENNIS G. CONDIE, Deputy Executive Director
HELEN W. EINERSEN, Executive Assistant
RUSSELL McFARLAND, Senior Professional
SHERWOOD C. CHU, Senior Professional Staff
LEON REITER, Senior Professional Staff
KARYN D. SEVERSON, Congressional Liaison
VICTORIA REICH, Librarian

OTHER PARTICIPANTS

R. L. ROBERTSON, President & General Manger, TRW Envir
JOHN BARTLETT, Director, OCRWM
JOHN P. ROBERTS, Acting Associate Director, Office of Systems
CARL GERTZ, Project Manager, Yucca Mountain Site Chara

P R O C E E D I N G S

[8:35 a.m.]

DR. DEERE: Good morning and welcome back to the second session of the Nuclear Waste Technical Review Board's first meeting of 1992. I am Don U. Deere, Chairman of the Board.

Yesterday, we heard a very interesting and informative series of briefings on the Office of Civilian Radioactive Waste Management's programs and priorities and budget allocations for fiscal year 1992 and a status report on the site characterization activities at Yucca Mountain.

This morning we continue our review of program priorities with an update on systems integration. At this time, I would like to introduce John P. Roberts, OCRWM Acting Associate Director for Systems and Compliance, for some introductory remarks.

He will be followed by Mr. R. L. Robertson, President and General Manager of TRW Environmental Safety Systems, Inc. who will talk about the role of the M&O contractor in integrating the civilian radioactive waste management program. John, thank you for being with us today.

MR. ROBERTS: Thank you. If you don't mind, my remarks are going to be very short and I will just give them here at

the table. Robby has the tie-clipped microphone on

already and he is ready to go.

As part of the systems and compliance concern, my office in particular is concerned with the overall activity of the program in terms of both systems and compliance and the integration of that.

We are going from a mode now of basically having been one project to multiple projects and the coordination of that and the long term concerns about the technical direction of the program is really crucial.

I think this is a crucial developmental stage and fortunately we have an M&O contractor coming on board to coordinate over the long term, it is a long term contract, the activities that will be necessary to weld this system into an overall active whole.

The other thing is that I think that we all realize that we were talking about continuity yesterday and we were particularly talking about continuity of funding, but it extends to other areas as well.

The M&O will provide us being under a long term contract the equivalent if you will of corporate memory and I think that their transition period which has been

accelerated, they are meeting that challenge and they are now coming on board and beginning to operate throughout the entire program, and with that, I would like to introduce Mr. Robby Robertson who will discuss their activities.

[SLIDE.]

MR. ROBERTSON: Thank you, John. When we went through the dry run on a bunch of these materials earlier, there was some reaction that said, "Gee, you know, this is boring."

[Laughter.]

MR. ROBERTSON: Well, let's see. I guess it is my belief that you would like for system engineering and integration to be boring because if it is not, you are in crisis. Is not unlike bringing a child into this world. It starts with a good conception. There is labor involved, sometime excruciating, followed by a lot of care and feeding, lots of diaper changing, lots of it in public.

[Laughter.]

MR. ROBERTSON: If it is done right, foundation is laid and that influence can reach forward into the adult stage of contribution and I would like to think that this particular process is not unlike that.

So with that, if you will bear with me with some of it, I perhaps can give you some framework.

[SLIDE.]

MR. ROBERTSON: I think it is essential to understand that program integration or system integration has to have some substantive basis. You have to have whomever you are putting the responsibility on, has got to

have the authority, has to have the responsibility and has to have the capability if this is going to occur.

[SLIDE.]

MR. ROBERTSON: I think the drafters of the original RFP and the construct that has been followed by John and his management team have reinforced this. We do have the authority. We have been assigned the responsibility of the system integrator for this program.

We have also been assigned the responsibility for a set of program activities whose successful performance will, in fact, assure that the program and the system is integrated. I think that is important to understand. You just don't do system engineering.

System engineering is the result of a contractor or an entity doing a series of activities which result in integration and the capability that we believe that the team has the background and experience and is rapidly

demonstrating to this particular program that it can apply those skills and capabilities to this program.

[SLIDE.]

MR. ROBERTSON: In our work statement and I won't dwell on this much but to buttress what I was saying, the original framers of this had laid some relatively specific responsibilities on the M&O. Our coordination of the baselines and the interfaces, technical direction of schedule and budget and technical, direction even with regard to the national laboratories and other agencies even though it is passing formally through DOE representatives.

The intent is for us to do the technical direction acting as your agent.

[SLIDE.]

MR. ROBERTSON: Briefly, here are a selected list of assignments which have been given us over this period of time which we have been on board, approaching, I guess at this juncture 11 months. We came on in February of last year but we have been assigned responsibility for cost and schedule baseline management ultimately, implementation of the program management system, the outgrowth of the MSIS activities that we are involved in, configuration management, heavy involvement in the outreach area, establishing the technical baselines and the associated

documents that are associated with that, leads for the system studies, obviously supported by many other able contractors and DOE entities, strategic and contingency planning which we have been heavily involved with Tom Isaacs and his shop, establishing the framework for system compliance, design of the various components and construction management of the ESF.

In the regulatory area, again we have the site characterization technical direction and integration listed

under the compliance arena in terms of our major focus there and the performance assessment and licensing activities. So by just looking at the assignments that we have essentially been given lead for, I think that those are the appropriate things if we do those correctly will result in integration of the program.

[SLIDE.]

MR. ROBERTSON: I think another important aspect is that we work for all of the RW organizations and so we become a facilitator in that process of linking those activities across and perhaps can cross some of the boundaries that exist where people have their own project responsibilities to focus on and we perhaps can help bring their attention to look a little bit across the border at

some of the other interfaces.

[SLIDE.]

MR. ROBERTSON: I have shown this chart before but I believe it to be a fairly good construct to kind of fit the M&O into the role again so let me just spend a little bit of time.

RW is clearly the entity that sets the policy, sets the budget, sets the direction of the program and provides the overall policy and executive management of the program. As the M&O, we view ourselves as supporting them in an integral sense across the entire program.

As we interface into the laboratories and the other agencies and the international cooperative agreements, we are basically dealing in the technology region. With the other associate contractors on the program, we are in a technical direction role and in some cases we are acting not only as the integrator but as the prime contractor for a piece such as the design, Title I/Title II design and things of that nature.

So you see again the various roles that are responsible for the program, the roles of the program if you will and the assigned responsibilities. Our role is: to support, in a technical sense, the headquarters and the policy makers in

the program decision role; do the design and development in a prime contractor sense; provide the technical direction to the associate contractors in that arena; and, in the case of these others, I have lumped all of those into a kind of category of technology application if you will as a title for that, then we are responsible for the system engineering and the management integration overall of the program. But that is just a framework for you to look at.

[SLIDE.]

MR. ROBERTSON: I did want to remind you again, some of you who may not have been here before, of who the teammates are and their general responsibilities that we

have focussed them on.

Fluor Daniel, mainly on surface facilities; Morrison-Knudsen on underground facility design; Babcock and Wilcox on the engineered barrier; Woodward-Clyde, consultants on site characterization; Duke Engineering, MRS Design, leading the QA effort, leading the outreach effort and leading the licensing effort. Notice that these three functions are closely tied to the power industry and we are drawing on that kind of knowledge and expertise and background.

INTERA Technologies is leading our performance assessment area; E.R. Johnson, the storage and transportation area; JK Associates, they are doing some socioeconomic and policy work and R & D Associates, doing some of the systems engineering and modeling support. So that represents our core team.

We certainly will be having subcontracts and consulting agreements with other peer expertise that we want to bring into the program for specific capabilities or in review of some of the work that is going on.

[SLIDE.]

MR. ROBERTSON: Let me try to walk through a few of these just to give you some flavor of what we have been doing over the last few months. In the area of the program management, I think the biggest thing to focus on is that

John had an initiative that was the management system improvement strategy which I think culminated in a lot of good underpinning work and we are now moving into a phase to implement that into the particular program management system, the documents that underpin that and the technical documentary framework and requirements framework that allows the technical baseline to e squared away.

One of the major efforts that we had underway was to

take this intellectual framework and move to a document hierarchy that was manageable and then to begin to prepare the major documents which were important to the management of the program, this being the program management system manual, the system engineering management plan and the configuration management plan.

InfoSTREAM is the RW internal system that will manage the paperwork and keep up with all of the documentation and ultimately interface with the License Support System so that that will be accessible for the discovery process and ultimate litigation on this program during the license phase.

[SLIDE.]

MR. ROBERTSON: It is a simple piece of paper, lots of bloodshed, tears and effort on trying to get this down to an agreed to/distilled list. Jerry Saltzman did an outstanding job of refereeing this whole process with us.

We started with almost 85 documents in the top tier. We have now reduced it to what we believe is a fairly managable set.

Let me draw your attention to something though because this is something that we refer to as the two-by-two matrix. You will notice that above the dashed line are the program

control documents and below the line are the project control documents.

To the left of this line are your management controls. To the right are your regulatory controls. Now let me point out that in the vernacular of those who are used to functional requirements and all, we have lumped those other performance requirements under the regulatory as well, saying that they are speaking to satisfaction of those requirements as well.

So you will notice that you have your system engineering management plan at the program level but each of the projects will have a system engineering management plan which will speak to that plan as well and for the peculiarities of the individual project.

You will notice that there is an example on the MRS, there is a system level set of requirements which flow from the overall system requirements which are fathered back through the mission plan and are answerable to the structure of the program management system manual which is the bible by which you have decided DOE how you are going to manage this program.

There is an answerable document at the design level that is down at the project level and likewise, in the other areas, there are much more complicated structure in the MGDS

system since you have a site characterization phase which is a little odd in the normal construct of a standard program management development of a normal system.

But I believe we now have a framework in which those major documents can be put together and we will have a manageable construct.

[SLIDE.]

MR. ROBERTSON: Clearly, the thing that I believe that should concern the Technical Review Board is technical baselines, in other words, what is your technical baseline that you are managing to, how is it documented and controlled.

We are clearly starting with the documents hierarchy we have. We are developing the management plans and having those approved for development of each of these key documents. The requirements documents which are at the system level that we are talking about are under development for MRS, MGDS, Transportation and Waste Acceptance drawing heavily on the work that was done as a part of the underpinning of the MSIS effort, drawing those into more of a specification format.

It is one thing to say this is a requirement but until a requirement is translated, a regulatory requirement is translated into a design performance requirement that can be

measured, the engineer doesn't know how to deal with it. Now clearly, we have to be careful in that translation to be assured that the regulatory entities are in agreement with our translation.

But if you don't translate it, you hand off to an engineer a requirement for reasonable containment, I submit that you will have a great deal of difficulty in getting closure. So that is underway.

One of the things that we are concentrating on, too, is the development of an operational concept for the civilian radioactive waste management system, quote, "the system" and we are not talking about a transportation center.

We are talking about the "the concept" of how you plan to operate the transportation system, the MRS, the contracts that you have with the utilities and the repository, how you are going to operate all of those things together as a system.

We believe that there needs to be a definitive operations concept laid down which is an integral part of the senior document on your program requirements and we are

in the process of developing that. Obviously, one of the major elements under your baselining is the system studies which we will come to a little later.

[SLIDE.]

MR. ROBERTSON: I don't want to dwell much on this except to make a couple of comments. Generally, the system engineering process is really a discipline. You start with a series of mission needs and regulatory requirements which flow into a set of requirements which leads to a design which leads to a construction and ultimately you operate the system. In our case, ultimately you decommission it.

There is a compliance end to the problem as well and you will notice that the method of compliance assessment is through design reviews and verification testing and your general regulatory compliance strategy and performance assessment is the major tool in a technical analytical sense that you use to get closure.

You will notice that as you go through this process, there are always two things going on. There is a feedback going on that is associated with changing the requirements and I want to emphasize that. Requirements do change. They are, in fact, a compromise always to the degree that you can design optimization.

On the other hand, there is the constant assessment going on. You will notice that in the early

parts of this, it is dominated by feedback to the

requirements. Later, it is dominated by feedback to compliance and always there is an opportunity to feedback and question your regulations and your mission needs. It is just a thought framework

[SLIDE.]

MR. ROBERTSON: One of the things that naturally flows from having established a technical and cost and schedule baseline is the management thereof. We are early as the M&O into this phase, just getting into it. We are developing the program system manual and have been involved in the budget call and the implementation is underway in this overall arena.

[SLIDE.]

MR. ROBERTSON: Let me give you a mental picture of what I mean by the management of that and the decision making process. The first thing you do in establishing a baseline is to agree at what levels of work breakdown structure for each program element or activity is going to e delegated to the program level or the project level.

It might be different for cost, schedule or technical. It might be different. As a matter of fact, generally speaking, it is different. You generally wind up delegating in terms of costs, you generally will delegate more flexibility to that than perhaps some of your technical

requirements, real technical requirements.

But in any event, you establish whatever this is. Then you have a variance process by which you analyze what is going on. You have technical performance measures for all elements of this program.

You analyze them at various decision points and then you take a look at the fit against the regulatory and institutional codes, standards, functional analysis, costs and schedules.

If you are somewhere in the bad zone, you come in and do an assessment of the risk of that, contingency planning on that, you look at all of the technical costs, schedule change management and out of that comes some changes.

Depending on the level of the change, they go to ESAAB, the program or the project. Those approved fixes and/or updates to the baseline are fed back and you manage the system.

[SLIDE.]

MR. ROBERTSON: It is much more difficult to do that on a site characterization program than it is on building a piece of hardware, however the principle applies. By the way, it is the way you are operating now. It may not be

clear to everybody but that is the way they are operating now.

In the configuration management which is one of the underpinnings of the change control process, we have been heavily involved in that. We are developing the configuration management plan at both the headquarters level and the project levels, really more of an update of these at the project level.

We are establishing the programs as I indicate both at the MRS and the transportation and waste acceptance since those don't exist yet. Carl has one because of where his project is and we are in the process of transitioning that activity to the M&O as we speak.

[SLIDE.]

MR. ROBERTSON: Again, for those of you who are not familiar with the change control boards, they are the mechanism by which management exercises its authority. Don't hold me to all of these numbers. This is preliminary. But as an example, you have a change that results in a $50 million dollar or five percent cost impact or greater than six months schedule slip, you have to go up here to the ESAAB for approval.

The program control approves all class 1 ECPs and

perhaps greater than $2 million and less than $5 million and approves anything that has a schedule impact greater than two months and less than six.

Below that, the project worries about them.

Again, one of the definitions of an ECP Class 1 is that it impacts one of the other major systems.

As an example, if Carl has a design change that results in a thermal loading profile that impacts the requirement for the MRS, that gets analyzed at the program level.

Now the design contractors are out here designing things and they have to have flexibility at a certain level to do that and manage what we call class 3 changes. For those of you who have been involved in the management of large programs, there is nothing unusual about that. That is the kind of structure but I think it is important for you to know that they are operating this way now. We are just adding some structure to the documentation in getting that system up.

In the system study areas, there has been a lot of discussion about this, the system studies, and I agree with Dennis that they are very important. I want to point out though that this is not a simple sequential process.

There is a tendency to say, "Do all the system studies. Figure out what everything is and then you can move into

the next step." This is a never-ending process. As I showed you before, these feedback loops that are occurring are occurring all the time.

When we talk about the sort of thing that Ron Milner spoke about yesterday, about the casks, yes, there is a time frame in which you can do that physically. Generally speaking, it is a cost to you the further you delay that decision.

It is more of a cost than it is a schedule impact, especially on this program which by in large is more focused on what is acceptable as opposed to what is feasible and cost driven.

As a matter of fact, that is one of the difficulties we have in this as a normal mode is that the guys you will see in this throughput study had a great deal of difficulty figuring out what is the right index. You say, "well, do the standard discounted cash value of what the cost is to you." Well, on a 50-year program of four percept DCF, you know what you spend after ten years doesn't mean much.

So you get into some of those problems that have to do with the measurements index. But we do have three studies that are underway. I will talk briefly about those and you

have been briefed on some of these and as we get into them a little further, I believe they are scheduled for subsequent briefings.

[SLIDE.]

MR. ROBERTSON: The throughput study was to take a look at the design basis, the throughput rate design basis

for the system elements and basically to determine the sensitivities to any operational changes that were associated with that.

We are looking at multiple measures of effectiveness, transportation miles, cost, handling, number of handlings and so forth. Again, we are trying to work through that. We are looking at the EIA Database.

We are using some of the existing models and systems that already are in place. We do need as a second cycle to this to go back and look at some of the innards of these a little more carefully to see how significantly they might be influenced by the assumptions.

That got initiated last summer. There is a report which I think we have just recently issued which is kind of an interim report and we are scheduled to have this one completed in 1992. I think Bill Bailey has briefed you once on that.

[SLIDE.]

MR. ROBERTSON: Let me preface the discussion of this hot versus cold repository because it is an item of current interest. As many of you perhaps are aware, there is a hypothesis that if you keep the region surrounding the fuel above the boiling point of water over its lifetime, then you might have a pretty good case for not ever having a release from the canister or it certainly is an enhancement.

In order to accomplish that, you have to have a certain thermal density, power density, in terms of heat load per acre so-to-speak. As you perhaps also are aware, it is a complicated problem because it can't be too hot to begin with because then you run into stress fracture problems that you don't want to induce but it has to be constant enough for the period of time that it is going to be okay.

That implies that there is a certain mixture of fuel in its aging and temperature profile that you would attempt to put into that density. It should be readily apparent that that has major system implications.

As an example, if you decide that that fuel on the average has to be 65 years old or something like that to get you to that particular position, I submit that we have a problem in proceeding with that as a design concept of loading that thing in 2010.

If we are going to have take open each canister and mix each individual fuel element into a canister to make sure that we get the right balance in that one, then that might mean that we need an MRS that will handle 20,000 metric tons, not ten, and it might mean major throughput handlings.

So one of the things that this system study will do is given certain thermal profile requirements and the

associated demand that that places on what fuel you might put in there, and Carl and his people are working on that along with the guys from Livermore on different profiles, given that they were to give us two or three of those sets, maybe a cold, a baseline, keep it dry for a thousand, keep it dry for ten thousand years and what do you mean by this in terms of the mixture of fuel, then we can do some analysis of that and say, "What are the system limitations?"

And if the limitation says that there isn't any way to do this until 2060, then I suggest that we might ought not to do the fourth order derivative of how good that is going to make the performance assessment on the repository or at least until we get Congress' approval or somebody else with a higher pay grade than me.

We just have started this recently and it is going to take a while to get there but we will begin to start that iteration process. Some of our people have already been meeting with Carl's team out there and the people from Livermore.

[SLIDE.]

MR. ROBERTSON: Again, that is the general concept that I think you are going to see us ask for or try to inject into the program where many of these ideas that come up are excellent and I think Carl made the point before, we have to be very careful not to confuse people because we are

looking at something as an option or something that might be an enhancement and confuse them that there is any lack of commitment to the exercise of our current technical baseline.

That system study process is a good one to bound that problem and make sure there is reasonableness before we take some of these to the next level. One of the things that is pretty apparent is that at the rate at which we are proceeding with the MRS design, there are a number of decisions which will impact the MRS and its design.

Before we get to the point where we go site specific

and where we get into making some major decisions about whether or not there is going to be wet handling, or whether or not there is going to be any handling in the particular design of the MRS, we have to make some decisions on some of those.

Here are a number of issues that we are taking a look at as they are oriented at producing first order recommendations that will affect the conceptual design. This will be an ongoing process as we refine these and bring them into match-up with the final configuration.

I don't know whether or not you all have been briefed on these as a general thing or not, have you, Dennis?

DR. PRICE: Yes, we have.

MR. ROBERTSON: This is scheduled for completion at the end of March or thereabouts and that is somewhat co-incident with headed towards the first conceptual design end up with the MRS. But obviously each one of these things, we are not going to go into them really deep but we have to look at them at some boundary conditions for purposes of the conceptual design.

Some of these will be driven by the requirements that may be levied by the potential host and we have already heard a lot of that.

[SLIDE.]

MR. ROBERTSON: I will touch briefly on the contingency planning thing but this is almost a duplicate of what John put up the other day. We have been involved a great deal in the contingency and the strategic planning process. We have done some thinking about the process itself along with Tom and I think we are making some progress on that.

We have two plans in terms of contingencies that are underway. We have two others which are being looked at. We would all like to think that this one, we could put less emphasis on and this one as John pointed out with the number of sites that we are getting, maybe we don't have to deal with that one as much.

But these things are in process and we will be

getting those finished up, I would imagine, later on in the spring.

[SLIDE.]

MR. ROBERTSON: The performance assessment area is one that we have been pretty heavily involved in in integrating the overall participants' efforts and developing an overall performance assessment strategy.

We reviewed about 30 models and evaluated those and we have been working with the guys at Sandia and the other

principal investigators that are involved in the development of the models which represent the particular phenomenology that is associated with the performance and in the process of heading towards a first round total system performance assessment which should be finished in the early spring.

I think we are making very good progress in that particular area.

[SLIDE.]

MR. ROBERTSON: I want to put this particular chart up to perhaps give you a visual reference about what our view of performance assessment is because it is a little broader than is generally used as performance assessment being only that portion that is associated with satisfying the definitive regulation.

We see performance assessment as the kind of hub

to this whole thing. Clearly, it has to answer the mail because we are required by statute to predict the behavior and see to it that we have satisfied the regulatory requirements.

In a broad, broad context and public is pretty broad, but generally speaking, they have some public expectations of what they are expecting out of this thing. Performance

assessment should be used for comparative risk analysis to feed back to that to satisfy to the degree that you can these public expectations.

Clearly, it indicates to you what your tools need to be, what your tool kits, your models, your analytic techniques and so forth are and it is interfaced with the waste package, the exploratory facility and the repository and the site characterization is much an indication of what your design requirements are and what kind of information you need back from this process in these loops.

So it plays at least in our structure of thinking a little bit broader than just the pure satisfaction of the legal regulatory requirement.

[SLIDE.]

MR. ROBERTSON: Our strategy that we are following is to base it primarily on licensing but with an eye that public acceptance is importance. Now there are those who will say to you that ultimately public acceptance is getting the license and I agree with that, but in a legalistic sense that it is true but you do have to deal with the public. There is a political system that exists.

We need to predict the system behavior, provide those risk assessments. We have to gain the scientific community's acceptance because if you don't have that

acceptance of it regardless of what you have done there, you won't have that credibility.

We believe that you should strongly look into the international programs, analog studies, publications, peer reviews. Important, we need to drive the program by setting these requirements and evaluating them, identifying the weak links, resolving is perhaps the operative word. We are never going to close a lot of these in deference to Mr. Frishman.

[SLIDE.]

MR. ROBERTSON: Also, as you have seen everybody talk, this is an iterative process, too, constantly operating to identify data needs, build confidence in your methodologies and results, provide assurance that you are going to meet these milestones and then support the resolution of the issues. Ultimately, it has to meet the license application needs.

[SLIDE.]

MR. ROBERTSON: We have talked a lot about the licensing process yesterday and we are clearly on board in terms of this is where it meets the road. We have a major responsibility in the licensing area. We are preparing a licensing strategy document, not anything very profound but at least it will give us all a common basis to be sure that

we are moving down the same path.

We have developed a management plan for the license application. We are in the process of generating annotated outlines for both the MGDS and the MRS. We are going to now with agreement with the NRC be on a twice-a-year cycle with them of producing this annotated outline and using this as the vehicle to get agreement that we understand what the requirements are, have interpreted them properly and are going to be complete in the data needs to the extent that we know how at this juncture based on what we know of getting that.

The first sets of those packages have been submitted to NRC for comment and guidance and we are leading this issue resolution initiative for the program and I second what John's comment was yesterday about that process.

I think he well captured it. It is very clear that NRC is extremely comfortable with that as a vehicle for bringing to as close to closure as you can prior to the actual license issue.

[SLIDE.]

MR. ROBERTSON: Let me just put this slide up here briefly. I don't really expect you to be able to read all this, but let me just make a comment or two because this is a more visual thing.

First of all, this annotated outline for the MGDS is about like that. This is the outline. One of the things that a person does is take a given section and he has the responsibility for this. It is scheduled out as to when these packages occur. There is a section for summary for this section. There are a hundred words written in here that will say what this section is intending to answer in the way of the mail.

There is generally an opening statement about what would be the opening statement of that paragraph just so that everybody kind of gets on a wave length of what is it the guy is going to tell you. Because if you can't agree, you and the NRC, about what this whole section is supposed to be in a hundred words, we are going to be in deep trouble.

One of the most important aspects of this though is that as this guy goes and starts developing this outline, this annotated outline, he starts to begin to identify what data he needs. Not only does he decide what data he needs, as an example he may say, "I need to know the size and the make and the safety records on all of the ventilation fans that are going to be in the exploratory studies tunnels. I have to have those by September of 1996 and those are going to be furnished by Joe Smith who is a part of the REECO team

that is going to purchase those."

From that comes an information request. Joe Jones now has an action item complete with whatever it is going to require. Obviously, if he can't furnish it by then, there is negotiations. So you get this in sync.

Then another item which is often overlooked which is absolutely imperative on this program is references. Those of you who have been in the licensing process before know the agony of getting to the end with a beautifully written structure about what you are going to do that references a document that supports that and then discover that that document never went past draft, because that is a disaster.

So you list all of the references you are going to use. These may be a figment of somebody's paper that he has written or something but this says to you, "Make sure that Sam Smith gets this thing finalized at some point" or I have to go back and change the way I deal with that back here.

This is a process that allows you to have some control, some tracking systems can be developed and so forth. No one is going to get rid of us making human errors but at least this is an opportunity not to let things fall

off the edge of the table and bring some discipline to the process.

[SLIDE.]

MR. ROBERTSON: Moving to compliance, we are working on conformance matrices, technical performance measurements and as I said before, I still subscribe that a requirement is not a requirement until you demonstrate how you are going to test or satisfy that requirement and therefore, that translation is extremely important, that we get these generalized performances moved into some measures of performance.

The overall test and master plan, we are working towards. Risk management plan is in the works. We are doing continued research requirements and we are working on a system for automating the requirements overall so that they can be tracked, linking them back into the annotated outline. Lots of good work has been done by Weston and the Battelle people in that general area as well as Westinghouse.

[SLIDE.]

MR. ROBERTSON: In the site characterization and technical direction area, we are just beginning to move into the transition of the technical direction role. We have been concentrating on looking over the surface-based testing requirements and, to speak of Carl's train, we are trying to get on board the train because it has left the station.

We are looking at the development of the work packages and the coordination of that, contingency planning and interface out of this into the annotated outline. We are particularly looking at test interference analyses, GROA versus the ESF and the surface-based testing and we have been involved in the seismic program largely because of Tom Statton's experience and background in the seismic program.

[SLIDE.]

MR. ROBERTSON: My model of what we are trying to do, the word is "convergence" and I don't care whether you argue whether the site characterization plan arrived by a beautiful system engineering analysis, top-down structured functional analysis, carried down to infinite justification of everything you ever were going to do, or a collection of heuristic thought about let me check everything I could ever want to know about the site, I don't really care at this juncture.

What is important is this process that we are dealing with must lead to some convergence. We have a site characterization plan. We have an annotated outline and issue closure going.

We have designs going on and we have performance assessments and we have data cycles going on. Data is being picked up off of the program, fed into these functions,

cycled back and forth and additional data needs identified fed back into the site characterization program, redirected fed back into it.

No mystery. This is the simplified version of what you saw yesterday in that overall site characterization logic diagram. The important thing is this thing has to converge and what does it have to converge on, the license application.

The biggest concern that all of us should be having is the duration of these data cycles. If you have a test that you are running that takes 15 years to get the answer out of, that is a data cycle that may say it is unuseful, can't use that data, therefore, why are we going to do it.

I believe there are some good object lessons in the lengths of these data cycles with regard to the foreign programs and the international programs that are going on which we have some people working right now with Tom and his people to look carefully about the lessons learned out of that from the standpoint of testing the usefulness of certain data.

Notice that these are functions that are being bled off. Clearly, the principal investigators are continuing their ultimate mission to wind up with a finished product of what they are doing that feeds into this but we

believe that it is our principal job to slip stream this data if you will.

As that data comes off, you slip stream it. The first thing being, did you get the core you said you were going to get and if not, let's go back tomorrow afternoon at 3:30 and try again. What does it tell you, first order? Does it tell you that one hole is going to be enough? Should we go back and plan another one?

Then as you go further, what does it tell you when you bleed that off and run it through the system performance model? What is the impact on the design footings, roof bolts, whatever it might be? How is it dealing with providing that data that is necessary to get intellectual closure with the NRC in a technical sense?

[SLIDE.]

MR. ROBERTSON: In the design and construction management area, we are heavily involved at the moment with a team of some 60 or 70 people, principally Duke but with a lot of Fluor people involved as well in the MRS design work. We are planning for the assumption of the Title II design in October of this year for the ESF.

We have developed an EBS strategy document and I say developed, it isn't really developed yet, it is in the early

draft stages that we are working on. We all would like to see more effort in that but we are doing some work in that.

We have been doing some work in the construction management plans for the ESF and we have been principally focusing on being sure at least in the fiscal 1992, given the limited design budgets available to all of us, to concentrate on this interface and then, of course, we are moving as John pointed out on this Phase One cask procurement. That is moving with a good deal of rigor.

One of the things by the way that we did on this conceptual design is that we also put out a separate procurement. We went out to industry and said, "We will pay you to develop a phase zero study of applying your off-the-shelf technology for storage so that we can understand that in a format that can be used in the conceptual design of the MRS."

So we are expecting ultimately to award three, four or five contracts to different people who have current nuclear waste storage technology and we will pay them to put that data in a format that will be useful for us in the conceptual design and also get a long term commitment as to what cost levels that they would guaranty delivery of those particular sub-systems.

Therefore, we can take those as kind of off-the-shelf pieces to be dealt with as a part of the conceptual design. We are very near letting the awards for those or at least sending those back for DOE's recommendation, very close to that.

[SLIDE.]

MR. ROBERTSON: In our outreach area, we believe that outreach is an integral part of the system engineering process. This business of what is acceptable has to be factored into your system engineering process and the understanding of that. So we believe that is closely coupled.

We have developed an environmental assessment outreach plan for the EA for the MRS's. We have been doing a lot of identification of key issues for the various potential communities on the MRS and given the recent activity, we are clearly turning the gain up there.

We have given a lot of support to the Nuclear Waste Negotiator's office through DOE in terms of working with them and we are working on the transition plans for a lot of those. We have done a lot of tours to the different storage facilities and in supporting some conferences, the standard sort of thing.

[SLIDE.]

MR. ROBERTSON: Mr. Frishman, here, he is probably going to get concerned with me about closure again, but I believe that the objective of system integration and system engineering is closure; closure in the sense that we will have a process that is formal, we will have a process that leads to forcing people to get closure on certain issues and move on to the next phase of analyzing things.

We can't continue to deal with this tent with every piece of the flaps in the breeze. At some point, we have to nail some things down knowing that we have a chance to change them but we have to have a way to get to closure with confidence. Closure without confidence is no good. It is like the guy who said, "Action without a plan is a disaster. A plan that is not executed is nothing, but when a plan comes together with action, it is a thing of beauty." Somebody on the "A" Team said that.

[Laughter.]

[SLIDE.]

MR. ROBERTSON: In my term, "closure," these are what I believe are the tools of closure. These are the things that are available to you as the program managers and the program executives. These are your tools. The design control management processes is just as much a tool of that as anything. It forces people to come to the table. It

schedules reviews. It ties things down.

The translation of the requirements into performance specifications, reviewing these things both from a requirements, design and compliance, having an overall test and evaluation plan, the annotated outlines, system performance assessment at the system level, this issue resolution process that we are using which is tied back with the annotated outline and clearly, the system studies and many of the system and subsystem models are elements of your tool kit.

[SLIDE.]

MR. ROBERTSON: Where are we focusing as an M&O right now? In the near term, I think it is important for us to follow through on John's original initiative on the MSIS and bring closure to that process in the sense of having a set of programmatic documents which match this program and satisfy DOE's program management requirements as well.

We must get in place in some of the cases where the MRS and transportation system are beginning to evolve the technical baseline documentation. In other cases, in Carl's case, we need to bring some of those documents more into a specification as opposed to a requirements document for some of those who might know, more of a design spec, and we will be working with, well, we are already working with them and

have made a lot of progress with that.

Clearly, the conceptual design on the MRS is a short term measured goal. Not only do we have to have that from the standpoint of the scheduling that we talked about, this squeaky 1998 schedule that we are all dealing with here trying to keep it on track, but also we need those fundamental building blocks to be able to talk coherently with the potential hosts.

Some of these guys have some pretty rigid ideas. One of the things we found out from the Mescalero's is when they saw one of the tall buildings out there, a rumor was running around the community that that was a reprocessing building and so they wanted it eliminated. We have to get some of these concepts and building blocks so that we can deal effectively with that.

I think the siting, outreach and the environmental assessments associated with the MRS are important. Clearly we are pressing on this Phase One casks. Integration of the performance assessment has been a high priority and based on everything you have heard, I don't think you have any doubt about the importance of the annotated outline and the strategy.

Systems studies, they are not as robust in terms of the numbers of these that we are doing yet but I think we are

making good progress there. Readiness reviews, getting our own QA program in place, and we just conducted a readiness review on the M&O's QA program as it is applicable for it to do design work on the Yucca Mountain project under the M&O's program. We had DOE's surveillance as well as NRC and we believe we passed that with high marks and are going to recommend to DOE that we be allowed to proceed under our program to do limited design.

We have a similar review coming up in early February on the MRS and then in March, we have one in which we expect to have the entire system, the entire M&O system fully blessed. Again, the work that we are talking about with Carl's people and with John Roberts' people on getting these issues on the table, getting some closure, getting some agreement as the process at least to put them in a box, I like to think of this as an impedance box.

Those of you who know about impedance, you know Mr. Frishman says you can't close an issue but I think you can put it in a box with a high level of impedance and it doesn't get out of that box until something drives it out.

That is what we have to do. Keep so many of those things from running around on the table at one time and I think we do need to continually be looking at the strategic planning for this program and the contingency aspects of it,

never confusing ourselves as to what a contingency is versus our baseline program, and as our baseline program becomes more clear, that ability of confusion perhaps will go away.

[SLIDE.]

MR. ROBERTSON: In the mid term, we expect to begin to move into a full technical direction/integration of site characterization, complete the technical baseline documentation, get the system performance level assessment in a standard iteration going, move into the Title I and Title II, assume the Title II on the ESF.

We see engineered barrier system and MGDS conceptual work starting in 1993 moving into a good bit of heavy activities. Clearly, we are going to continually be working on the systems and subsystems models and beginning to take a look at the overall test and evaluation master plan, honing up the configuration management system and setting up regular cost, technical and schedule review of all the participants.

I am sure that is welcomed by everybody.

[SLIDE.]

MR. ROBERTSON: Long term, or longer term, let me not put long, let's see, that is the early part of 1993 focus at mid-term and this is a little bit longer from there, but I think at some point the M&O is going to be asked what about

the overall program costs, schedule, baseline, is the $6.x billion dollars the right number and I believe that as we move into this program, we working with DOE have a major role in evaluating and updating the overall program baselines.

I think Carl's program is and one might quibble about what the number is but I think he has a lot of baselines that are in there that are pretty good. But in terms of adding them all of up to a program including the MRS and all the other things, we are in the early stage of defining that. So we want to try to bring that in.

We hope to be moving into a lot of design and compliance reviews because it is these tables where you are essentially in the rubber room and the blood can flow freely that you really get to ground truth on where these problems are and it is this review process that is conducted.

Again, continued focus on convergence of the site characterization in the design and licensing need and then, of course, you are going to be more into the model validation end of things.

[SLIDE.]

MR. ROBERTSON: In summary, I believe we are facilitating program-wide systems engineering and integration even in this early stage and I think that is a

tribute to the team of people that are on board this program. Much of the capability was brought to the table as they came on the program.

I think it is a tribute to John and Frank and his staff that they have allowed us to come into many of these roles taking the risks that they did in many cases that we were going to step in our underwear or something in this whole process but I think that generally speaking, that has been a very open environment.

I think that it has worked very well and I believe we are having an effect. I will point out though that the concept of an M&O is a significant cultural change to this program and, in particular, this being the first M&O ever at the headquarters level and the first M&O for a program as opposed to an M&O for a government facility.

Therefore, we beg a little commitment, patience and sensitivity in this process.

The ultimate success of this and its inculcation into the basic culture is going to be evolutionary. It is not going to be revolutionary. You are not going to wake up one morning and say, "Man, I have system engineering." It is going to take time and it will occur and Ray and I were talking yesterday afternoon, having listened to the all-day session yesterday and compared it to the Atlanta meeting

that we went to some time ago, early on, in this program and this program has matured significantly.

We have had a part of it but it is a maturing process and I believe that we are getting there and that is kind of where I am with it. Thank you.

DR. DEERE: Thank you very much. I think we will begin with some questions from the Board. John.

DR. CANTLON: Robby, if one now looks at the role of the M&O and looks at where the program has been particularly paying attention to the critics and the hyper-critics in the DOE and particularly those in the scientific and technical community, it is fairly important, I think, for the Board to have some kind of feeling about the M&O's approach here because one way one could go at it and I listened very carefully to the way you referred to the base plan, one of the criticisms of DOE has been that much of what they do is trying to assemble justification for an already-chosen base plan and you said, let's not do anything to perturb commitment to the base plan and I know I am putting words in your mouth but roughly.

It would seem to me very important here to take a sort of scientific evaluation where you put a lot of energy in trying to disprove your theory and disprove your base plan so that when you look at, let's take for instance, the

thermal loading alternatives, you don't simply assemble all of the data to make sure that you can rule them out of the way.

MR. ROBERTSON: Right.

DR. CANTLON: Could you give us some critical point of departure here?

MR. ROBERTSON: Let me put that in two categories because one of them has to do with the overall program and its credibility if you will or where it is. I guess where we are right now is given the maturity of this program where it is and everything and what we know about it as the M&O and I am now speaking from my view of it, you can't say that "Man, this thing has got all these major problems." It hasn't.

Now we have not done a very good job, and I use "we," we, as the M&O and the team, have not been doing a very good job of explaining to everybody. And I believe the fundamental tenet of this meeting is a good indicator. You are asking some hard questions of a program manager. What are you doing with this money?

I believe that this has been answered. Perhaps we haven't answered it before. Otherwise, the question would not have been raised in terms of that issue. I believe that in terms of the M&O as another entity that has some

independence in the sense of looking at this thing, being able to say, for instance, "Is the $6.x billion dollars right?" is premature. I can't answer that until I have a lot of data, a lot of integration. I wouldn't even begin to attack that.

However, on a performance assessment thing, we have already said, "We can drop this study. We can drop this model. We can quit doing that. We can stop doing this and focus on this and bring these things together." So, at the subsystem level, if you will, we are beginning to do that.

It is somewhat, to you, transparent. You don't see it. It is occurring as a natural evolution of the program. I do believe that the question is a valid one which is, is there danger of the M&O becoming a part of the problem, as opposed to someone who is going to look at this thing objectively and try to bring light to all of it, for us to deal with.

I believe that we are being charged by management to do just that. I believe we would be irresponsible if we tried to do that in the absence of data and, therefore, I can only give you an assurance that we are working towards that end and, certainly, will be doing it in a programmatic sense.

John.

MR. ROBERTS: I just wanted to point out with one of

the prime topics discussed here, the ESF, is an example and not to misconstrue, if you looked at our internal process and this, admittedly, caused some strictures on us but we maintained the existing baseline and continued through on it and Carl and his people until we reached the point where internally we went to ESAAB and began to make the change to following recommendations from NRC and TRB with respect to that.

So it is not that the maintenance of a baseline means that we are not sensitive to the need for change, to the requirements that comments and data bring in. It is that it is an orderly process that we are trying to do here. Because otherwise, as was commented on, I think, yesterday, when we present ideas or potential contingencies, they shouldn't be confused with "Here is what the program is doing." We are open to change but it is orderly controlled change.

MR. ROBERTSON: I think when I say "protect the baseline," it is very important that you don't confuse yourself because you have a cast of thousands out here working on this problem and, therefore, you don't want to confuse them about which roadmap they are dealing with.

It is always nice to change the map sometimes and say, "Okay, here is a new map" and then we know where everybody

is when they start on this next leg and we don't lose them in that process.

To answer the other question which, perhaps, is a different level using the systems engineering studies and things of that nature as an adjunct. I believe that you will find that we are motivated to try to make the right blend of pragmatic decisions so that we don't waste a lot of effort looking at something that is precluded by some other feasibility limitation, that we are going to be oriented at trying to muster all of the intellect and peer capability that we can to the problem, so that it gets the right amount of light and discussion, and then try to crystallize that into the best pragmatic solution of that and move on having carefully documented what we do, and have done, and what the decisions were, as opposed to saying, "Hey, this is just completely right."

It may not be completely right, but it is the best, perhaps, that can be done given what all of the factors are and I believe we striving for that objectivity and I believe that the history of the contractors that are on our team will indicate that that has been a history of them in their performance.

DR. CANTLON: One follow-up question. The other element as you look at that and again, this is one of the

criticisms that has been leveled not explicitly at DOE but really at the U.S. approach to the problem and that is that it is driven by a set of regulations that exist as opposed to a somewhat more open idea of long-term public safety that one might focus on the explicit defined regulatory words and miss out on longer term safety.

I didn't see anywhere in your presentation the word, "safety."

MR. ROBERTSON: That is a very good point and my guys have been teasing me lately because I have a saying that says, "Comatose compliance does not a safe system make" and I think that there is a danger of us focusing on the regulation and think, "By God, I am going to satisfy all those regulations and that is it, I am done."

That is not the answer. The regulations are clearly a surrogate for public safety and it is imperative that we go down the path of demonstrating public safety and therefore, also saying we have satisfied these requirements. We are going to satisfy them, but if there is a case where we are demonstrating public safety and we are absolutely convinced of it and it still doesn't satisfy the requirements, then maybe we ought to examine as to whether that was a real proper surrogate for the public safety.

But I think you are absolutely right. There is a

danger of focusing on stretching the underwear and sticking the label on it, as opposed to building the quality into it that really results in the safety.

DR. DEERE: Would you be able to put slide 16, page 16, and then after that 20?

[SLIDE.]

DR. DEERE: I am referring to the lowest level that you have on the left hand side actually.

MR. ROBERTSON: Level three?

DR. DEERE: Yes, level three, "Approves all Class 3 ECPs and field changes as required."

MR. ROBERTSON: Correct.

DR. DEERE: I think experience has shown us on many types of projects that the system has gone wrong and the project has been in great failure because of a decision at level three that didn't have the necessary control by the design.

MR. ROBERTSON: Correct. However, in every case an ECP that is processed here is reviewed by this next level to see if they concur with the proper classification of it. That is done in each case and we as the M&O are the secretariat for each of these boards, not here, but for these.

So we will be staffing those changes as they come through and you perhaps will notice that I am using a term,

"engineering change proposal" which really means exactly that. It is changing the baseline; schedule, cost or technical.

Now this change process applies to the management system as well but we are dealing here with configuration control but you are absolutely correct. Without that cross-check, some guy makes an assumption that I am going to be able to do this and it is within my purview, that is why you have to set down some fairly firm rules.

On all of the large programs you have different levels that they operate at. One of the major things that occurs here is that if you are affecting one of the other projects (indicating). One of the major things here is if you are affecting one of the major interfaces with the subsystems or that you are having certain kinds of schedule or cost impacts as well. And again, for this system to work you have got to have a very definitively documented reference as to what you are dealing with in terms of requirements and interface documents because you can't hold this guy accountable for violation of an interface if he doesn't know clearly what that interface looks like and so it will make this guy's job impossible at, this level, to make sure that that has been properly delegated.

DR. DEERE: I think part of the difficulty that has

come up on other projects is that the original designers who know very well their purpose and their logic in reaching the design and coming up with a certain thing, many times are separated from the field construction group, and the inspection control group, that are following more systems specifications. And they say, "Well, this change which the contractor has proposed, a very minor change, obviously, it is a little cheaper and faster to do this way, we will approve" but it may completely have fouled up the design intent.

MR. ROBERTSON: It could well be, but again, that is one of the responsibilities of the construction manager to make sure that that doesn't happen. And then, secondly, this system had better be designed; both in the mechanics of the way it operates, and its documentation process, that there is a way that this system can be alerted to those and take a look at it. At some point, you are going to have to trust somebody.

As an example, if I have turned a guy loose to do a design of a communication system, as an example, and I have carefully constrained what my interface requirements are for him, hey, I don't care if he changes brand names of the receivers, and so forth, as long as he hasn't violated my outside parameters, or changed my mean time to repair or my

availability factors or whatever I have levied.

But you are absolutely correct. This assumes that this is done right.

[SLIDE.]

MR. ROBERTSON: There is a whole herd of things below this that are at the next level. This is where you really have to be careful. You have to make sure that whatever is important up here is left up here and what you are going to delegate to this guy down here is truly delegatable and that there is a proper interface document written between these two things, MRS and the repository and so forth, has to be. Otherwise, no system like this will work.

DR. DEERE: Perhaps then we could look at page 20.

MR. GERTZ: Excuse me, Don, while you are going to that, I would like to relate some of our actual experience at the field level change because when we started Midway Valley calcite/silica and we started the recent neutron drilling in September we had several field level changes and we did have to fine tune our workings of the board to assure the principal investigator was involved and the architect engineer who was designing pads or whatever was properly involved before all those changes could go through the system.

So we are very sensitive to that issue that you brought

up and I totally concur with you, that the person responsible for the original design has to concur in the change to that design or the investigation if it is a scientific investigation, the PI has to indicate that that is acceptable.

DR. DEERE: You can see where this interface could be a problem because if people that are in the field and the construction engineers and the inspectors, they are going to do a job.

MR. ROBERTSON: Absolutely. That is what they are paid to do.

DR. DEERE: This is what they are in there for. Do it right, do it efficiently and keep their schedule going and if there is a change and it is just a little work matter change to them, well, you pour the concrete in three lifts instead of two, well, this is even better. It may not be. You have created an additional joint that could lead to a failure which has happened.

MR. ROBERTSON: Right.

DR. DEERE: Things such as this seem to be minor because they don't really understand the purpose for the design and that is why I think you have to go back to the PI or to the design team that they really know that this is true.

MR. ROBERTSON: True.

DR. DEERE: Now it can come rather easily on many government projects because in the past the design group also had field construction. They were also in charge of that so the design intent always carried precedent and everyone knew what it was but later we tended to go to two contractors or maybe three. Maybe they have a preliminary conceptual design and then later you go out for the detailed design and it goes to another design firm and then it goes out for construction and they go out for bids and they get a third person for the construction control and construction engineering and that is where if any change is made, it can slip through. I just wanted to emphasize that.

MR. ROBERTSON: I agree with you and I think one of the responsibilities of the M&O is to make sure that that corporate memory is followed through with those requirements and there is a valid interpretation of it all.

DR. DEERE: Exactly.

MR. ROBERTSON: I would agree with you.

DR. DEERE: On page 20 then, it says the MRS issues assessment and you are going to have a study initiated in 1991 and a schedule completion in March of 1992.

[SLIDE.]

MR. ROBERTSON: This is the first pass at these.

DR. DEERE: All right.

MR. ROBERTSON: In other words, we are going to have a first output of these. The purpose of this date here is to do two things, is to input to the final conceptual design and to update the systems requirements spec for the MRS so that we are in as a good position as we can be and have a sound, at least assumptive basis, to begin on Title I. That is the purpose of it.

Now obviously you know that you are going to be continuing to be refining these all the way through Title I and Title II.

DR. DEERE: I will go into one specific one, the impacts of hot versus cold repository on the MRS design.

MR. ROBERTSON: Right.

DR. DEERE: It seems to me that there are issues that are being studied or hopefully are going to be studied over the next few months or over the next year or two that may impact what you would like to do on your MRS design and you are not going to have a decision yet.

MR. ROBERTSON: Correct.

DR. DEERE: Yesterday we talked about the casks.

MR. ROBERTSON: That very point that you made is in itself a decision. As an example, we may make a decision to

move into MRS Title I design leaving some options that can accommodate a range of things knowing that we are not going to have a final answer on this yet.

DR. DEERE: Yes.

MR. ROBERTSON: But even that says you carry two. As an example, right now we are carrying three different things forward. At some point, we are going to have to decide. We can't carry wet storage and a vault storage and dry transfer. We can't carry all those through to Title II, but we are carrying them through conceptual design.

DR. DEERE: Right.

MR. ROBERTSON: This narrowing process will have to occur there as well. Many of these studies may tell us that we don't have the answer yet and therefore, you are going to have to accommodate some winnow with that.

DR. DEERE: Let me give a second example. Let's say that the in-drift storage concept which has many advantages from the construction point of view, it has advantages from different types of ventilation to maintain, you don't have to wait 60 years, you can put it in whenever you want and then you have a ways of controlling the temperature, but these concepts are not going to be studied and come out with a yes or a no on whatever one happens to be developed for certainly another two or three years.

MR. ROBERTSON: It could well be and so if we make a program decision that that option appears to be significantly viable passing some threshold of probability, then you may well decide that you had better design the MRS to accommodate that option.

DR. DEERE: Right.

MR. ROBERTSON: Like all engineering decisions, you have made some kind of sunk cost decision that is not optimized but it is going to cover the uncertainty.

DR. DEERE: I think that is the important thing because there are some thermal loading concepts that are being examined now.

MR. ROBERTSON: No question.

DR. DEERE: There has been very little work done on the cask design, on alternative designs, even on concepts and so we just wanted to make sure that moving forward to a 1998 MRS doesn't close the types of studies that still are going to be coming forth.

MR. ROBERTSON: No question. The studies are going to be an un-ending process. It will be continuing. As he said, you are not going to start accepting until 2010. There is a lot that you can go back and retrofit.

I think all of the concepts in terms of general layout of the MRS sites that we are looking at are making

sure that we have enough room in a physical sense to accommodate coming back in and deciding that we perhaps ought to do this and maybe we will do some of them in phases.

As a matter of fact, the first one might be parking lot, you know, with a lot of asphalt or concrete and you bring them in and park them for a while with some emergency handling situation in the event that one of them is breached or something, but beyond that, that may be phase one. Phase two, maybe you move on to some building the rest of it so I think it does have to be phased.

DR. DEERE: In that particular one, it is really an alternative conceptual design.

MR. ROBERTSON: Correct.

DR. DEERE: It is not a design detail that we have the concept fixed and just a little detail. It is bigger than that because it is going to impact other things.

MR. ROBERTSON: Correct. Absolutely.

DR. DEERE: Obviously, you can't keep a lot of those open for a long time but while they are being studied, they have to be open for a while.

MR. ROBERTSON: They can be kept.

DR. DEERE: Yes, Dennis.

DR. PRICE: Dennis Price. First of all, about the top

level studies and the comment that we have had kind of underlying several comments as a matter of fact, that there is a conceptual design and preliminary design and this kind of a phased type of system engineering, the conceptual design work being phase zero and the very start of things where you get involved in high level, top level trade-offs, is there an MRS, is there not an MRS, coupled with the parameter of hot versus cold, coupled with the transportation modal ideas, coupled with the types of casks and the indication seems to be that well, we have committed ourself to certain of these parameters.

For example, I really think DOE has committed to an MRS. I think you have announced that commitment and so you are not providing an MRS/no MRS type of conceptual design evaluation because you are committed to an MRS. But that has not been done at the top level at this point.

So the phase zero conceptual stuff which you indicate now is part of ongoing system studies is starting behind where perhaps in an ideal system and, of course, you have inherited this, these things might have occurred.

At this point "TESS" stands for The Expected System Savior, is that right?

[Laughter.]

MR. ROBERTSON: Oh, Lord, we are in trouble. I hope

that is not the expectation because there are several thousand people working on this program which we are going to have to make our contribution to it but I think the answer to your point is, you are correct. The train has left the station. This program has been underway a long time. A lot of it has been dictated by law and policy and regulation.

DR. PRICE: We are just now getting requirements.

MR. ROBERTSON: The requirements have been there. We get a lot of different interpretations of those requirements, perhaps is a little different to put that as we all get smarter, meaning both us, the regulator and the general public, those who are influencing that.

But I think that the point is that we are at a stage of maturity with the program where the program is in my judgment better served by doing these system studies and then going back and questioning some of the fundamental tenets than it is starting with a clean piece of paper and let's just start all over and question whether it all ought to be there.

I think that is where we are in the stage of maturity with this thing and so it seems to me that the things like the throughput study, the thermal loading, the hot versus cold and things of that nature will, in fact, lead to an

examination of the merits of the MRS and the role it plays in that and therefore, give you some measure of confidence as to whether those are valid assumptions.

DR. PRICE: I was glad to hear your comment about planning the operations of a system, singular.

MR. ROBERTSON: Correct, because it is a system.

MR. ISSACS: Robby, let me add something on the MRS. This is Tom Issacs. I just want to make it clear and I think you are probably aware that the decision by the Department on whether there ought to be an MRS or not was based on a very elaborate and extensive set of analyses that were done over a long period of time.

There were independent analyses, of course, by the MRS Commission who came to their own sets of conclusions on it but there is prior to the time of the M&O, a very thorough and rigorous analysis on what the virtues and costs of an MRS in the system versus a no-MRS were.

I just wanted to add that one of the virtues that was preeminent in why you wanted an MRS goes right to the point that John Bartlett made yesterday which is the flexibility issue. One of the reasons you want an MRS in the system is because the repository won't even start for four decades, will take decades and the very inherent nature of the MRS itself will provide a degree of flexibility for us to do the

right thing when we have to make decisions that we can only get 30 and 40 and 50 years from now.

DR. PRICE: But, Tom, the point that I was making is that there are a number of these top level parameters that should have been mixed together at the conceptual level and MRS and no-MRS, that study would work into shipment modes, casks and some other things.

MR. ISSACS: And many of those things were looked at, again at a very conceptual stage to the degree necessary to make a decision on whether nor not an integral MRS made sense for the system. I have no argument with your point that we ought to continue to try and do those kinds of things as we mature in the system.

But we had to make certain decisions. They were required by law that we make certain decisions and we did the work necessary, we believe, to make what we thought were prudent decisions at the time.

DR. PRICE: I don't want to debate it further. The idea of a system and the operational planning aspect of it, I think is an important contribution to getting this thing integrated.

MR. ROBERTSON: It is important. When we went through our system requirements review in kind of a preliminary form, it wasn't a real formal one because we knew we weren't

quite there, but we did go through a system requirements review and one of the things we started talking about is where is the network that is going to decide what Carl needs to put in the ground out there in his repository and what is coming out of the others.

You have your transportation system and it is keeping up with where things are but you have to have the intellectual center that is dictating because it is going to dictate if you are going to co-locate it with the MRS, it is going to dictate some requirements on the MRS, facilities, communication interfaces and things of that nature if nothing else.

DR. PRICE: With regard to a system and the reason I brought that up as a singular, with regard to your role on page seven where you have the M&O role overhead.

[SLIDE.]

DR. PRICE: Could you explain the system view and I think you would agree with this, starts with respect to spent fuel at the generation of the spent fuel.

MR. ROBERTSON: Correct.

DR. PRICE: That is behind the fence. Could you state how you, the M&O contractor, interface with the utilities, and, hopefully, not through the external office but what kind of direct contact do you have?

MR. ROBERTSON: We are directly supporting Ron Milner's shop in the waste acceptance arena so we have a team of guys, mainly the E.R. Johnson guys, who have a lot of experience and background in utility contracts with waste, the waste handling systems at those different utilities and the transportation systems that they are using themselves

either for bringing in the raw fuel or in some cases transporting it in to some of their dry storage or between their pools.

So in that sense, we are heavily involved in that support role. There are contracts and things like that which they are laying the framework for for the interface with and we are hoping to make sure that we get the right design interfaces identified and put into those contracts so that that is optimized as best as we can.

DR. PRICE: When you are doing your system studies, I don't see how a good overall systems study can be conducted without a very active participation of the utilities and that is what I am trying to get to to figure out how do they get really wrapped into what the M&O is doing.

MR. ROBERTS: Robby, do you want me to address that?

MR. ROBERTSON: Sure.

MR. ROBERTS: This actually would be more appropriate, I think, if Ron Milner discussed it but as Robby said, they are involved in the accept waste. They are also involved in, like as was presented by Ron, the ACR, acceptance capacity report. There has been for years now a continued analyses of what fuel is at the individual utilities and the age of that fuel and other data.

That is all being collected and that is, effectively with the cooperation of the utilities. The utilities also have a corresponding team of people who interface with RW-40, Milner's shop, and, of course, the M&O is coming on board and operating with that.

So there has been a long term continuing interface with the utilities as I say and they have their own organization that interfaces on that.

DR. PRICE: But if the M&O is doing a system study, do the utilities sit down with the M&O and participate in the system study?

MR. ROBERTS: Well, they have before because I know and again Ron would be the better person to discuss that.

MR. ROBERTSON: He is back here. Ron, do you want to come up here and address this?

MR. ROBERTS: I was thinking of the MESC question and things like that that you have had interface between the utilities and your own people and this has gone back and forth.

MR. MILNER: Yes, that's right. As part of the whole waste acceptance process that we have been going through, development of the waste acceptance protocols as we call it and that has been going on for about three years or more, we have had numerous and continuing interactions with

the utilities on things such as MESC's, different types of storage, different types of transport and so forth.

Now the M&O is on board and basically I tend to look at it as a team concept that the M&O/DOE together as a team is interacting with the utilities to try to flush that out further.

DR. PRICE: The reason I pointed to this M&O role, I didn't see the utilities up there anywhere.

MR. ROBERTSON: Yes, but again, you have to be a little bit careful. In the construct of the way you are doing business, there are 113 sites and there are 60-something utilities and I can assure you that that is not a homogeneous glob.

The UWASTE Committee that EEI operates is the surrogate

for trying to get their views from a technical standpoint on this program and both sides of the interface, i.e., the acceptance end of it and what is on the utility side, I think is a fair assessment, and we certainly would expect to be briefing them on these system studies that we go and get their inputs to it.

We are fortunate in having Duke as a major teammate of ours who we use in many cases as a kind of foil saying, "Okay, you are from the utilities, how the hell does this float?" and so you try that in a concept aspect but it is a very difficult thing to get a committee of those guys involved in it perhaps except through that.

Secondly, Ron is trying to deal with these guys in a contractual relationship. You really have to have some formal contractual relationship that you are dealing with them and ultimately if you are going to change that interface, that is a complex thing to do.

MR. MILNER: That's right. Everything we have done in the waste acceptance area has been based on the contract but then we are taking it a number of steps further in terms of detail.

For example, within the next year we will probably be issuing what we will likely call a waste acceptance guidebook, the results of several years of our working with

the utilities on the waste acceptance protocols indicating and delineating what the specifics of that process is going to be.

The way we have worked the interface with the utilities has been through EEI, the utilities have established a number of committees. There is one on transportation. There is one specifically on the waste acceptance protocols. We work through those groups in developing these things.

DR. PRICE: I guess the thrust of my question is well understood and that is that the utilities and what goes on inside the fence has a lot to do with maybe what is to

maximize the safety of this and to optimize the handling of this stuff.

MR. ROBERTSON: We certainly are looking over the fence into that. As a matter of fact, I think Ron mentioned that yesterday. When you start talking about the cask thing going to a multi-use cask implies that you sure have to understand what that means across the fence because many of these guys have no rail access and if you are dealing rail access, that means that you have now imposed something else on them. How are they going to get it from there to a rail head or whatever?

DR. PRICE: As I understand the requirements side of

thing, the regulatory side of thing and it is a limited understanding, but as I understand it, some of the requirements actually tend to limit the options that are available not because of safety reasons but because of the way the requirement is written.

It is tagged, for example, maybe to the licensing of the repository with respect to the universal idea of a waste package which affects things and have these impediments to a freer objective look at alternatives been systematically viewed or are they going to be systematically viewed?

MR. ROBERTSON: I believe that as a part of every one of these trade studies that we have talked about doing

in a system level questioning the requirement in terms of its validity or its constraint is an integral part of that process.

Now some of them you might just say, "Hey, that is in the category 'too hard'" and therefore, for what I get out of it, it is not worth trying to fight that one. But you have to look at all of them in that context.

In our opinion, in the sense of the M&O's of a system study, all requirements are questionable in the sense of how they are interpreted in terms of those; only in that sense. It means that we have to deal with them and meet them

unless we can get something changed that has a valid base.

DR. PRICE: Where there is a timidity to challenge the requirement, that may tend to limit a view of the various options. And where these options, and we talk about the top level examination - concept zero, are deferred to later, as you indicated yourself, as they are deferred the costs of change go up and those costs themselves then get entered into the trade-off study which, as a result, tends to eliminate them.

So if you defer or if you fail to vigorously approach the question of requirements in order to keep your options alive, they tend to shrink. And I think part of the Board's concern is the shrinking of the view.

It has to converge ultimately over time, that recognition of convergence. And given the way in which the program has gone to date and where we are to date may tend to deliver this "decide, announce, and defend" kind of a syndrome that, at least we perceive, is one of DOE's credibility problems.

MR. ROBERTSON: I understand and all I can really say is I think that we, as the M&O, certainly our analysis teams and all, have not been restrained in the sense of having looked at these things with a very objective fresh look.

And perhaps, to some degree, there is an advantage to not having been historically so much a part of that because you can't bring them to question. But, it is not our decision from a policy standpoint of whether we were going to try to challenge those or not. We can only put the options down and tell you what it means, and the program limitations. That is up to management and policy.

MR. ROBERTS: I would just want to say that there is another factor here that comes into play and it is not that we are necessarily static, if you will, because we are the back end of the fuel cycle, the very back end of the fuel cycle. And the fact is that the basic input to us: fuel, fuel designs change; enrichment values, the initial enrichment values, of fuel have steadily risen; burn-ups have steadily risen; composition of fuel changes.

We are, if you will, dynamically having to assess these things and, consequently, our attempts to have close interaction with the utilities and understand what they are doing--. But I don't think that we are in a position, if you will, to dictate to the utilities or to the NRC or to scientific development, the continued development of the nuclear industry because we are going to dispose things.

So we, to an extent, are faced with a combination problem and with a systems change, a continuous systems

change. We have tried to factor that in. For years, we have known this and there are studies that have gone on before on this. So I just would caveat that. We are in a dynamic situation.

DR. PRICE: I didn't mean to carry on another question but you do bring a question to mind that I would appreciate a comment on, just, I think for the record. That has to do with the fact that you don't have a lot of control over the age of the spent fuel that you receive. All your control, I think, is five years and then it is a queue that you determine, when they come up. But other than that, you have to take the fuel that is available but there is some mix out there already in the industry as I understand it that you can expect to get but you don't really directly control it.

MR. ROBERTSON: That's true. However, I think it

incumbent on us, in that equation, to say to Ron and to John, "For the following money, you might be able to ameliorate this guy's position of what he is going to give you." And, in the overall sense, maybe that is the better way to spend the money and then somebody can decide, from a policy standpoint, whether that is the way they want to do it, or whether the law allows them to do it that way.

If you want to think about this money, this is the

regulator's money. It is the public's money that is brokered through the utilities and it seems to me that, at some point, when we get to that, if that is a major constraint, it is up to us to, at least, put that on the table and let somebody decide whether you want to induce the guy that has the right to give you five-year old fuel, to induce him to give you some of his 15-year old fuel.

DR. PRICE: Do you have enough control over it to determine a hot versus a cold repository?

DR. BARTLETT: The fuel is hot enough to have a hot repository but the problem is even more complicated than you allude to. When we talk about five year old fuel or whatever, that is simply years out of the reactor. There is also the issue of how long was it in the reactor and how much burn-up did it take. We have no control over that aspect of it.

We can negotiate with the utilities with respect to what they might send if it is beneficial to us, but we also have the opportunity to mix and match after it gets to the MRS, too, or to the staging area at the repository for that matter.

But basically the decision as to which fuel will be send and what its conditions are is a matter of the utilities at any market exercising trading rights that they

might chose to exercise.

DR. DEERE: Are there other questions from the Board?

MR. GERTZ: John, excuse me, but let me just enhance what John said, Dennis. It is true once we get something from the utilities we can't necessarily control that in total but we then have options to store it in an MRS, store it at a lag storage or staging at the repository, so there are lots of options and flexibility available to us after we receive it, whether it is at the MRS or at a repository before it becomes the time to dispose it.

DR. PRICE: So my question was, do you have enough control to determine the hot versus the cold or the various ways in which the repository could be handled?

MR. GERTZ: I believe we have enough flexibility to address a hot or a cold no matter what kind of fuel we receive under the contracts right now.

DR. BARTLETT: We can achieve a hot repository.

DR. DEERE: Dr. North.

DR. NORTH: I would like to start out with a comment and changing the tone a little bit. In two years on this Board, I have been concerned over a lot of the system and engineering analysis issues and in our initial Board's reports, we made a major feature of that.

We felt the program needed to move a long way in this direction. I am very encouraged by the presentation that we have just heard as to the philosophic change being brought in with the M&O concept and referring to your last slide, number 38, the facilitation of program-wide systems engineering and integration is a major task.

[SLIDE.]

DR. NORTH: I would strongly endorse that this is a significant cultural change requiring commitment, patience and sensitivity. I think it is very important for the Department of Energy to be perceived as moving away from "decide, announce, defend" but I see the philosophy that we have just heard as an excellent way to do that, moving in the direction of making the basis for decisions a great deal more explicit, having a top down focus where out of this enormous mass of detail. You can figure out what is important as the basis for decision and then share that in an open process so that the interested and affected parties have some sense that they know what is going on.

It is not "decide, announce, defend", but rather, here is the information that is available and here is the rationale for making a decision which may be clearly the Department's decision but other people at least get to watch.

You have stressed the interaction with the public and, of course, there are many publics and I presume this means there is a major emphasis on listening to what the public concerns and expectations are and that is going to be factored into the process.

So I like this. I would like to put on record that I think that this is terrific and I hope you keep going in this direction. But what we are going to be looking at, as a review board, are the specifics and you already heard a lot of comments and concerns at the level of the details. There are lots of things that we would like to see fixed or brought into the process and dealt with, and I have my own candidate there in the area of performance assessment.

I was surprised that you had the issue of model validation under longer term focus. Actually, the way you stated it was models validation. It seems to me where it ought to be going is relatively near term, under the iteration scheme that you have in your picture on slide number 30, the convergence of site characterization.

It seems to me that a lot of what ought to be done in the models validation is similar to what you described in terms of the timing of data cycles. The issue is how much accuracy do you need out of a model and how can you assure that that level of accuracy is going to be achieved.

So I would urge that this not be left until late in the process.

MR. ROBERTSON: That is a valid point.

DR. NORTH: It should be brought up to the front and immediately get on to the question of what are the requirements and how do they get translated into design specifications for the models you are going to need and then get some experience working with them and see if they do what they are supposed to do and find out whether for the validation, you are going to need to just check the numbers or whether you need to go out and do field studies at the level of a few meters or very large scale and work out the requirements as part of this convergence of site characterization picture that you show.

Models should be included not just data gathering activities.

MR. ROBERTSON: Definitely, and I agree with you. My placing it in the quote, "longer term," was probably predicated more on anticipation of having more data to deal with. One of the problems that we have had on this program, as Carl and many of the other scientific individuals who have been working on this program know, is that there has been some data but there really hasn't been a lot of data that one could feed into this thing. And so we have been

doing a lot of intellectual processing of something without the reality check of some of that raw data.

So that is the only reason I put it there. I would agree with you that it ought to be the thing we are concentrating on earlier.

DR. DEERE: John.

MR. ROBERTS: I would just say that this is actually already occurring. There are many models. There is a winnowing process and so forth but in the process of discussing the overall interaction here and the annotated outline, and the work that Carl's people are doing, and the data, and the going to the NRC to talk about this. We have discussed the fact that how we gather the data, the modeling and so forth, the bedrock that goes into the preparation and what we are presenting to the regulator as "this is the way we are going to go", that process is a part of this.

This is a part of the data cycle flowing back into the site characterization. What models will be acceptable? Will the regulator buy off on it? What is our technical basis for this? That sort of thing is already basically beginning to occur as we begin to try to address these problems. We realize as I think your point is well made, that the time of cycles and things like that, we have to start moving now.

We have to start coming to try to resolve some of these issues and find out from our own point of view, and from what point of view may be acceptable to the regulator to make our case that we are doing it the right way. And if technically we can't, then what is our next alternative to address these problems.

DR. BARTLETT: There has been an international effort for modeling V&V ongoing for about a decade and what we need now to do is just pick up our piece of it and decide which of our models are going to be applicable. It is an old and long-standing issue.

DR. NORTH: As a specific example, let me go to the hot versus cold repository and the modeling of the thermal pulse on which we spent three days at our last meeting. I think one of the issues that came out of that was the need for further work in validation and verification.

Now what does that consist of? After going through those three days, I don't really know, and I am not sure you do, but it seems to me that it is an issue that potentially is very important in providing the justification for any of the thermal concepts that you might decide to adopt.

So I would urge that you get started on that process

and really think of it not just as a science problem but in the framework you just presented to us as what do you really need in order to get the convergence of site characterization and think about it at the level of: do you want to run a massive field experiment in Busted Butte, which is an area where you don't have to worry about compromising the integrity of rock that you would be using in the repository and validate a very complex three-dimensional two-phased flow type of a model at great expense; or can you conclude quickly that something much less dramatic will be adequate for the validation and verification?

We would like to see it and so would a lot of other people. I think we are going to make progress only as we get away from discussion of validation in the abstract, as something that is going to be done as a relatively mechanical process late in the sequence, and get it up early in terms of what data and what level of validation do we need in order to support the decisions that clearly are going to have to be made in the program.

MR. ROBERTSON: Yes, sir.

DR. DEERE: Thank you. May I suggest that we take our break now. We will come back at 10:45 for Dr. Bartlett's summary remarks and then we will open all of the

presentations for discussion again.

[Brief recess.]

DR. DEERE: Good morning, again. Our last speaker on the schedule for this morning is Dr. John Bartlett again who will give us his concluding remarks.

DR. BARTLETT: Thank you, Dr. Deere. I would like to first pick up a few threads from this morning's discussion and then move into a summary of the overall meeting we have had the last couple of days, what I believe we have attempted to convey to you and interact with you on in the broadest sense.

First, now referring again back to Robby's presentation and the discussion associated with it, when Robby made his presentation in our dry runs with this boring stuff, the first thing we had to do was corral the folks who decided they had another meeting.

[Laughter.]

DR. BARTLETT: I want to say that at that time I shared a reaction such as Dr. North expressed. I can't tell you how pleased I was to see in that setting how capably the M&O has begun to pick up on its responsibilities and authorities and to implement what has been a very significant goal to us which is to bring this system integration and the technical program integration to a focal point in all of our

activities.

It is a very significant element of progress for the program and I have been very pleased with the rate at which they are bringing that to the program, how well they express it as you saw yourselves which shows their understanding of the function, how it interacts with the program activities and how it will serve as a major element of progress in the future.

As Robby said, he says, "boring" because it is not the substance of the program. It is, in fact, the infrastructure of the program and when it is well-established, well in place, it becomes part of the woodwork and it is just the way we do business.

What it signifies to me is that fundamentally we are very much getting there with respect to having a sound business practice for the program and that the integration brought on by the M&O will be a major factor in accomplishing that. So I think that is a very, very significant element of progress for the program as a whole.

A couple of other things that were mentioned, Dr. Langmuir asked me at the break to make a couple of further comments about what I will call the source term, the spent fuel.

We have been for several years interacting with the

utilities to gather highly specific data about that source term, the dimensions, the actual location, the burn-up histories, the pedigree in other words of all the spent fuel subassembly by subassembly at the reactors and the specifics of transfer technologies and capabilities so that we have the information base that we will need for the direct interface with each of the specific utilities.

As Robby said, not only is it not a homogeneous situation, every single one of them is different. There is a vast array of specific technical parameters associated with virtually each subassembly.

We are prepared to deal with that and it will have to be dealt with on several levels. First, we have the technical aspects of just accomplishing transfers from the reactors to the casks, et cetera. We are building, as I said, the information base to do that.

Associated with that is the question of when you take what from where. That is part of this protocol for the implementation of the contract with respect to who has the rights, first rights in line in the queue for spent fuel pick-up and as was mentioned, it is not necessarily true that those that have the lead rights, the first rights, will be giving us, let's say, their oldest fuel. they may choose to give us something else.

It is even further complicated. They may exercise trading rights. There may be specific reactors or plants that are facing storage capacity issues where they although are low in the queue could trade opportunity to have some fuel transferred with somebody else around the system so that we would take their fuel even though they don't have the rights at such an early time in history.

So there may be exercising of trading rights. So specifically we do not know exactly what we will take when. Let me assure you that as far as we can tell, that is okay because we are preparing the system to be able to handle that. We are dealing with that at a very detailed level and at the system level with respect to the specifications for the RFP for the procurement of the casks, we have taken that into account so we will have the capability to receive at the location that proves to be first in the system, whatever that turns out to be.

We are working with the utilities to establish exactly what the receipt will be. So I would like to think that we are handling that aspect of the program sufficiently.

Then there was the question about the impact of the fuel and what we receive with respect to the concept of the hot repository. Let me simply make a blanket statement without proof at this point that the fuel is, in fact, hot

enough to achieve a hot repository.

Now I don't know for sure that we could achieve it for 10,000 years. That is an issue that is still under investigation as one of these system studies but we can

achieve the hot repository.

Furthermore, we have the opportunity in the system to mix and match to achieve that goal because there will be opportunity to remove the stuff selectively from the MRS or selectively from the staging area associated with the repository wherever it may be.

So there is opportunity within the system to achieve selection of the use of the spent fuel to achieve the goals of the design of the repository system. At present, we don't know the specifics and we will have to deal with it on a case by case basis as we gain further information.

But again, I think we can handle that. We have the system studies in place to accomplish it.

I would like to pick up another theme that was essentially discussed in pieces this morning and I will make the statement. All aspects of this program are in a continuing dynamic state and will continue to be. When I say, "all aspects," I mean everything including the legislative, the regulatory, the programmatic and the system

technology aspects of the program.

We have already seen the legislative framework, the Nuclear Waste Policy Act, as Amended. We are seeking amendments right now in the sense of seeking an additional amendment to de-link the schedule for the repository and the MRS. I expect that there may very well continue to be evolution of the policy and the legislative framework for the program.

With regard to the regulatory framework, as I think you all know, part 191, 40 CFR 191, the EPA regulations for safety performance of a repository, have been remanded by the courts back to the EPA for revision. Those revisions will occur sometime in the next year or two probably and they will then again engender, probably, changes within the NRC's regulations, 10 CFR Part 60. Then we still have yet to develop the aspect of the regulatory framework which deals with the methods for demonstrating compliance with the long term safety standards.

So there is a lot of evolution with regard to the regulatory framework that has yet to be accomplished. I might note in parallel with progress with regard to the design of the repository system, the evaluation of the suitability of the site, the Yucca Mountain site, et cetera.

This is one of the reasons I might mention that I

continually harp on the need for the Department and our program to be aggressive with respect to establishing the regulatory framework. We can't wait.

We have to interact and integrate our activities with the evolution of the regulatory framework to make sure that our progress and our decisions are not controlled by lack of knowledge, lack of certainly about the regulatory standards themselves.

The flex with respect to compliance with the standards that are established is in my mind not one of simply meeting existing standards. We can go beyond them in some cases and, in most cases, the opportunity is available for the program to establish or utilize different methods of achieving compliance with standards so we do have flexibility associated with the issues of compliance and we will have to be as I said, and I want to emphasize, dealing with the evolution of the regulatory requirements in parallel with the evolution of our work.

Those are the two key points. Before I move into the summary, those are the two key things I wanted to mention in conjunction with this morning. If you have any further questions of me on that subject, I would be glad to take them now and then perhaps we could move into my sort of overall statement.

DR. DEERE: Yes, Dennis.

DR. PRICE: With regard to the role of the M&O, I don't know if this is the appropriate time to ask, but where are they with regard to their staffing against comparing to where they would be if they were full? Are you at full involvement and staffing at this time?

DR. BARTLETT: No. We have a transition plan and I will let Robby give you the specifics but we have a transition plan which we are about a third to a half of the way into.

MR. ROBERTSON: Right. We are at about 450 head count right now. In full staffing, it depends on the overlay of the design functions and how they occur in terms of stack-up. That is the major one, but I would say we are about a third of the way up that process to the max.

DR. PRICE: Thank you. Another question, could you have a cold repository. The MRS has a limited capacity and you are de-linking it from the repository and so forth. With all of those problems involved, could you have a cold repository, that is, below boiling point?

DR. BARTLETT: Our preliminary studies show that we would have to cool for upwards of 80 years before emplacing and so you can see the limitation that might impose on the concept of having a cold, but I think Carl has some detail

on that.

MR. GERTZ: Dennis, age of fuel certainly has a relation to the thermal loading but also emplacement and how much you put in each hole is the key aspects. When we talk about a hot repository, if you remember the thermal loading discussions, it involves 40 or 50 or 60 year old fuel to get a hot repository because you have level heating and you

pack it tighter.

So a hot repository doesn't necessarily mean we use hot fuel. We use 60-year old fuel for the hot repository. For a cold repository, you would use old fuel or whatever fuel and just space it further apart. What John refers to is if you would keep the current design, you would have to cool it for 80 years before you could get a cold repository.

DR. DEERE: Yes, but this study has not included the possibility of in-drift emplacement and ventilation and the very late backfilling.

MR. GERTZ: That is correct. As you are well-aware, we had the nice three-day study on that and Buscheck is doing a lot of work on that and we just recently had a project meeting on that.

MR. DOMENICO: Has a decision been made on hot or cold since our last meeting?

DR. BARTLETT: No.

MR. DOMENICO: It seemed to me, John, that you were implying the hotter the better the longer or the hotter the longer the better. I think I wrote down here that you can achieve a hot repository and I was just wondering if you were implying then that that decision was already made. It has not yet been made?

DR. BARTLETT: No. The decision has not been

made. We have not in my mind got a sufficiently solid foundation to justify a decision. I am saying that we can do it. There are many trade-offs that have to be evaluated before we make a programmatic decision in that direction to justify it and that is what is in progress.

DR. LANGMUIR: John, you mentioned that you have a staging area at the repository as another place you can sort and select. Is there any legal limit as to how much you can put there or how long you could store it there? Couldn't it effectively be much more than an MRS in terms of its capacity and useful function?

DR. BARTLETT: As far as I know, there is no limit of that at this stage. Let me take advantage of the opportunity. There was some dialogue about the history of the issues, about having an MRS and a statement which is

certainly true is that we decided we needed one.

The reason for the dialogue historically in the larger sense was great concern that the MRS would become the defacto repository and so the broad arena of constituencies for this program was very much concerned about how you prevent that from happening and obviously, one means you use to prevent it from happening is not to have an MRS in the first place.

So you had that broad range of concern that was more social than it was technical. Technically, the program must have an MRS or something like it. The fundamental reason is the fact that you are not going to put spent fuel in disposal in the same form at which you took it from the reactors and you need a place to do the handling and you need a place to do the conversion of form.

Now we don't know exactly what the form will be but you must have these functions in the system. The various functions can be performed at the repository site wherever it is or somewhere else. Systematically, it looks like somewhere else is more advantageous and that is why we have a free-standing MRS as our objective at this time, at present.

There could be potentially you might call it an ancillary MRS in the staging area at the repository site or

for that matter technically, you could have the MRS at the repository site and then you are burdening that area with all of the functions associated with everything beyond receipt from the reactors and transport to the handling facilities.

All those are possible. The situation we have is a result of a great deal of social dialogue about these various issues and so we are working with that as the basis as where we stand today.

Anything further on that?

[No response.]

DR. BARTLETT: If I may now, I would like to shift gears on you and summarize very broadly what we have tried to do in the last couple of days with you, summarize the key points and let me start by thanking you, the Board, Dr. Deere, very much for providing this opportunity to interact with you on these matters.

It has given us a very important opportunity to explain to you and to those attending what we do, why we do it, how we do it and to give you, I hope some further insights into some of the issues that we face on a routine basis and how we deal with them and as a result to give you an opportunity to help us in our dealing with then and I will back to that at the end of this.

So let me summarize our materials in a few, brief statements. First of all, one of the key points that we made to you is the fact that we have, in fact, for the program two goals of equal importance and those goals have been established as a result of public policy and contractual arrangements and we are working broadly within the program to achieve both of those goals.

Secondly, related to achievement of the goals, I think we have indicated that at this point we believe that we have good prospects that we will know where we are going with the MRS about a year from now and that that as a result will enable us to achieve, we anticipate, our goal of beginning spent fuel receipt in 1998 and we have focused and marshalled our resources to achieve that very important program goal.

The third point, we have now a solid baseline for the Yucca Mountain project in place and that is based on a focused effort to determine as soon as possible whether or not the Yucca Mountain site is a suitable location for disposal.

I would emphasize that it is a baseline. It is a snapshot in time based on what we know today and we anticipate, very solidly, that that will change as we learn what we learn from the site but we do have a solid baseline.

We have a solid management program. We have a solid basis for our program activities as we proceed.

Closely related to that, we do have flexibility with regard to how and when we get to the determination of whether or not it is a suitable location for disposal and we will be using an iterative process of surface-based and underground testing to obtain the data as a basis for that decision and as we proceed, we will be exercising that iterative process in terms of what we do and how we distribute the activities between surface-based and underground work.

I might just mention here parenthetically, we will be looking for assistance and guidance from the Board with respect to that as we do make that progress.

We have a sound estimate as a result of having that sound plan of the resources required to meet our goals, specifically that with regard to evaluation of the Yucca Mountain site and submittal of the license application if it proves suitable and we are, in fact, working to make the process of getting there as effective as possible.

We have a responsibility to the country, to the ratepayers, to everybody to spend no more time and money than is necessary to get this job done. We are working toward that goal as much as anything else.

As I said, we have an estimate of what those resources are. As we evolve through this flexibility, we will, of course, see what happens but our objective fundamentally is to get the job done at the least cost and with the least time possible

Closely related to that, I would like to think that we now have what I call a sound basis for the enablers in the budget process to support provision of the resources needed to move the program forward.

Historically, we have not had this. We have had issues associated with whether the program had its act together, whether we had the permits we needed to proceed. Issues of this kind have constrained the freedom, the confidence on the part of the individuals and institutions involved in the budget process to provide the resources that the program has needed.

I now believe that we have the confidence to proceed and that we can transmit to the enablers that confidence and hopefully then receive from them the support we need in terms of funding levels to allow us to meet the goals. Closely related to that, if for whatever reason that is not achieved then, of course, we will have to shift our goals. That is an inevitable result at some point.

We will be constantly making judgments as to the impact

of funding restrictions if they should occur and the flexibility and the findings we are making as we are proceeding with this goal of efficiency of production to determine just what the impacts will be but harking back to the concept that we have a baseline and a present solid estimate of what the resource requirements are and those, of course, will be adjusted as the baseline adjusts, I think we at any time including now have a sound basis to go to the enablers to provide the foundation the resources the program needs.

Let me say also that at present I do not know of any reason why we can't meet the goals as they are established right now beginning spent fuel receipt in 1998 and beginning disposal in 2010 with the caveat that funding from this point forward is sufficient to fulfill the resource requirements as we see we need them.

I think we do have the flexibility. We now have the insight. We have the systems integration, synthesis and focus of the program to help us achieve that with what we know now. Things may change, of course, but I do believe at present, at this moment that we do have the potential to meet those goals.

Looking ahead a little bit to the interaction between the Board and our program as we proceed, independent of the

rate of progress, we will be as you heard during the last two days moving in this iterative process of data acquisition and interpretation evolution of business and moving toward issue resolution and moving toward issue resolution as effectively as we can in order that when we finally come down to the determination, we do not have open issues on the table or have them as minimal as possible when we get to our various end points.

We will be looking very much to interactions with the Board for guidance, advice and counsel with respect to our progress toward resolution of the various issues associated with evaluation of the Yucca Mountain site in particular and as a first step in that, we will be producing in the very near future scheduled for February and April these reports on our site suitability evaluation baseline and our performance assessment baseline.

Essentially we will be evolving from those reports our future activities and working toward resolution of the various issues that are identified in them. That will be the substance of a great deal of our technical effort with regard to site evaluation and the areas in which I would look forward to substantive interaction with the Board as we move toward making our decisions and findings with regard to the various issues.

Basically, that concludes the comments I would like to make at this point. I would be glad to take any further questions from the Board.

DR. DEERE: Thank you very much, John. Board Members. Warner.

DR. NORTH: I wonder if you could be a little bit more specific on the timing of the site suitability baseline and the performance assessment baseline products. Would they be available such that we could look at them at our scheduled April meeting?

DR. BARTLETT: The performance assessment is due out in February, Carl?

MR. GERTZ: If Russ is here, he can probably give you the latest schedule. I know internally we are reviewing some parts of it now. Certainly, it appears that the site suitability one would be available in April.

MR. DYER: Russ Dyer speaking. Yes. We will have the site suitability to you by the end of this month.

DR. BARTLETT: To me?

MR. DYER: Right. Out for public comment probably in February and I guess we will be out for about 60 to 90 days for public comment. The performance assessment, we will have it in the project office for formal review probably in the February/March time frame. It depends how long it takes

us to put it through the publication process at Sandia. We will expedite that as much as possible and shoot for the April time frame.

DR. BARTLETT: So they both should hit the streets about in April basically. I don't know if that would be time for you to peruse about yea many pages for your April meeting but that is the time frame.

DR. DEERE: Probably not but it might be well to have those two items on our schedule for April that can be presented by DOE and we will have had a chance perhaps to have looked at them.

DR. BARTLETT: We will be glad to give you an executive summary of the materials.

DR. DEERE: We will discuss that in our Board meeting which will be coming up this afternoon in closed session and get back to you as to what our schedule might be on that because it certainly would be helpful to have some interaction fairly soon.

Yes, Warner.

DR. NORTH: I have another comment that I want to make and then will turn it into a question. Yesterday I asked Carl Gertz about the ten year total, the $6.3 billion dollars for the Yucca Mountain project of which through 1991 roughly a billion has been spent.

The projection that he gave me this morning, I was surprised to find how fast the ramp up is in this baseline set of cost numbers. The fiscal year 1992 number at the bottom, the total project cost is actually $340 million and then for fiscal year 1993, the number goes up to $624 and it says in the six range there more or less flat for the next four or five years.

This is a very massive increase in the project funding from the rates that have prevailed until recently and I just wonder if you could comment further given that the number is this large your thinking in $50 million dollar increments is certainly borne out by these numbers. I am just surprised how many $50 million dollar increments we are talking about.

I wonder if you would comment further on how you view the prospects of getting this kind of a ramp up actually achieved or conversely if you don't get it achieved, how much of a setback does that become in terms of meeting the target dates that you talked about.

DR. BARTLETT: Let me first say that in theory it is achievable on grounds that the spending that is projected to be required is, in fact, about equal to the revenues that the program achieves annually through the fees and interest earned. So if one was taking the broad view that you could

turn the revenues directly into current year or following year expenditures, something like that, then that is entirely possible and I would observe that that leaves the bulk of the capital asset that is in the Nuclear Waste Fund intact continuing to earn interest and to serve other functions with regard to the federal budgeting process.

So that is possible. I would like to ask Carl to give you a little more of the detail again or mention why these $50 increment numbers are necessary and it has to do, of course, with things like procuring tunnel boring machines and drilling equipment and things of that type and then operating it at a level effectively to keep the program moving. Carl, would you have some comments to supplement that?

MR. GERTZ: I think John summarized it very well. There is a ramp-up that will be significant. The early part of that ramp-up includes capital equipment, whether you spend six million for an LM-300 and you buy three of them and then you buy the capability for TBMs, whether you buy two or three, pretty soon you are in the hundred million dollar, or $120 to $150 million dollar range for equipment.

Then when you start to operate them, right now we are not operating around the clock at all. Occasionally, we will work a 24-hour month or week but now you shift when you

go to around the clock operations, you go from one crew to four crews and so that is what it takes, in effect, to get the work done and that is how we have scheduled it and we don't think it is unreasonable but certainly it is a challenge.

Should we not get some of the early year funding and it is a more gradual ramp-up, we will have to ascertain if we can accommodate that within the schedule and if we can't, we will go for a schedule change in accordance with the change control procedures.

If we can or if we gain new data that says that we don't need all of the drill holes that we have had proposed or all the other tests that we have proposed, perhaps this schedule is still achievable. So you are right. It is a lot of resources to get the job done. It is some initial ramp-up, but the initial in flux of money goes for capital equipment and then 24 hour operation of that equipment. Does that get most of your question?

DR. NORTH: Yes. Thank you.

DR. DEERE: I think we will take questions now from the audience if we have any and I might ask first Dennis Bechtel if you would like to make a statement. It was suggested that you would. Clark County, Nevada.

MR. BECHTEL: Thank you very much. My name is Dennis

Bechtel and I am the coordinator for the Nuclear Waste Division of Clark County's Yucca Mountain oversight program. I have some copies of a summary of our program and an article of an incident that happened in Guyana and in Brazil that one of our consultants did an analysis on the effects for the Committee so I would like to maybe distribute this to whomever would be interested.

[Above-referenced documents distributed to the Board Members.]

MR. BECHTEL: I also have just a brief statement to read to the Committee. Clark County, Nevada is grateful for the opportunity to provide the Technical Review Board with a statement concerning DOE's implementation of the Nuclear Waste Policy Act as amended in 1987.

We are providing as an attachment to this testimony a copy of our report to the Secretary of Energy Advisory Board Task Force on civilian radioactive waste management entitled, "Overview of the Clark County Nuclear Waste Repository Program" which describes issues affecting the development and maintenance of trust and confidence in U.S. DOE's civilian waste management program.

A second article details the potential socio and economic ramifications of community response to risks posed by radiological exposure. It is our hope that the members

of this Committee will find an opportunity to review these materials.

The focus of our present testimony, however, is the concern of Clark County that this prestigious Board of national authorities may not be giving adequate consideration to the human consequences, and I mean social, political, economic, health and safety of the characterization, construction, operation and post-closure effects of the proposed high level nuclear waste repository at Yucca Mountain.

While there are not formal opportunity for the Board to address these issues, we have been informally encouraged to provide this Committee with periodic updates on the activities and concerns of the Clark County oversight program and we appreciate this opportunity today.

Our fundamental concern is simple. Provisions of the NWPA were written to ensure meaningful local government oversight over DOE activities in association with the proposed repository. The intent of this oversight was to ensure that the risk to human populations affected by DOE's actions would be identified and where possible eliminated or otherwise ameliorated.

Finally, DOE's interpretation of the Act as it pertains to local government oversight in conjunction with

its independent mandate to vigorously pursue site characterization have raised questions about its treatment of local government oversight over DOE activities.

There is a certain inconsistency between DOE's implementing role and its responsibility for determining the level and distribution of oversight funds, as an example. It is, in addition, not clear how affected local governments are empowered to actually affect the siting process.

According to the DOE, there is no formal requirement that DOE respond to any concern of the affected publics. U.S. DOE has interpreted its requirement to consider human impacts under the amendments act to have been extinguished with its completion of the section 175 report which "determined" and I put that in quotes, that site characterization would not result in social or economic impacts.

DOE has in effect already determined that there will be no significant human impacts in our mind. Oversight is further constrained by the fact that at least for Clark County the locus of socio-economic impacts of the program, DOE has reduced its oversight funding to the point where Clark County is unable to effectively carry out its mandate.

DOE has been granted authority by Congress to determine the level of funding for affected units of local

government. They have as you may be aware requested the ALG budgets prior to submission to Congress. In addition to last year's reduction in funding, seven additional affected counties were invited by DOE to participate in the program.

They also determined the distribution of a reduced amount of funding among the various affected governments. This has in essence resulted in affected local governments competing amongst themselves for funds for oversight purposes. This is clearly not the intent of the law.

The impact to Clark County and others of this decision, with regard to Clark County, funding is reduced nearly 60-percent less than our 1990 appropriations. The affected local governments should be allowed ample funds to carry out their mandated responsibilities.

We are bringing this up because, of course, your discussion is with DOE about the budget today and we feel that it is important input to that.

In summary, DOE has managed through its funding authority to reduce the effectiveness of Clark County's oversight over DOE site characterization activities. Clark County's remaining hope is that the Secretary of Energy's Advisory Board Task Force on Trust and Confidence which held its first meeting in December of 1991 will provide an appropriate mechanism to allow more effective participation

of the affected local governments in the overall process of defining of how the program is to proceed.

With the exception of the informal participation in this advisory board and the Strategic Principles Workshop which I think we appreciated that interaction, there appears to be no formal means available through which the concerns of the public are to be addressed.

The Mission Statement for the Secretary of Energy's Task Force states that the Department of Energy recognized that the resolution of outstanding institutional issues such as access to sites, social and economic impacts and organizational design is as critical to the ultimate success of the civilian radioactive waste management program as the resolution of outstanding technical issues.

From the perspective of the major affected parties to the proposed action, this is indeed a profound observation and one supported by virtually every other major hazardous waste siting effort undertaken in the United States.

It is our belief that this realization on the part of DOE that is ultimately reflected in a corresponding policy change will prove pivotal in defining how such social and economic impacts are to be treated by the agency.

This Technical Review Board was at one time and I refer to this Board here, was at one time considering the

possibility of recruiting an additional Board member with a

policy background.

If that member were to have an understanding of socioeconomic issues, this would enhance the Board's understanding of affected local governments' repository concerns.

From the perspective of the affected local governments, such action would reflect positively on the overall process and allow for greater integration and more productive interaction as the process evolves.

I appreciate the opportunity to provide this input to the Board this morning.

DR. DEERE: Thank you very much. I will respond to part of that and John, maybe you would like to respond to part. We still have hope that the appointment of the policy person is nearing completion and we will have the man aboard. We have done everything we think we can to get the appointments made of those three vacancies that we have.

DR. NORTH: Another clarification. That choice is made by the White House. It is out of our control. We are simply observers in terms of who and how fast they are appointed.

MR. BECHTEL: Thank you.

DR. DEERE: Dr. Bartlett, would you have any comment?

DR. BARTLETT: I would simply observe that we

consider all oversight functions vitally important to the progress of this program. Our decisions unlike virtually any other program in the government must be made openly and as a consequence of and in the full view of all affected and interested parties so we do what we can.

I like to think that we do what we can to provide the support needed for those who are truly the interested and affected parties and certainly the counties in the State of Nevada and many other parties. Within the framework that we have been discussing the last couple of days, all I can say is that we simply do what we can with regard to the support, the funding going to those parties of all dimensions and interest.

DR. DEERE: Thank you. Bill.

DR. BARNARD: John, yesterday during Carl's presentation he mentioned that the project baseline schedule and the total project costs had been reviewed and approved by the Secretary's Acquisition Board and then this morning Robby indicated that the total budget cost --

DR. BARTLETT: It sits at the top, doesn't it?

DR. BARNARD: Yes.

DR. BARTLETT: I am sorry.

DR. BARNARD: Yes. I am just wondering if you could give us a little more background on what this Board does, who is on the Board, who chairs the Board and what does it mean when the project and the budget has been approved.

DR. BARTLETT: I will be glad to try. As indicated by Robby's diagram and the role that the ESAAB has and the emphasis we have placed on the approval of our plan by that Board, it is a very highly significant function within the Department.

Energy Secretary Acquisition Advisory Board, it advises the Secretary as suggested on the viability of the basis for major program acquisitions within the Department. One that you would be familiar with that is of the same ilk is the one we just went through, of course, is the Super Collider. The viability of the plans and the budgets for projects of large magnitude that come to the attention of the Secretary because of their significance with respect to program resources or departmental resources and budgeting, it is chaired by the Undersecretary.

The membership includes the Department's General Counsel, the Department's head of procurement and other members who are and the important point is external to the

procuring or proposing organization.

The formality of the process is that there are independent confirmation or tests hopefully confirming evaluations of the plans and budget estimates and the like that are made by the proponent organization.

They are fed independently into the members of the Acquisition Advisory Board and then a formal presentation is made to that Board of our proposal and they do extensive review of the material supporting the proposal and then ultimately make their decision on behalf of the Secretary.

The point is that it is a very high level board, that the members of the Board have key responsibilities for the allocation and execution of resources within the program, that they are independent of the program, that they seek independent information to support their decision with regard to the proposed action and that that then gives the foundation for the program moving forward once the approval of the ESAAB has been obtained.

DR. BARNARD: Are any of the Board members independent of DOE? Are they outside experts?

DR. BARTLETT: No, not the Board itself but they can obtain outside expertise and support of information that they bring to bear in their review. Sam, do you have something to add?

MR. ROUSSO: Sam Rousso, if I might add a little bit to that. Bill, the meetings of the Board on a particular project will happen once a year or sooner if we meet key decision points in the process.

In other words, there are four or five key decisions called KD's that you see sometimes, the initial one being the idea to go forward to start the conceptual design. Another one is when you get to as we are in this case to ask for Title II design start and here will be another one when you get to the construction phase.

It is geared so that the Secretary has the full confidence that the resources he will asking the Congress for, he feels confident the project can deliver upon so it is like an in-house scrubbing if you will of do the proponents understand what they are going for, have a clear indication of what they need. Is it timely? Have they passed all the other gates? Has it satisfied the other parts of the Department and should it indeed get a fair share slice of the Department's appropriation request for the following year.

MR. GERTZ: Bill, let me just add to correct the record. I think yesterday I indicated part of the process involved an independent estimate which was outside the Department and I used Stone Webster as the independent cost

estimate check. I was wrong. I got them confused with Gilbert Commonwealth. It is Gilbert Commonwealth who did the independent cost estimate. So I want to correct the record on that.

In essence, as Sam and John pointed out, the Board is high level. I think there are only about 20 projects within the Department that are considered major systems acquisitions. There are other projects that are called major projects which is a different level of review but there are only about 20 and the Super Collider happens to have the highest total cost and we are probably second on that list right now with the total cost. So that will put it in relation to resources required by the Department.

I do want to add one more thing. The process took about nine months working with the different staff's from General Counsel, Procurement, Environmental Safety and Health and we worked about nine months with staff, three meetings, coming to the final resolution which occurred just before Christmas.

DR. DEERE: Any additional comments from the Board or Board staff?

[No response.]

DR. DEERE: Now back again to the audience.

MR. EICHNER: Thank you, Dr. Deere. I am Phil

Niedzielski-Eichner with Nye County, Nevada. I just had a question with regard to performance assessment and it is a clarification, I think.

Our understanding is that there is a number of performance assessment models being worked or at least two major ones, one done by Golder and one done by Sandia and there are perhaps inputs into those two. Mr. Robertson talked about the performance assessment role as an integrating role. Will you be bringing those two together in some fashion and if so, how will you do that and I have one follow up question after that?

MR. ROBERTSON: Yes. One of the goals, I think, of the M&O is to get its arms around a lot of intellectual work that has been done. Golder has done a lot. EPRI has done a lot. But there are lots of different constructs as to approaches to that.

One of our jobs in the integrating role is and obviously, of course, Sandia has because that has been the principal responsibility for that up to this point, but we are mainly focusing on those things on what you would call the system level model that pulls all of this together.

There clearly are individual components like a fluid transport model that somebody is working on, I think there are maybe just hundreds of those. One of our jobs is to

filter through all of those at that phenomenology model level, I guess you are saying, kind of decide on where there ought to be redundancy because of differences of approach, which ones of those are going to e useful under what circumstances and then try to take all of this thought bringing together under one overall system performance assessment and then ultimately, the M&O is responsible for operating that performance assessment on a system level.

The individual PIs or guys that have the expertise in a particular phenomenology will continue their component of that with us in a major role of kind of giving it a proof test in our own construct and seeing how that fits into and its significance of effect on the overall system of performance.

MR. EICHNER: So when there is a license application, it will reflect a performance assessment model as opposed to models.

MR. ROBERTSON: That is correct.

MR. EICHNER: I was a little confused by Dr. North's reference to multiple models.

MR. ROBERTSON: That is correct.

MR. EICHNER: My second question is, in your performance assessment discussion, you identified the fact that the public should have input into the performance

assessment model. How will that be accomplished? What is the mechanism that that will be done?

MR. ROBERTSON: I think that is in its broadest of term the public because I think that the kinds of meetings that have been conducted on the mission plan and things of that nature, we are getting inputs from people.

We expect to continue to get inputs from the affected counties and people who are involved there as they survey what is going on with the designs which I assume they have been invited to the design review meetings and things of that nature and I think that will be a synthesis process as opposed to some kind of great big formality of a question sheet that you will out and send into those.

I think in the ultimate sense, the public issues and concern, we hope, are captured in the licensing process itself but if there are some particular issues that come up, it seems to me that the tool kit of performance assessment analyses or models and so forth can just as easily be applied to work your particular impacted area item although it might not be something that is necessary in a legal sense to close on a license issue.

MR. EICHNER: I thought that what you might be leading to is when you convene expert panels, for example, to conduct or to exercise their judgment that you might be

inviting outside experts into those panels that would contribute their expertise.

MR. ROBERTSON: No question about that.

MR. EICHNER: So that is planned?

MR. ROBERTSON: That is planned, right.

MR. EICHNER: Thank you.

DR. DEERE: Thank you. Any further speakers from the audience? Mr. Frishman.

MR. FRISHMAN: First, I would like to, not seeking any response, maybe clarify what it is that concerns us about the matter of issue closure and it is very simple and that is that we have no great concern if the Department as Robby describes wants to try to go forward with its own closure with confidence of particular issues and I understand from all of the comments that that is a resource distribution issue to you and we have no problem with that.

What we are concerned about is the extent to which the concept of issue closure enters into the relationship between the applicant and the regulator and what we are most concerned about is that the integrity of the regulatory process, applicant, regulator, intervenor, whomever, be maintained.

That is our concern when there is discussion using the terminology issue closure, issue resolution, relative to

pre-licensing interaction. Simply stated and I hope you understand that now.

Now a comment that I think probably goes to both John and Robby and the relationship between the M&O and the Department, I see from Robby's presentation and he and I have discussed elements of this through time, I see some maybe gaps or disconnects that maybe are worth at least thinking about or even responding to or commenting on at this time.

One is in the area of if you look at Robby's layout of the entire systems diagram, you see that the top document is the mission plan. The mission plan is a document that is essentially out of the M&O's control but is very much the responsibility of the Department.

Now as we observed in our comments on the draft mission plan amendment, almost everything in that document is out of the Department of Energy's control. It relies on actions being taken by others that will forward what the Department considers to be its desired or preferred path towards meeting its goal of disposal.

So it becomes, I think, a major problem for the M&O to carry out a program when the person or the agency that is laying out the job that the M&O has to do and that agency has essentially no control other than expenditure of

political capital on even telling the M&O what there is to be done.

I think maybe at this point in time this is an unavoidable problem because of the way the program has been managed in the past but still I think it is one that must be recognized and I think both the Department and the M&O because of that have maybe even greater than has been recognized responsibility for evaluating contingencies and evaluating them publicly and assuring themselves that at least one of the scenarios they evaluate is the existing policy condition and the existing condition of regulations.

I don't see this stated at all in any of these presentations. Everything is based on changes that the Department cannot unilaterally assure and may not even be achievable with the Department's vast expenditure of political capital.

So that is one area where I see a disconnect but I also see at least something that can be done to mitigate that disconnect if it is agreed by both the agency and the M&O that it ought to be done that way.

Another area of gap or disconnect and that is that the Department states very clearly finally over the last year or so has as its first and most important goal is to make a site suitability determination. That is a requirement under

the Nuclear Waste Policy Act. That is what the Secretary is supposed to be going towards with site characterization.

Now Robby has shown that the M&O apparently has a different goal because what Robby's diagram of convergence is that it is converging on a license application. Now a license application as people have said and maybe without thinking very hard about it, but I think most of us are now coming to understand and agree that a licensable site may, in fact, not be a suitable site.

We have discussed this a number of times. So this is a disconnect that I don't know how the M&O is going to be able to deal with relative to what the true current objective of the program must be under law and I would like

to see somehow the M&O factor that first statutory requirement of the program into his program if he is truly an M&O as he describes himself to be and has the types of responsibilities associated with site characterization that he has taken up.

A third gap or disconnect that I see is nowhere in the presentation of the M&O's responsibility is a discussion of the one, two or possibly even three environmental impact statements that are going to have to be generated and I don't know even whether there is a decision about how those

EIS's will be generated.

If you have an MRS, you need an EIS. If you have a suitability determination for a site, you need an EIS. You have to factor transportation in somewhere, maybe in both of those or maybe in another EIS and we won't get into the discussion of how you can comply with NEPA in the way that you have piece-mealed the program anyway.

So one, two or three EIS's. Nowhere do I see any of that factored into even the thinking of the M&O or into the system lay-out and breakdown as it was presented and the EIS ultimately has a great deal of significance in the decision that is made under the Nuclear Waste Policy Act and in any licensing decision that is going to be made.

Nowhere is the program exempted from the requirements of NEPA and an EIS cannot even under this program be considered a pro forma document even though there is some forgiveness that is granted to the Department and the NRC under the Nuclear Waste Policy Act. That does not diminish the significance of the NEPA documentation.

So I think that area needs to be at least factored into the thinking of the M&O if the M&O, in fact, has the authority and responsibility and capability that he says he has acquired for both himself and under agreements with the Department of Energy.

I guess finally there were a number of questions asked, mostly by Dr. Price, about how the concept of thermal loading enters into the whole system thinking. I would like to extend that a little bit farther and put it maybe into an even bigger context and that is that we see that thermal loading must really be on the minds of a lot of people because it factors into such things as the M&O's discussion of both MRS and repository.

We have had some discussion of how far-reaching such a decision would be all the way through the entire system. The question that I see arising in it is that some of the decisions that could be made regarding thermal loading require policy changes and cold repository, at least the implication is, that you may end up in a policy change situation.

You might be able to begin accepting spent fuel which would meet the contract but I think that the intent of the Waste Policy Act was not for you to sit on that spent fuel forever or for the 80 years if you don't change design or change policy.

So you can have the thermal loading issue, a policy question. You can have it a management question but I think you must remember first of all if you look at 10 CFR 60, thermal loading is a safety issue and it is a safety issue

at the repository. That is what the regulator says.

I have been sort of watching the issue of thermal loading developing for quite a while and there is a fundamental difference in thinking between how 10 CFR 60 is constructed and how the Department is thinking about thermal loading and somehow they are going to have to be reconciled.

Under 10 CFR 60, thermal loading is considered effectively either an adverse condition or a condition that must be accounted for very rigorously in considerations of safety. The Department seems to be looking at thermal loading as an engineering tool and a design factor and a management factor.

Somehow I think we need a very visible acknowledge that the thermal loading issue is first an issue of safety and then may be subject to all of the other considerations such as design, management, policy and so on. Those are the areas that I think should be on the table right now relative to the type of presentation that we have heard over the last day and a half and any discussion on those would be appreciated.

MR. ROBERTSON: I will start then. This is Robby Robertson. Let me first dispose of one very quickly on the EIS. It is very clear to all of us and every schedule for every project or MRS site has built in to it an EIS process.

That process of the development of the EIS will be done by an independent contractor as it must.

The M&O will, in fact, do in many cases the environmental assessment aspects that are underpinning that and certainly furnish or be a vehicle for consolidating a lot of the site characterization data as well as some of the engineering data that is an input to that.

But I don't believe anywhere in any of our presentations should you assume or anyone assume that we take lightly the issue of the EIS. There is absolutely no question but what those are statutorily required and we intend to meet those so I think that is fairly clearly. If I did not emphasize that, I should have in there.

It is clear that when we get the site characterization done and put a site suitability report together that goes to Congress preceding a license application, it must have an EIS that goes with it and I think all of us understand that in the maximum, the EIS is
the lightening rod that the litigation will surround when it is ultimately all over with. So I think we all understand the importance of that.

Let's see. On the issue of the site suitability versus license application, I believe that focus on the license application answers the question of suitability along the

way in the context of is the site suitable.

I understand your argument about 60 versus 960 and that issue but no one is ignoring that suitability issue as along that direction, but I think that if you need some piece of data that is different from what you need for the license application for site suitability, then one ought to perhaps examine the question of why that is the case because you may have a disconnect in there.

So I think that is a mechanism to try to force some convergence on it. I don't believe that you should imply from that though that we are focused on licensing in the design sense as opposed to the primary objective in the initial phase which is to determine the suitability It is just a mechanism like any anything else to try to bring some focus to that.

On the contingency versus the regulatory policy, I think I made clear to a comment, I believe, that John Cantlon made, on that point and that is, is the M&O perhaps going to get captured by the process and more or less say, "Well, gee, that is the policy. We are not going to do anything about it." I think to the converse. It is incumbent on us to constantly be raising the question, "Aren't these regulations challengeable?"

Should we be looking at all of these things in a trade-

off sense and then allow the policy overlay to be made to that as to whether one is going to challenge some of those policies because they are far-reaching as you are well aware.

When someone as august as the National Academy of Sciences can make some observations that they did and take the kind of flak about, quote, "changing the ground rules," I think we have to take that into account as a part of that.

But I don't believe in any context that the M&O is operating in nor do I see that, by the way, in the DOE organization itself, either. I think we are looking at that and that regulatory changes and policy changes are an integral part of a tradeoff of the possibilities.

In the last sense, I believe that one should view the thermal loading and Carl and some others can comment perhaps further on that in the context of a broad system problem whose whole purpose for consideration of it has to be in the ultimate overall public safety generated by the entire system and looking at the costs that are attendant

with that or the particular other ramifications that are brought into issue as a result of that and I believe that that is the approach that we are taking with that.

I would suggest that as we go through that if we are

genuinely convinced that the margin the safety of the entire repository system is enhanced and if that triggers some kind of conflict with some policy and/or regulation, then that ought to be also a basis for going back and challenging that. I guess that is kind of where I would leave it.

MR. GERTZ: I just want to add a couple of things to what Robby said and I think Robby, you summarized the thermal loading issue very succinctly. The only reason that we are looking at different thermal loading is to enhance the safety of the system.

If higher thermal loading will provide greater assurance that radionuclides won't reach the accessible environment, then we will look at higher thermal loading. That is essentially a safety issue first. Policy issues would come in second, what will make the system of engineered barriers and natural barriers work best from a safety viewpoint.

So Steve, I think we are right in the same line as you are along those lines. Thermal loading is a safety issue.

Secondly, just to point out although maybe Robby did not show in his schedules, I know our repository schedule that I provided you yesterday showed EIS and a draft EIS and

we certainly recognize our requirement to produce those. I believe Ron's schedule for the MRS had the same EIS's in them. So there is no intent at all to downplay the role of EIS's in the program and the schedules we showed yesterday did include them.

DR. DEERE: Are there other responses from the questions that were raised by the audience from the Board?

[No response.]

DR. DEERE: Any questions from the staff?

[No response.]

DR. DEERE: Yes. Any further questions or comments from the audience?

MR. CALLEN: Rom Callen from NARUC. I want to raise a question for Robby and perhaps John with respect to the $6.3 billion dollar figure on getting to license application and the reason I raise that is because as you know the whole question of site suitability is a big challenge and also because I find that the $6.3 billion dollar figure is perhaps the most astounding figure to come out of the program.

I note and let me put these things that I have heard together and see if I have this straight. First of all, in fiscal year 1993 and Dr. North, I appreciate the number, the program would have to double its annual budget.

From then on for a number of years all of the money that would be flowing into the program from the one mil per kilowatt hour would be used up, leaving the balance the same as it was with the exception of the inclusion of interest.

I take that to mean that that would represent a severe challenge to the one mil per kilowatt hour fee and the total dollars that that would raise since the remainder of the funds that have to be there would have to go for the construction and operation of the facility over its lifetime.

Then finally, Robby, I think you mentioned that you, the M&O, would not be on board until 1994 in terms of assessing that program and that by that time we are either going to be deeply into this $6.3 billion dollar program or we are going to be struggling with a Congress who doesn't see their way clear to funding that.

If I didn't get that right, I would like to know and I appreciate the opportunity to bring this to the Board's attention because I think it is a very significant issue.

MR. ROBERTSON: Ron, let me respond to that. I mentioned that I felt that kind of 1994 time frame or I

guess the terminology I used was the longer term where we

would be in a position as having been sufficiently up to speed and integrated into the program to have a good position on what those total numbers are.

I expect that that will occur incrementally. As an example, as we get into the performance assessment area, we will begin to understand that a little bit better. As we get into some of the surface-based testing part, we are beginning to understand that a little bit better.

As we get a little further into finishing the conceptual design on the MRS, we will have a little bit better handle on it. As we get into the procurement on the casks, we will have a little better understanding. As some of these system studies evolve, we will begin to find some drivers for it.

But what I guess I am really saying to you is my comment to try to make to you at that point was not to shirk the fact that we aren't going to be trying to do this and get our own value added into that to try to make those numbers as credible as we can understand them, but rather to preclude your expectation that on some magic date within a couple of months that the M&O is going to have some, quote, "independent evaluation" of whether that six point something billion dollars is the right number.

I believe that in the earlier years leading to

that those are close in enough to have a pretty good view of those being real over the next two to three years. I think as a general experienced program manager looking at the magnitude of what you are trying to do, I don't find any major fault with the magnitude of the numbers you are dealing with in the first few years upcoming.

What I don't have a good answer for you is what is my feeling about the degree to which this thing is going to converge and perhaps some of the out years might be in question as to whether they need to proceed at that level of funding in the tails, not the long tails, but in that end of it.

So I think that is the context in which I was attempting to make that.

MR. CALLEN: If I can follow-up your answer with a question, there is one thing I am not grasping and that is, there are two kinds of checks, I assume, you do and one is to presume that the program that is identified as identified would cost $6.3 billion dollars.

MR. ROBERTSON: Yes.

MR. CALLEN: There is another one, a more fundamental question asks, "Is that program correct, sufficient, appropriate, extensive enough/not to extensive?"

MR. ROBERTSON: Correct.

MR. CALLEN: I am not sure which question you are going to answer when.

MR. ROBERTSON: I am going to ask both ultimately but let me point out.

MR. CALLEN: When you answer them is my question.

MR. ROBERTSON: Oh. Let me point out that Gilbert Associates just answered one of those questions. Given that you are going to put that many holes in the ground, given that you are going to run this much evaluation, given you are going to put this many feet of tunnel in the ground over this period of time, I validate your cost rate numbers basically is what you say.

Now ultimately what you need to ask of us as you need to ask all the rest of the program participants is to justify, do you need all those holes. Do you need all of those people doing all of those things?

It is that portion of it where I believe that the real value added by the M&O ought to be brought to bear but it is going to take us time and it would just not be prudent for me to say to you, "Hey, I know enough about that to give you that judgment." It is going to take some time. We will work through a systematic process of trying to bring that into total.

MR. CALLEN: I understand then that your answer would

be available starting in 1994.

MR. ROBERTSON: Well, yes. I would hope by that time that if you asked me, Robby Robertson as the manager of this thing, "What do I think about it," I believe at about that time, we would be far enough in there to have some independent feel for that.

Before that, we are going to have a lot of individual pieces of that which will be fed in as a part of the overall process and I would hope that those will converge in with that whole budgetary process and planning process.

DR. BARTLETT: If I might make a supplemental statement, the issue in whether that is the right program will be answered as the program proceeds in many ways. The core strategic issue is what is the ability of the program to reduce uncertainty as a basis or associated with a decision on whether or not the site is suitable.

At one extreme, you have the possibility that you find the Aztec princess, as Bob Bernero described it, and you know immediately that the site is not suitable and so you go into doing other things.

At the other extreme is the situation which Steve Kraft of Edison Electric Institute once described where he said that his greatest fear is that each year we will find the site suitable for another year of evaluation.

[Laughter.]

DR. BARTLETT: That, of course, has to do with our

inability to use the acquisition of data to drive that uncertainty down to have a decision. We simply don't know at this point. The estimate right now is our best guess based on what we do know.

The site suitability evaluation report, the baseline report that is coming out in the next few months will detail a little more our best assessment of that work scope that is required but the fundamental issue the effort will continue to face is that one of assessing and building in the contributions of the data to reduction of uncertainty with each of these issues associated with the evaluation.

MR. GERTZ: Let me just add, Ron, for your information and to clarify a point, the Gilbert Commonwealth people as I said did a bottoms-up on the brick and mortar part of the estimate. They did a sampling on the scientific investigation. They are assembling a team right now to do more in-depth evaluation of the scientific investigation part of that cost estimate. That will be part of our 1994 budgeting process.

In addition, to set the stage straight, is it the right plan? What we have provided the costs for, the number of

drill holes is in effect based upon the SCP which we received over 2,000 comments from utilities and public on the consultative draft. We converted that to a final SCP which we received 4,000 comments on. We have tried to accommodate those comments in our program and so right now, we consider it the plan for moving forward.

As we gather data, John points out, certainly we intend to change the plan. Hopefully, with the gathering of data, we may be able to reduce the resources necessary to get the answer in. That is really what the program is all about but this is a snapshot in time right now.

Just for the record, as you are well aware, the $6.3 billion includes a billion dollars of pre-1990 costs approximately and it also includes a billion dollars of oversight and benefits, potential payments, to the State of Nevada. So there are some big numbers in there that maybe had not been included in other estimates we have heard before.

MR. ROUSSO: If I could add to that part, Ron, you raised a concern about the one mil per kilowatt and addressed the characterization costs of the six billion dollars. Obviously the program runs for many, many years and the total cost of the program is about five times that six billion dollars and the inflow streams that come from

the utilities go on for many, many years.

Even though we have years of high expenditure rate like in the characterization and again when we do construction, there are years when the expenditure rate is very low and it is the totality of that that is figured in in coming to a conclusion on the one mil per kilowatt.

DR. DEERE: Additional comments?

[No response.]

DR. DEERE: If not, I would like to express our gratitude and thanks for all of those who have made presentations to us and entered into the discussions. Certainly the Board members, staff, and the audience that have raised questions and made comments as part of our understanding of the problem and I think part of the public having a chance to hear the justification, the questions and the deliberations.

Now we would like to bid farewell to all of you and thank you and the Board will continue with its close-up evaluation of what we have been hearing the last day and a half. Thank you.

[Whereupon, the meeting was adjourned at 12:10 o'clock p.m.]