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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE

(ACNW)

137TH MEETING

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THURSDAY

SEPTEMBER 26, 2002

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LAS VEGAS, NEVADA

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The Committee was called to order at the Texas Station Hotel, Amaryllis Room, 2101 Texas Star Lane, North Las Vegas, Nevada 89109, at 8:30 a.m., by Dr. George Hornberger, Chairman, presiding.

COMMITTEE MEMBERS PRESENT:

DR. GEORGE HORNBERGER, Chairman

DR. RAYMOND WYMER, Vice Chairman

DR. B. JOHN GARRICK, Member

MR. MILTON LEVENSON, Member

DR. MICHAEL RYAN, Member

DR. JOHN LARKINS, Executive Director

DR. SHER BAHADUR, Associate Executive Director

ALSO PRESENT:

ACNW STAFF

DR. ANDY CAMPBELL, NRC

JEFF CIOCCO, NRC

PAT MACKIN, NRC

BUDHI SAGAR, NRC

TIM MCCARTIN, NRC

I-N-D-E-X

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

(8:30 a.m.)

CHAIRMAN HORNBERGER: The meeting will come to order. This is the second day of the 137th meeting of the Advisory Committee on Nuclear Waste. My name is George Hornberger, Chairman of the ACNW.

The other members of the committee present are Raymond Wymer, Vice Chairman, John Garrick, Milton Levenson, and Michael Ryan.

Today the committee will, one, hear scientific updates on selected activities of the geologic repository program at Yucca Mountain.

Two, reserve time for interactions with stakeholders and meeting participants. I will add that I think that our schedule is going to be such that we will move the timing of that up until approximately 3:00. I think it is scheduled currently for 4:15 or 5:15. I forget.

And, three, we will discuss proposed reports by the committee. Howard J. Larson is the designated Federal Official for today's initial session.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. We have received no written comments

or requests for time to make oral statements from members of the public regarding today's sessions.

Should anyone wish to address the committee, please make your wishes known to one of the committee staff. It is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

The session this morning continues with a session that we started yesterday afternoon. We will hear scientific updates from the Department of Energy on the Yucca Mountain Program. This morning the topic or the cognizant member of the committee who oversees this is John Garrick, and so I will turn the meeting over to John.

DR. GARRICK: Thank you, George. I think the presentation that we are about to hear are primarily for information, and to get a head's up on what has happened, for example, since the final environmental impact statement that just came out in February.

It also hits on the whole issue of the Yucca Mount repository. I don't think there are any preliminary remarks to be made, and I know that Joe Ziegler wants to kick off the session with a

presentation on the content. So, Joe, if you would proceed.

DR. ZIEGLER: Thank you. Good morning. My mane is Joseph Ziegler, and I am the Acting Manager for Licensing and Regulatory Compliance for the Yucca Mountain Project.

Basically, I am going to go over very briefly where the project is today and its status, and talk about the primary elements that will be the technical piece to our application, that being the preliminary design, the preclosure safety analysis, and a post-closure analysis and safety analysis that we call the total system performance assessment.

If you look on Slide 3, this kind of gives you a schedule, and you have probably seen this before, with various checkmarks on it. We have made significant progress for moving towards a repository, both technically with our site characterization activities being wrapped up, and our environmental impact assessment being completed.

And culminating in a site recommendation by the Secretary of Energy to the President, and the President making his recommendations, and the State of Nevada filing their notice of approval, and Congress taking their action to designate the site.

We are in what we call the licensing phase right now, and heading towards the license application. The next slide, just to put things in perspective, DOE's highest priority is protecting the public health and safety, and safety of the workers.

We have been for the most part a science project up to this point in time, and we have had some or a lot of interaction with the NRC, and they have on-site representatives, but there is no real regulatory direct authority by the NRC right now.

They don't do inspections, and they do assessments, and they give us feedback and they don't write violations. We know that we need to instill a safety conscious culture on our projects similar to other licensees under the Nuclear Regulatory Commission, and it is a different culture than just doing good science, and doing good technical work is not enough. We know that.

We are in the process of developing a license application that meets the requirements of 10 CFR 63. We plan to submit that license application in December of '04, and that has kind of been the schedule that we have discussed in meetings over the last year or two, and that has not changed.

We are working on the programmatic

sections currently, and things like the radiation protection program, and QA program, and we are also working on the technical feed, and that is what we will be talking about today, and that being the design work.

And then ultimately the pre-closure and post-closure safety analyses. Next slide. Just to give you a little summary for the design. The license application will have what we call a preliminary design.

That will be a level of design detail comparable to what you would typically see in a preliminary safety analysis report for a commercial nuclear power plant.

It includes the basic concepts of operations that will be in the license application, and provides a basis for the safety analysis that will be in the application, and the NRC will ultimately be able to do their safety evaluation for it so that they can approve the construction, and hopefully give us construction authorization in a timely manner.

The design has been and will continue to evolve as far as the level of detail and the specifics in the design as we learn more and as we move further in the process.

We have what we call conceptional design at this point in time. There is some flexibilities that we have talked about, as far as what was the highest or the greatest temperature that will ever be reached within a repository.

And we are defining that design to be able to take it into the license application. We will go in with one thermal operating strategy in the license application. We have not made any final decisions on that yet, or on the specific details of what goes in the license application.

It is looking like it will be the higher end of the thermal range. In other words, the temperatures will go above the boiling point of water in the repository, and the waste packages will be spaced relatively close together when we begin the license application, is the way it appears to be going right now.

But again the final decisions have not been made internally yet, but that is just kind of giving you a heads up of where we are headed. Ultimately the design refinements and detail will continue to evolve after the license application.

And we will have enough detail at the time of construction authorization, which we anticipate

about 3 years after the license application to begin construction, and then we will work on other details, not so much important to the safety analysis, but important to get the project completed and constructed as we go through the construction activity.

And this is pretty comparable to a commercial nuclear power plant. I have probably already covered what is on this slide, and I tend to do that on the first design slide, but again we will move in greater and greater levels of detail in the refinement of the design as we go through the process.

We have not made final decisions on some things, but a lot of that is going through the administrative process, which can lead to changes internally on what we decide to go forward with.

We are looking at trying to be more efficient in our subsurface repository, where we can reduce the amount of excavation required for the same amount of inflation of space. So there is some efficiencies being looked at there.

We are considering modular construction. where we don't build up surface facilities before we do any handling or emplacement. There is no need to do that actually. So we can level out the costs going out into the future.

Those are the types of things that we are looking at. As we look at these different design details and refinements, and we consider environmental impacts as we made the decisions, because it is part of the decision-making process in moving forward.

And we really have not seen anything that would substantively change the environment impacts that we have evaluated so far. Once we have our design, then basically we have to go to our safety analysis, first at pre-closure, and again this is pretty common for commercial nuclear facilities and other facilities.

And a quantitative analysis, which looks at potential events during the operations, and event sequences, which describe the site and the design, and which describe the potential events and the probabilities of the currents.

We assess the adequacy of the facilities, and the systems to perform that are intended to deal with those event sequences. Identify any limits on the design or operations that might be required as far as operational limits or operational practices, and describe means to mitigate or prevent accidents that could lead to a radiological release.

We will iterate that if we see things that

could lead to a release, and we will know what sequences that lead to the greatest probability of release, or the greatest magnitude of release.

We will iterate that back to our design organization, and if there are fixes that can be made to actually lower the probability or lower the level of release, if it makes sense, we will incorporate those as we refine the designs.

Similarly on the next slide, Slide 8, total system performance assessment, which is a long term safety analysis, or waste isolation analysis I presume. It is once we have our preliminary design, we go through and do that analysis.

We will incorporate any scientific data and information that we have collected, because we are in an ongoing data collection and analysis phase from a scientific point of view.

We will quantify and validate our starting point, and the second bullet there is what we call the supplemental science and performance analysis, and the final environmental impact statement models.

That is the model that we call the revised supplemental model in the SR documents, and that we believe is our best set of information, and what would be most likely or expected to happen.

There is some model elevation and things that would have to be done for some of those inputs as we go into the license application, and some of the science and testing work that we are doing right now is for model validation purposes.

In addition to that, we have a series of key technical issues that we are working on that have been identified by the NRC, and there are 293 agreements associated with those key technical issues.

Of the 293, 20 something odd plus percent of those have been closed by the NRC to date, and we have a process of a schedule to work closure of those additional agreements out as we head towards a license application, and we expect most of those agreements to be completed for license application.

We also are going to improve the treatment of features, events, and processes, and again per the regulation, it calls to evaluate features, events, and processes, that could lead to event sequences, and that could cause potential releases from a repository.

The work there is largely the same work that is associated with resolving the key technical agreement issues, and the agreement items associated with them.

And then we will perform our licensing compliance

analysis, and we will evaluate those base performance, and the word objectives is probably not right. It is requirements in the regulations that we have to meet, and that is the 15 milliram all pathways dose in the groundwater protection standards in 10 CFR Part 63.

We will also demonstrate the importance of multiple barriers, but the engineered barriers are natural barriers in the repository system, and I think there is not specific barriers as we define them, and I think we talked about those in the site recommendation report.

On the next slide, the documentation milestones, and we will create intermediate reports and products that will feed to the license application, and the first one of those leading there is the total system performance assessment license application methods and approach document that was issued by our management contractor, BSE, this month.

The following products, process model, and extraction analysis and modeling reports, AMRs, which is probably the term that you have heard the most often, are to be updated by June of next year.

The FEPs database, looking at the features, events, and processes, and documenting those features, events, and processes, will be completed in

about a year from now.

The license application and model analysis, and modeling port, that is the approach document on how will modeling be done, and what QA methods will be applied to it, will be done at the end of next years.

And by May of '04, the license application will have a complete documented report, probably several volumes, that will talk about the telesystem performance assessment that we will use in the license application.

And that is the document that will have the dose curves and the results in it. To summarize, on the last slide, we have developed our plans and schedules to submit a license application to the NRC in December of '04.

That presumes an adequate budget, you know, and our funding, even though there is a nuclear waste fund with many billions of dollars in it, the funding is appropriated by Congress each year, even though most of the money comes out of that fund.

Since we are under annual appropriations, at some point in time, if we don't get the requested monies that it takes to get to these schedules, we may not make it.

Of course, we will try to prioritize it in every way possible to meet these schedules. The focus for the license application is going to be a progress towards the completion of the preliminary design, and we will track that through interim design reviews.

We have a formal interim design review schedule for January of '03 is the next one, and our preclosure safety analysis that we will develop figuratively with the design, and see improvements and refinements that we can make and that make sense, we will incorporate those as we go.

The total system performance assessment, we will focus on enhancing our confidence and adequately representing the uncertainty that we predict in the future for 10,000 years.

And we will also continue our science testing and performance confirmation programs, and not just the license application, but throughout the process, to license the construction through operations, with an ongoing performance confirmation and test and analysis program.

And it is kind of an exciting type of program, and getting into the site recommendation phase, and we will hear a little bit more about some of these topics later on today. And I will entertain

any questions that have.

DR. GARRICK: Ray, do you have any questions?

VICE CHAIRMAN WYMER: No.

DR. GARRICK: George.

CHAIRMAN HORNBERGER: I take it that your design timing now, that what you called, I think, the conceptual design is the design that was used for, let's say, TSPASR; is that correct? That has not changed?

DR. ZIEGLER: The basic design has not changed. For TSPASR, which was done, what, about a year-and-a-half ago, that particular document, there were some refinements to that that were made in the SSPA analysis and the EIS analysis, that we think were improvements, even though the validated models that would have to exist to take it down to LA, for some of those, parameters don't exist yet.

CHAIRMAN HORNBERGER: Yes, but my recollection is that there were refinements in the models, but the design for the repository did not change?

DR. ZIEGLER: The design really has not changed. It depends on your perspective. We define -- well, for instance, subsurface layouts. We define

a fairly large subsurface layout, and exactly where within that potential footprint we end up going, I would call that a refinement.

It is the same basic block of rock, and it is the same horizon in the rock, but the exact location or any more detail definition of that location will be defined for the LA as we go forward.

Just remember that we called it a flexible design, and where we could put the waste package further apart or closer together, and right now what we envision, even though they have not formally approved our process yet, is that the waste packages will be closely spaced, which was the same as the modeling that was done for the TSPSAR.

They will be essentially in the same locations, even though the exact locations within that repository block may be modified a little bit as we refine it. But I would call that a design change, versus a refinement, for that.

And the same basic waste package design, maybe with a few minor tweaks to it, and the modular concept, which is what I think we will probably go with, is a little bit different, but it is not changing what we were doing. It is more like looking at 3 or 4 buildings instead of one big one. So

basically it is the same design.

CHAIRMAN HORNBERGER: Conceptually, are your designs at least at this point still include a drip shield?

DR. ZIEGLER: Yes.

CHAIRMAN HORNBERGER: And no backfill?

DR. ZIEGLER: Yes. Yes, the basic conceptions haven't changed.

CHAIRMAN HORNBERGER: They haven't changed?

DR. ZIEGLER: What we believe we are going to take into the license application is hot, which means that it gets up above the boiling temperature of water, you know, for a thousand to fifteen-hundred years or so, and then comes back down.

And to change that, we would have to modify our application.

CHAIRMAN HORNBERGER: So I take it then that you have wont he NWTRB over to the hot repository?

DR. ZIEGLER: Won the NWTRB over? I am not claiming that everybody agrees that that is the way to go. We will also identify expansion areas, such that should a decision be made that it should be a cooler temperature, and that we should not allow it

to go above the boiling point of water, or whatever the chosen temperature would be, that we could move the waste packages further apart.

So that there will be areas identified for expansion that could accommodate that, but that would require a modification to what we currently intend to apply for.

DR. GARRICK: I know that we are going to hear more about this in the next presentation, but let's continue to see if there are some questions at this point. Milt.

MR. LEVENSON: I have a question about slide five, and I don't know if we can get that up on the screen or not. I realize that the diagram there is a cartoon, and it is not to scale, but it seems to me that it is intended to define the concept or the philosophy that you are using, and as such it bothers me somewhat because even though it is not to scale, it implies that the preliminary design will not be completed until half-way between construction and receiving material.

Is that really the intent, that even a preliminary design won't be finished by LA?

DR. ZIEGLER: I don't think so. I think the preliminary design is what we are going to take

into the LA, and we will continue to refine that as we go through the process, and I guess I would like some indulgence, and like what you pointed out, it is a cartoon.

MR. LEVENSON: And also that the detail design continues all the way to permanent closure?

DR. ZIEGLER: That is probably if you think about the way -- think the way that a commercial nuclear power plant operates today, is that they will start construct, and you refine designs, and most of those have been going through modifications ever since they have been going on.

MR. LEVENSON: But that has nothing to do with licensing. The plants all during their lifetime, there are modifications, and there are upgrades, and I have never heard them referred to as design of the original plan.

This says that we are not going to have a finished detailed design ever. Are we discussing the philosophy as indicated in this, and not what kind of work goes on.

Presumably there is continuous monitoring and you make modifications, and they may or may not require a license adjustment. But the idea that -- I mean, if I take this at some kind of a single

significant figure of scale, which maybe it isn't, I don't think I would start building a house with as small a fraction of the detailed design completed as is indicated here.

DR. ZIEGLER: I would agree with that, and I think Jim Gardiner is going to talk more about the design later, but there was no intent to imply that there won't be a final detailed design before a license is received, because there will be.

MR. LEVENSON: Well, I guess we will get into this more later, but I think this as a concept, I find it fairly disturbing, because the fact that decisions haven't yet been made is perfectly acceptable. You have not submitted an LA.

But the implication that the bulk of the detail design comes after construction starts, I think we have got some discussion.

DR. ZIEGLER: That is probably a misrepresentation of what will actually happen to it.

DR. GARRICK: Mike.

DR. RYAN: No questions.

DR. GARRICK: I guess since you are in management, I guess it is appropriate to talk a little bit about schedule.

DR. ZIEGLER: Yes.

DR. GARRICK: As I see it, the Department is still optimistic about the schedule for the license application.

DR. ZIEGLER: In December of '04.

DR. GARRICK: Right. Is there a time well in advance of that date that if it becomes obvious and apparent that that schedule is not reachable that that will be disclosed?

I am thinking again of a credibility issue. Schedules in most industries, most major projects are pretty darn important, and yet DOE doesn't have the best reputation in the world for meeting schedules.

What is the strategy here? Is the strategy here to wait until the license application date comes, and then find out that you are not ready, and then go for a new schedule?

I am thinking of all the people and regulators, and everybody that is involved here, and the impact that schedule instability has on their activities. Could you comment a little bit on DOE's strategy with respect to managing a schedule?

And we are all very much aware that you don't have complete control of it, and that anything that is under regulatory process, and anything that is

under conditions of possible legal actions, and so forth, there are some things that are clearly beyond your control.

But on the other hand, I think the issue is important enough to at least understand what your strategy is relative to schedule management.

DR. ZIEGLER: Right now we have got a resource loaded schedule that gets us to 12/04. Now, there is not a lot of contingency built into that schedule. Truthfully, I think that -- well, I am the licensing manager for DOE, and I believe we can meet a 12/04 schedule.

There are no technical issues that I think would prevent us from getting to a 12/04 license application. Now, some of the process issues that you mentioned may do that, you know, but as far as what would DOE as far as how we would announce, or any delays in the schedule, that kind of goes into policy decisions out of our headquarters group.

But I would think that if we know that we can't meet the schedule, then we would announce that we know that we can't reach the schedule. That is not the case today.

And again looking at the key technical issues and the agreements associated with them, we are

on a path, and we are making steady progress, and we are on schedule for resolving those that we have agreed to with NRC to date.

Maybe with the exception of one, but I think there is one or two that we are ahead of schedule on. So I know of nothing that would prevent us from getting to a December '04 schedule from a technical perspective.

And it is really hard to project what is going to happen with the budget, and what is going to happen with the litigation, and what is going to happen with the factors that we don't have any control over.

So that probably doesn't answer your question satisfactorily, but I would have to speculate on what I am going to do if I don't meet the schedule, and when we are going to announce it.

DR. GARRICK: But you think that if there is a schedule change that that will be so announced well in advance?

DR. ZIEGLER: I would hope so, but I am probably not going to be the person to make that announcement.

DR. GARRICK: I think probably the committee has some questions about design, but we will

defer those until the next presentation, except that I understand that Milt now has one he wants to ask.

MR. LEVENSON: On the last of your backup slides, which is the schedule, the first bullet at the top, the interim design review be completed, and that is three months from now.

DR. ZIEGLER: Yes.

MR. LEVENSON: Has that been started?

DR. ZIEGLER: We have done a lot of design studies, and I think there are going to be some recommendations pretty soon. We have got a baseline change proposal in from our management contractor that goes into it.

MR. LEVENSON: Yes, but this says design review. So presumably the interim design, if you are going to have a review finished three months from now, the interim design isn't finished yet, right?

DR. ZIEGLER: The interim design is not complete, but there are elements that have been studied, and proposed path forward. It is my understanding, and Jim Gardiner is going to have to help me here, because he is going to talk about design later, is that there is various design review steps that we go through.

So this doesn't imply that the preliminary

design is complete at the time of the review. I think it is just a progress report just more than anything else.

MR. LEVENSON: Then I think that helps. That's fine. Maybe I need to ask a different question. I interpret this kind of a schedule for a project like this when it says there is a design review, that that is a rather formal thing after the design has been done, as opposed to the conventional checking and things which go on all along the way. Is that the case here?

DR. ZIEGLER: Well, I would ask Jim. Am I right? Is this a current status preliminary review?

DR. GARDINER: Yes.

MR. LEVENSON: You have to use a mike and identify yourself.

DR. GARDINER: Since we have a very formal design process, we are going to monitor this very closely because of all of the quality assurance and other aspects that need to be factored in.

So we have a series of design reviews, and that is one of the reasons it says interim up there, and as the status of the subsurface, and stages of the surface repositories get designed, we are going to look at those packages as soon as we can.

We are going to do formal reviews on them to make sure that they meet the standards that they should, and yes, design will be continuing at that point in time, and we will probably have three, maybe four, of these interim design processes, before we get to the point where we have a sufficient license application design to submit.

MR. LEVENSON: Could you state your name?

DR. GARDINER: Yes, my name is Jim Gardiner, and I am with the Department of Energy. I work in the Office of Project Execution. Suzy Millington is the manager of that.

And my area of work is the surface facilities for the repository.

MR. LEVENSON: Does that mean that the sequence, like the second interim design review, is just to cover things that weren't covered in the first one, as opposed to the system that I am used to, where a second design review means that you corrected things that came up in the first review?

What is the concept of these sequential reviews here? Are they all bits and pieces?

DR. GARDINER: Well, like I said, we are trying to make sure that our design process is fully functional, and it is passing the test that we are

going to impose upon it. And, yes, when we have a second interim license, we are also going to bring in, and we will be discussing, the design review elements that we discussed the first time.

We want to make sure that the integration is proper, and we want to make sure that what items in our -- that what items that are left, and what we call to be determined items that are maybe still pending at the time of the first review have been resolved and have they have adequate documentation so that they are complimentary to both our first and second reviews that we perform.

MR. LEVENSON: Do you care to make a guess at the final one, which is your design and verification for a license application, how long a process that is, and is that a separate formal one, or is that just another piece of an ongoing program?

DR. GARDINER: Okay. One of the benefits that we have in doing interim reviews, and that is getting all of the organizations better able to perform reviews in a more efficient manner.

So when that review comes along, we should have gone through this process a couple of times, which means that we can proceed and do a better job on that final license application review.

MR. LEVENSON: So all of these are then more or less in-house reviews by the people involved, as opposed to anywhere along the line here? Is there an external or independent review before you submit your license application?

DR. GARDINER: Yes, there is going to be independent reviews and at the interim reviews, we will also have people from the various stakeholders. There will be representatives from the NRC and representatives from QA and the State, et cetera. They are free to come in and observe those interim reviews.

MR. LEVENSON: I am not sure that the NRC will participate in your internal review of anything prior to a license application, in the sense of review that we are talking about here. I don't think that is necessarily appropriate.

DR. GARDINER: Well, the term review --

MR. LEVENSON: Maybe as observers, but --

DR. GARDINER: Yes, that is the correct term. Excuse me.

DR. GARRICK: Thanks. Thank you All right. I understand that we now have a speaker on rebase lining. Oh, I'm sorry, are there any questions from the staff?

MR. LEE: Mike Lee, ACNW staff. If I understand correctly then, aside from letting the issue, the KTI resolution process proceed, there are no other issues that you have to get resolution with the NRC staff?

DR. ZIEGLER: There are no other issues. Well, I am in licensing, and I don't like to use words like no and all, but by judgment is that there are no show stoppers, and that the technical issues that exist are the technical issues that exist.

I know of no significant new technical issues in anything that has come up recently that would make us think that we can't meet a December '04 license application.

MR. LEE: Sure. And along that same line then are there any critical issues that you have to take before the TRB?

DR. ZIEGLER: Critical issues? We take the -- well, I think this issue of hot versus cold will continue to be a source of opinion, different technical judgments and opinions.

And I think that we are accommodating in our design the ability that if needs to change for whatever reason back to where we don't allow a temperature to get above boiling, you know, post-

closure, then we will be able to make that change.

There may be a cost in the schedule associated with that, but if you are asking me to predict the way that these expert panels are going to do, and the expert panels are experts, and have very good credentials, and very strong opinions.

So right now we plan to go forward with a higher temperature license application. And I am saying that, and I want to always hedge that, but that has not been formally approved yet by the DOE process. But that appears the way that we are going.

And will it change? We will see. You know, there is a process in the regulations where modifications could be made, and if they need to be made, the physical layouts and things are such that that modifications could be accommodated.

MR. LEE: And my last question is has the NWTRB identified a role, or in terms of a schedule for submitting a license application, are you going to have to get denied from them before you submit to the NRC?

DR. ZIEGLER: I think certainly before we go forward, we will present what our proposal is to the TRB. I know of no formal mechanism, and probably similar to the mechanism that existed going into SR,

and I would expect the technical review board to make their opinions known before we submit a license application.

MR. LEE: Right. The reason that I asked was that I wasn't sure and I didn't see a milestone to that effect on your backup slides. So I was not sure if you were going to have that type of activity.

DR. ZIEGLER: We have regularly scheduled meetings with the TRB, and those will continue, and I am sure that there will be one before we submit our license application.

And I am sure that there will be one before we submit our license application to lay out exactly what our plans are.

MR. LEE: And I would expect them to comment. They are not shy.

DR. GARRICK: Any other questions for Joe from the staff? I'm sorry, Mike, but I was just trying to practice what I preach and manage our schedule. We are seven minutes behind schedule. But I am sure that we will get back on. Okay. If the next speaker will introduce himself.

DR. LUNDGAARD: Good morning. My name is Eric Lundgaard, and I work for the Office of Project Control, with the Department of Energy. And I wanted

to talk to you a little bit about the baseline design phase that we are in right now, which is a preliminary and design phase.

And before I get into that, I would also like to talk a little bit about the budget status and where we are now, and the budget for 2003, and where we are at this point in time.

And then go on to talk a little bit about the overview, and I think that most of what has been said here is included in that overview. And then some of the newer things that probably have not been discussed yet that I will be discussing, and I think Jim Gardiner a little bit later, are the contractor's proposed approach for emplacement given the schedule that we have and meeting it by the year 2010.

And then also a little bit about the budgets that are required to do that in the future, and the budgets that we have available to us to do that in the future.

This year, we had an initial request of $527 million, and a supplemental request of $66 million. Both the House of Representatives and the Senate have taken action on that, leaving us with $525 and $336 million respectively.

At this point in time, we are not really

sure exactly what we are going to end up, because the process has now moved forward to a conference committee, and certainly of course the President hasn't signed it.

It looks at this point in time that we are going to be in a continuing resolution, unfortunately, and perhaps that might last six months. And we don't know exactly what the funding level would be in a continuing resolution. It might be $375 million, which is where we are at right now in terms of funding.

But it might be above that or lower than that, depending on what the Chief Financial Officer decides to do with it, with the continuing resolution. As I said, some of this has already been discussed. The baseline change proposal has been received by the Department of Energy from our contractor on September 3rd, and is currently under review.

And within the schedule that is proposed to us, the license application of course would have to change from March of this year to December '04, and waste acceptance would still be occurring in 2010, all numbers that I think people have discussed before.

So I will talk a little bit about the contractor's proposed approach to emplacement,

requires a phase surface facility or staged surface facility that would occur over time and in stages.

And it also allows us to receive 400 metric tons per year initially, and then of course we would need to wrap up to the 3,000 metric tons per year over the 2010 to 2014 period.

This process has some beneficial effects. It allows us to look at and learn from the lessons that we might have from the first panel and the first surface facilities to make sure that the next ones are more appropriate to obtaining the objectives of taking waste and storing it under ground.

And we assume also in this, or the contractors assumed also that no waste receipt characterization provisions are in those facilities. So the waste would have to be characterized ahead of time before it is shipped to Yucca Mountain.

The initial operations then would exist to a panel one, and I will show you a diagram of panel one and the other panels, and the balance of the plant for panel one would be completed to support the initial operations.

And then we go on to panel two according to this proposal by the contractor, and the construction would continue beyond the initial

operation. As far as the underground facilities, the underground facilities would look something like this.

Prior to this, we had proposed to have a perimeter drift around the entire facility. With this phased approach, we wouldn't require that perimeter drift, but it would require another underground access as you see on the top of that diagram.

There is another tunnel boring machine that would be required in another hole in the mountain, or another north portal would basically be required for panel two. The second north portal.

And you see that we have five panels there, which allows us the flexibility of having a hot or cold storage within this, and depending upon how far we have to space those.

So there are things that Joe talked about that we have not necessarily precluded in this option the ability to go with a colder design. And it utilizes the exploratory studies facilities that exists today, to begin with emplacement by the year 2010.

And a construction schedule that is required for that first emplacement is in around a little over two years, 2 years and 4 months. It eliminates as I said the need for that perimeter

drift, which will save us some time, and again that third access is required.

Going on to the next slide, I think it gives you a little bit of the proposed schedule that is required by our contractor. The modulation means phase and the flexibility is that it still could be a hot or cold design, or a hot or cold facility.

And the production waste streams means that we have an ability to wrap up this facility and go from the 400 metric tons on to higher levels of waste received.

And I don't think there is any surprises here in terms of our schedule. We are still asking for a submittal of the license application in 12/04 with 36 months then required before construction authorization.

Now, that date, a three year link, is probably 12/07, unless you include three months for docketing. I think the Department of Energy has always said it would be 12/07.

But this one from our contractor includes three months for docketing. And then there is a process then of updating the LA and going head and asking for a license to receive and possess.

And we would expect to get that in time

for the 9/2010 goal of receiving the first waste, and then some emplacement by December of 2010 goal. If you look at safety and infrastructure improvements, you will see probably some new items in there.

We are going to be able to go ahead and do some work on the site prior to construction authorization, roads and access utilities infrastructure, and test facility upgrades, and the underground utilities. The staging issues. however, would be things like perhaps both purchases, off-site prototyping, which would be offset modules, and storage of both materials.

And also allowing us to go ahead or allowing the contractor to go ahead and provide some engineered equipment, like the welding machine that is required for the canisters.

And then perhaps a training facility, and normally procurements would be things like the TBM that is needed for the third access. Let's see. We then would go on to basically maintain the same objectives that we already have with the 12/10 goal. And the license or the facility active at that point in time.

There is some uncertainty in there, in the process, between where we get the construction

authorization and the actual then request for license to receive and possess. Those dates aren't really well known, but we expect that they will occur in time for us to go ahead and receive the waste by 12/2010.

And then as far as the budget goes, as I said, this year, we have requested $593 million, and we are in a state of flux waiting for some direction from Congress and then the decision of the President as to what level of funding we will have in 2003.

And it is anybody's guess as to what that might be, but we do expect a continuing resolution, because Congress has been very busy lately, especially with the possibility of a war and those kinds of issues.

And you do a wrap-up, and this is from our chief financial officer, and the rest of the numbers are 2004 to 2008, and a wrap-up of budget requirements, on up to billions of dollars, culminating in the year 2008.

And this is a schedule that is provided by our contractor and provides a schedule until March of 2008. We should know better in terms of what OMB's position is after Thanksgiving, when they will provide us a pass back on all of these numbers, 2004 to 2008.

Some of the more detailed -- and I know

that some of this will be presented by Jim Gardiner also, in terms of the more detailed design effort. But I just wanted to give you an indication as to where we are with the scope, and where we are with the review process, and what our expectations are for funding.

So if you have any questions, I would be glad to entertain those.

DR. GARRICK: Ray.

VICE CHAIRMAN WYMER: You indicated that there would be a small initial facility. What is the size of that facility, and what is the capacity?

DR. LUNDGAARD: Initially, it would be 400, would be able to receive 400 metric tons.

VICE CHAIRMAN WYMER: I mean, what is the capacity?

DR. LUNDGAARD: I don't know what the capacity is. I think that Jim will be able to speak to that in more detail.

VICE CHAIRMAN WYMER: And what sort of schedule do you have for enlarging that?

DR. LUNDGAARD: In terms of waste received Over the 2010 to 2014 period? Are you looking for capacity?

VICE CHAIRMAN WYMER: Yes.

DR. LUNDGAARD: Actual capacity at certain points in time?

VICE CHAIRMAN WYMER: Yes.

DR. LUNDGAARD: I don't know exactly what those numbers are.

VICE CHAIRMAN WYMER: But that is of interest to the facilities?

DR. LUNDGAARD: Sure. I understand. Joe, do you have an answer to that?

DR. ZIEGLER: Joseph Ziegler. Eric indicated that in 2004 that we would be up to full capacity to be able to handle at least 3,000 metric tons per year, but that is just a wrap up from the first year to the fourth year to get it up to 3,000 metric tons per year.

So it is not being extended indefinitely. So it is basically just a few years stretched out.

CHAIRMAN HORNBERGER: Could I just ask one question with my taxpayer hat on? Can you tell me why the tunnel boring machine that has been sitting at the south portal since daylighting couldn't be used for the third access, rather than purchasing a new one?

DR. LUNDGAARD: That is a very good question. As far as I know, it can't be. I think they are required to get another one, but I'm not sure

exactly what the details are for that.

DR. GARDINER: Jim Gardiner, DOE. In using the machine that they had, they found a number of operational problems with it, although it did work, and it did do reasonably well for us. If in fact we are going to get into a higher production mode, we could use the machine as it is, but there are some plans underfoot to go back and maybe refurbish, or change, or alter that machine, which would help us accommodate the ground conditions that we have been finding.

And we got it stuck a time or two, and it caused us some problems. So there is definitely some modifications that would have to be made to that machine, but that is a possibility to have it reused after being refurbished.

MR. LEVENSON: I guess I have a taxpayer question, too. We are up to $1.6 billion at the time that we start construction. What is the expenditure rate during construction? I assume it doesn't go down.

DR. LUNDGAARD: You mean the budget numbers beyond 2008?

MR. LEVENSON: Well, 2008 is when you get construction authorization, and presumably

construction doesn't start before that. So what is the level of funding during construction, the one significant figure?

DR. LUNDGAARD: It would be at a higher level actually, but as far as the actual numbers and what they are, I don't have those with me.

DR. GARRICK: Mike, do you have any questions?

DR. LUNDGAARD: No, I am just a little bit staggered by those numbers.

DR. GARRICK: A bit dumbfounded?

DR. RYAN: Yes.

DR. GARRICK: I don't know if this is a question to ask now or later, but --

DR. LUNDGAARD: I think it is relevant at this point just to mention also that this is with the phased approach to building the repository that the numbers are still this high. There is an intent to spread the money out, and that's what we end up with in terms of doing that.

DR. GARRICK: One of the peculiarities of this project is that there is going to be a great deal of construction going on during the early operating phases. I am curious if there has been a careful consideration of that, in terms of, for example, what

the construction operations might be, or how the construction operations might impact preclosure safety?

Do you know if there has been any detailed modeling of the combined activities of construction and operations as a function of time, and has that information been factored into the preclosure safety analysis?

DR. LUNDGAARD: That is a very good question and I will defer to Joe on that one. That is his area of expertise.

DR. ZIEGLER: Joseph Ziegler again. I may not have a satisfactory answer yet either, but the concept had always been, even back in the SR, or the pre-SR, or the viability assessment days is that the underground construction would continue as emplacement was going on, with a bulkhead in between to make sure that the air flow -- that there would be negative pressure, you know, in the construction areas, versus the positive pressure where the emplacement is going on, so that you wouldn't get any -- I'm sorry, that's backwards. Excuse me.

That negative pressure where emplacement is going on to make sure that the air flow wouldn't go in any direction, just in case some event, even though

unanticipated, and unlikely, might occur.

The new layout that we are considering right now with the modular underground, with the modules that go in there, the specific analyses, the specific preclosure safety analysis for those, has not been completed yet, and until those are defined better, won't be able to be completed.

But it will be a similar concept that will be bulkheaded, and physically separated, both air flow and actual geographic separation. So we don't anticipate it to be a problem.

But, no, there has been no detailed analysis of that at this point in time.

DR. GARRICK: Milt, go ahead.

MR. LEVENSON: I just wanted to comment on that. I don't think we want to imply by our questions on that that it can't be done. If we use as an example the WHIP facility, which has a fair amount of weight, there are two things that are underway with WHIP.

One is the storage of waste, and the other, which is an interesting one, is in an adjacent tunnel, the high energy physicists of the world have installed equipment because they find it is the lowest background of anywhere in the world for nutrinal experiments.

So certainly these things can be separated, but they have got to be planned for and designed for, and thought out.

DR. GARRICK: Any questions from the staff? Mike.

MR. LEE: Mike Lee, ACNW staff. Just going back to slide five, you said that there is no provision for site waste characterization at the site?

DR. LUNDGAARD: That's right.

MR. LEE: Could you explain that?

DR. LUNDGAARD: It is expected that the waste would have to be characterized before it is shipped, and it is a way I think of speeding up the process, in terms of receipt, and having to review it. There is an inspection process, and rather than answering that question, I think I would rather defer that.

MR. LEE: My point is that I think you have to have materials control on accounting at some point, and so where does that begin? I know that the Navy fuel, for example, will come as is, and it will be presealed and it will be good to go for emplacement. But I think the other --

DR. LUNDGAARD: Well, it will come in the estimate.

DR. RYAN: Well, I understand the reason for not doing it at a receipt location, but there has got to be some front end process that qualifies the material, and that is a good point.

DR. LUNDGAARD: Perhaps Jim will touch on that point.

DR. RYAN: That's my point. That's what I said. That's what I said, that it is at the point of generation, and not at the point of receipt.

DR. LUNDGAARD: Yes, that is what this implies.

DR. RYAN: Right.

DR. GARRICK: Any other questions from the staff? This might be a good time to see if any of the public wants to make a comment in response to these two presentations, or if they have any questions? Yes.

MR. PARROTT: Jack Parrott, NRC staff on-site rep. On your milestone chart, you have got construction authorization in what looks like FY 2008, but on the next page, on page 9, you have a big wrap up in funding in FY 2005, '06, and '07. What is that wrap-up in funding for?

DR. LUNDGAARD: I think largely what that is, is trying to spread out the costs so we can go

ahead and move ahead with the phases that are outlined here in the receipt and emplacement diagram that I have got.

MR. PARROTT: So would it be like physical site activities or point of --

DR. LUNDGAARD: There are some physical site activities. That is what is indicated, and they are not actually site activities, not before construction authorization, but perhaps in some off-site work that would have to be done. Perhaps Joe could expound on that.

DR. ZIEGLER: Joe Ziegler, DOE, and I don't have the specifics. We would have to look at the cost estimates, and we can make those available, but there is all kinds of materials and equipment procurement activities that are going to have to go on, and some of this stuff is pretty dog gone expensive.

And a dish on Nevada Rail is very expensive, and we would like to get the rail on in as soon as possible, and so some of those activities are probably showing up, certainly earlier than 2010. And it is anywhere from between a hundred and 300 miles of rail line that would have to go in before 2010, and that's going to show up in the schedule as well.

So I don't know the specifics, but we recognize that there is certain on-site activities that can't happen until we get an NRC construction authorization, and there is certain other activities, particularly off-site activities, that can go on.

DR. GARRICK: Any other questions? Steve.

MR. FRISCHMAN: Yes, Steve Frischman, State of Nevada. You know, you raised a question about page 5 on Joe's presentation about his design and level of design.

Now, you will see in the comments that I referred to yesterday were that we had sent to the Chairman a review of the department's comments on the Yucca Mountain Review Plan.

You will see in there that we raised this same issue about level of design, and it is because the department raised it in their comments, and on looking at it, and what Joe said was that at license application the design level of detail will be similar to what is typically seen with a design for a commercial power plant at license application.

Well, in looking at the process of Part 50, it is different from what appears to be envisioned in Part 63. In part 50, there is the very clear distinction, or as the Department used the word,

differentiation, between a preliminary safety analysis report, and a final safety analysis report.

And the requirements for each one of those is laid out in Part 50. In Part 63, the requirement is for a safety analysis report at the time, or to accompany the license application.

So there is a distinction here. The Department is apparently very intent on applying the requirements of Part 50 instead of the requirements of Part 63, and i think when you brought this up, this is an illustration of what they are trying to do.

And part of the reason that we sent our comments on to the Chairman of the Commission, and we have also spoken with the staff and management about this, is because this is going to need to be resolved.

And I bring it up here just in case you are not aware of the level that it is going to. And Janet tells me that it is possible that there is a meeting coming up fairly soon where this will at least be mentioned.

This has been going on for a number of years actually, and we have raised the issue to the Commission in the past. We have raised it with the staff, and so far there has been silence.

And what we take the result of that to be

is that the Department continues on trying to have their desire to use Part 50 procedure, and their desire to have that self-fulfilling, and we see that that is essentially happening at this point because of silence from the Commission.

So our intent in-part in sending our comments to the Chairman was to get this on the table before the silence actually does become self-fulfilling, rather than the Commission actually looking at how it wants to operate and implement its own rule, rather than the Department telling them that Part 63 is really going to be operating like Part 50.

DR. GARRICK: Any comments or response to what Steve just said? And I guess that was more of a comment than a question. Any other comments?

(No response.)

DR. GARRICK: Okay. Thank you very much. Our next presentation will be on the final environmental impact statement for Yucca Mountain. This is simply a report, I understand, as to what has been taking place since the final environmental impact statement that was published in February of this year.

As we all know the draft environmental impact statement received literally thousands of comments, and there were many changes in the draft as

a result of those comments.

For example, more information regarding potential impacts, and particularly impacts associated with transportation, and use of a representative fuel element in the accident analysis, and use of updated data, particularly population data in the impact analysis.

A more detailed discussion of the issue of potential impacts associated with the negative perceptions about the repository project, and use of updated computer models for assessing human health and transportation; the usual types of corrections; an addition to the U.S. Fish and Wildlife Service biological opinion as an appendix to the final EIS; an addition of a reader's guide to help the document be a little more reader friendly.

And all of that was a part of what went between the draft and the final, and I understand that Robin Sweeney now is going to indicate to us and give us a rundown of what happened since the final publication.

DR. SWEENEY: I have to admit, Dr. Garrick, that you did a great job. I am not sure that there is a whole lot I can add to that. I did want to let folks know that Jane Somersome was unable to make

it today, but does send her regards to the Committee.

Next slide. Part of this Dr. Garrick went over, and we went back and looked, and discovered that it was in May of 2001 was the last time that we briefed this committee, and so we wanted an opportunity to update folks and let them know what has happened since then, and just give it a little bit of additional information on the final environmental impact statement.

Next slide, please. Since the draft environmental impact statement, and most of this initial information is what we shared with you last time, I think the supplement had just come out when we briefed you before, and since then we have had a 45 day public comment period, with three public hearings in the State of Nevada on the supplement.

We received an additional 1,100 comments. So altogether we have received almost 13,000 comments on the environmental impact statement, which certainly helped us make a much better final environmental impact statement.

We really appreciate the effort that the public went through to provide us some really careful thought out comments. Next slide.

As you are aware, on February 14th, the

Secretary of Energy recommended the site as scientifically and technically suitable, and as part of the basis of recommendation package, was the final environmental impact statement as required by the Nuclear Waste Policy Act. This document is approximately 5,100 pages long. Next slide.

We made the final environmental impact statement available to the public on the internet, embracing the Secretary of Energy's warm endorsement of a paperless government, and since then we have just recently delivered to the General Printing Office the document, and it is in the midst of being printed now.

Next slide, please. The major conclusions that we reached in the final environmental impact statement is that the proposed action would call small, short term public health impacts, primarily due to transportation, and that the impacts of the site would be very small.

And that primarily the transportation impacts are traffic fatalities, and long term performance of the repository would result in a very low mean peak annual dose and that we cannot expect the repository to result in impacts to public health beyond prescribed standards.

The primary areas of change from the draft

environmental impact statement, and Dr. Garrick touched on some of these, is that we provided more information regarding potential impacts, particularly transportation impacts, within the State of Nevada.

We received a large number of comments from the public that asked for this additional information, and this included things like additional descriptions of the rail corridors, looking at some of the Clean Air Act non-attainment area, and information on the Las Vegas valley, looking a little bit more at biological resources, and things like noise and ground vibration.

We also came up with the concept of a representative fuel assembly and accident analyses. I think that this was primarily a comment that we received from the State that said that you, DOE, have underestimated the potential impacts here.

We have used an average age fuel in the draft, and we decided to go back and use a representative fuel, which is average risk or hazard. And what this meant was that it was approximately 25 percent higher burn up fuel. It is 15 year old fuel, versus 26 year old fuel.

And it increased the source term by a factor of two. We also provided updated data along

the lines of population data. It was a little touch and go there for a while, but some of the census data was out in time for us to incorporate it into the final environmental impact statement.

And we also used County-provided population data and projected it out to 2035. We provided a more detailed discussion on perception-based impacts, and we received numerous comments on that, and we looked at whether the state of the science in predicting future behavior had progressed to the point that it would allow DOE to quantify this, and quantify the impacts from it.

We hired an independent expert to come in and look at the literature and review all the comments that we had received, and the results of his analysis are in Section 2.5.4., and we also included his entire report as Appendix N in the document.

We used updated computer models, and we went from RAD Tran 4 to RAD Tran 5. Obviously, we added editorial changes and corrections, and we also added an additional appendix on transportation, Appendix M, and there were a lot of questions that we received that were on transportation, but were not necessarily DOE's purview.

Questions about the Nuclear Regulatory

Commission regulations, and Department of Transportation regulations, and that sort of thing. And we felt that it would be helpful to the reader if we provided essentially a primer of information on transportation in the EIS to help them understand the basis for some of the analysis that we did in Chapter 6 and Appendix J.

So all of that is in Appendix M. The Fish and Wildlife Service provided us a biological opinion, and we included that as Appendix O, and as Dr. Garrick said, we also provided a reader's guide.

We had received comments saying reciprocal -- you know, trying to know where to go in this environmental impact statement, and since the document increased so much in size, we felt that for the final one that it was really important to provide that information up front to help people know where to go in the document to find certain information.

As I said before, a large part of the changes in the environmental impact statement were due to public comments. Volume 3, which is the comment response document, is almost 3,000 pages long, and contained the public comments that we received and DOE's response to those comments.

And approximately 25 percent of the

comments we received caused a change in the documents, and so we really do feel that the public helped us improve the document immensely for the final.

We also thought that we had to correct errors. You know, typographical and editorial errors, and in places where we thought we were absolutely as clear as we could be, that based on input that we received either internally or externally, we found that maybe we had not done as good a job explaining things as we thought we did.

And then again if there was new information on improved analysis, that was put in the document as well. Now, the comment response document, as I said, we received over 12,000 comments -- letters, e-mails, transcripts from the public hearings -- and we counted any comment that we received through August 31st, 2001, and we were able to get that in the document.

Any comments that we received after that, we looked at and evaluated to try to determine if it raised new issues, and we felt that none did.

Similar comments were summarized, and what I mean by that is that we received numerous comments that said the same thing, and we combined them all into one which we called the summary comment, and then

provided a summary response after that.

It was a trade-off, because we really carefully scrubbed those to make sure that any nuance in an individual's comment wasn't lost when it got grouped together.

And if at the same time this document is already 3,000 pages long, and if we hadn't done that, I can't even imagine how long the comment response document would have been. And I am essentially repeating a lot of the same answers over and over again if we had decided to do it by individual comment.

And as we said before, approximately 25 percent of the comments caused this change or update in the environmental impact statement. The preferred alternative in the final environmental impact statement is to do the proposed action, which is to construct, operate, and monitor, and eventually close the geologic repository at Yucca Mountain.

And in the transportation section, we identified mostly rail, which is our preferred mode of transportation, nationally and in the State of Nevada, acknowledging that there may be some sites, some commercial sites, that do not have rail capability, and would have to ship by legal weight truck. So

that's why the mostly is in front of rail.

At some point in the future, a DOE record of decision will come out on the transportation load, showing what DOE has selected as its mode. This can come out no sooner than 30 days following the EPA notice of availability, and obviously if we receive any comments before then, we will have to address them in the record decision.

If mostly rail is selected, then the next step would be that the DOE would identify a preference for one of the rail corridors in Nevada, in consultation with affected stakeholders, including the State of Nevada.

And then DOE would then issue a record of decision on a rail corridor in Nevada, and we would issue that record of decision no sooner than 30 days after the announcement of the preference. And a similar process would occur if the DOE decided to select heavy haul truck as the mode in Nevada.

We would go through the same identifying preference for one of the routes, putting in a Federal Register notice, et cetera. And other transportation decisions, such as selection of a rail alignment, should we choose to go with mostly rail, would require additional NEPA analysis.

We are also currently reviewing ongoing project activities and potential design changes to ensure that we are still in compliance with NEPA, and at this point we are closely looking at the Nuclear Regulatory Commission to understand what is going to be required as far as adoption of the EIS by them. That concludes my talk.

DR. GARRICK: Thank you. Ray, do you have any questions?

VICE CHAIRMAN WYMER: No.

DR. GARRICK: George.

CHAIRMAN HORNBERGER: I'm just curious, but I think you called it perception impacts or something. Is this mainly the perceived economic impacts, which can be real, as well as perceived?

DR. SWEENEY: Right. It was economic, but it was also things like -- gosh, what was the term that was used. It was standard of life or whatever, and that it would have an impact on them.

And it may not be a direct economic impact, but it would still affect them personally. The stigmas, as Joe said, is another term that folks use for it as well, and that sort of thing.

DR. GARRICK: Milt.

MR. LEVENSON: I understand changing the

representative fuel assembly to a higher burn up because that is what is in fact happening, but I don't understand shortening the time with cooling, and I think it is going to be 60 or 70 years before you can possibly reach a fuel element cooled only 15 years.

And if it were used as a limiting case, it might be, but to use it as a representative number seems strange.

DR. SWEENEY: Sure, go ahead, Joe. You are my boss. I will let you answer.

DR. ZIEGLER: Joseph Ziegler, DOE. For the representative fuel, we used a median hazard on the fuel for the transportation accident analysis, and that is the transportation analysis.

The accident analysis for the fuel at the repository, we basically used five year old fuel burn-up fuel there, because that was the worst case, and we analyzed the case that we would have to design the repository and the handling facilities for it.

So the representative fuel was used in the transportation analysis, and that was as a direct result of comments that we got from the State of Nevada.

The average age didn't give you average hazard, and so we went back and did a hazard index to

do the median hazard that would be more representative of what the potential accidents during the transportation accident could be. Does that answer your question? No? I ask that because you still have a puzzled look on your face.

MR. LEVENSON: When are you going to be shipping -- how soon can you possibly be shipping 15 fuel-cooled only 15 years with the long delay in the repository schedule for shipment?

DR. ZIEGLER: How soon could we ship? As far as I know, there is nothing that would prevent us from shipping five year old fuel in the year 2010. So the only limitations on shipping is if we got some temperature limits and we have got some radiation limits, and how much fuel you put in any particular shipping container.

But we could legally ship five year old fuel as soon as we start receiving fuel.

MR. LEVENSON: Well, I know you can legally, but in the real world, it is going to be more like 30 years isn't it?

DR. ZIEGLER: That may be true, but we were trying to make sure that we bounded the potential environment impacts associated with it.

MR. LEVENSON: If you use it as a bounding

analysis, I have no problems at all. It's when you define it as representative.

DR. ZIEGLER: Well, I will tell you that the way that the assumptions went on the fuel shipments that we used, is that we assumed that 10 year old fuel would be shipped out of the pools first, and then we would ship progressively younger fuel per the standard contracts that we have with the utilities.

And then we would start picking up the older than 10 year old fuel, and the last things that would be shipped would be the fuel that was already in dry storage containers at the utilities.

That was the basis for analysis to make sure that we covered the potential impacts. I can tell that you don't -- if you want to talk more about it, we will come back to it.

DR. GARRICK: Mike, do you have any questions?

DR. RYAN: I guess as a follow-up. The utilities are scheduling to ship 10 year old fuel before older fuel? I mean, I don't mean to press on it, but it just sounds like they would ship the oldest fuel first.

DR. ZIEGLER: Joe Ziegler, DOE. The

utilities get to choose which fuel they ship first, okay? So if you are a utility, and you have got fuel in your fuel pool, then it may not make a lot of difference which fuel you ship first.

But then again you may want to ship your youngest fuel first if you are a utility, because that is the hottest and highest burn up stuff. And if you can load a full container with it, you might want to ship it first.

But instead of speculating too much, we had to make a set of assumptions to do the analysis on. So knowing that we weren't in full control over what got shipped with the utilities, we tried to make a set of reasonable assumptions, and we tried to be a little bit conservative in those assumptions.

We got comments from the State of Nevada that maybe we weren't conservative enough, and so we did a reanalysis on the accident.

It didn't make a whole lot of difference as far as just normal radiation level impacts from an environmental impact standpoint, because we assumed that the normal radiation dose limits were at the regulatory limits on the shipping containers and vehicles.

So I'm sure that we overestimated there,

because we will never get up to the absolute limit. But for accident analysis, again we used average aged fuel of everything that would be shipped in the first 70,000 metric tons, or 63,000 metric tons of commercial fuel.

And because we got the comment from the State, and because if utilities chose to ship younger fuel first, we are not in complete control of that, then it could be a younger average age.

So we were trying to be conservative and make sure that we bounded the impacts.

DR. GARRICK: Joe, while you are up there, if it turns out that thermal blending becomes a big practice, would that not impact the shipping schedule?

DR. ZIEGLER: It could if we could somehow work out arrangements with the utilities to optimize so that we would have to do less handling at the repository for thermal blending.

What we assumed for the impact analysis in the environment impact statement was that we would have 5,000 metric tons of lag storage, or capability, at the repository such that we could accommodate whatever we received, and be able to do the thermal blending as necessary to levelize the heat load in the repository once it's closed.

But I agree with you that what would make more sense would be to work out an arrangement with the utilities so that we could get some older fuel and some younger fuel, and get that so that we would not have to do so much fuel handling or storage at the repository.

So that is what makes sense, but again we wanted to make sure that we bounded the impacts and so we made some assumptions that would allow us to do that. When we get into the actual operations, you know, life may actually be simpler.

VICE CHAIRMAN WYMER: Is that your design basis, 5,000 metric tons at lag storage?

DR. ZIEGLER: The design basis as it existed going into the site recommendation was 5,000 metric tons. Now, there has been some relooks at that, and Jim may be able to address that later, is that we may not need that much.

We may have overestimated the needs there, and so I think that number has been going down based on some relooking at the conditions that exist.

DR. GARRICK: Okay. Thank you. I wanted to ask a question about transportation. If it turns out, and especially by the State of Nevada, that rail transportation is much preferred over truck

transportation, is consideration being given to some sort of interim shipment process that will accommodate the plants that don't have rail facilities?

In other words, that is one option, and even though it increases the handling, et cetera, it may better distribute the risks if you wish if it turns out that the analyses and the conclusions are for a strong preference for rail shipments in the State?

DR. SWEENEY: Let me see if I can -- let me attempt to answer and make sure that I have captured all your points here. We have estimated that there would be about a thousand truck shipments over the 24 year shipping campaign if we go mostly by rail just to accommodate the six sites.

I can't tell if what you are asking is would we take their fuel and move it to someplace else and blend it, and I doubt that we have analyzed that. But another option would be to take a legal weight truck cast from these sites and put it on a rail car and do it that way.

DR. GARRICK: That's right, and I am just asking if that is being considered.

DR. SWEENEY: We analyzed that as part of the sensitivity analysis in the EIS, trying to put all

the legal weight trucks cast if we went mostly truck on rail to at least get it closer here by rail.

As far as the record of decision, we are just now starting to put that together and looking at the comments that we are receiving on that, and that sort of thing.

DR. GARRICK: Okay. Are there any questions from the staff on the environmental impact statement presentation? I would also offer this as an opportunity for anybody else to ask questions about the final environmental impact statement? Yes. Okay. John.

DR. LARKINS: I have just an information question. What burn-ups did you consider? You said that you went back and looked at high burn-up fuel. What average?

DR. SWEENEY: As part of the representative fuel? Let's see. It is approximately 25 percent higher burn-up.

DR. ZIEGLER: Joe Ziegler, DOE. I don't know the answer right off the top of my head. It is in the EIS back in -- what is the appendix for -- have you got a copy of the EIS there?

DR. SWEENEY: No.

DR. ZIEGLER: All right. It is in

Appendix -- is it J?

DR. SWEENEY: Yes.

DR. ZIEGLER: Appendix J is the transportation analysis appendix, and look at the accident analysis part of that, and you will find the burn-ups that were assumed. But I can't tell you off the top of my head.

DR. GARRICK: Any other questions? Contrary to what is on the program, I think we are going to declare a break before our next presentation. So let's take a 15 minute break.

DR. SWEENEY: Thank you.

(Whereupon, at 9:57 a.m., the meeting was recessed, and resumed at 10:19 a.m.)

DR. GARRICK: I am going to turn the cognizant member responsibility over to Milt Levenson, but before I do that, I have been asked to remind us all that for those of you who have not signed in, please do so.

It is very important for us to have an accurate record of who is in attendance. So with that, and given that we are now moving into the repository design issue, the member of the committee that is cognizant and responsible for overseeing that activity is Milt Levenson, and I yield to Milt.

MR. LEVENSON: Okay. Thank you, John. I guess our next presentation is the repository design update, and is going Jim Gardiner going to do that?

DR. GARDINER: Again, my name is Jim Gardiner, for the Department of Energy, and I work in the Office of Project Execution, and that is managed by Suzy Millington, and my area of work is the design of the repository surface facilities.

As far as a little personal background, I have worked at seven nuclear power plants around the United States, and I am proud to say that six of them are now operating, and have a good operating record. The one plant that is not operating happened to get mothballed when it was about 60 percent complete.

And I guess that Washington Public Power found out that Building 50 was kind of stretching their finances a little bit. For the overview, we want to provide you folks with a basis that we have for proceeding with a license application design, and we wanted to describe the design evolution which is in progress.

And which takes us from the site recommendation design to the license application design now under way. Our specific reasons for moving towards the design concept that supports a phased

implementation approach are as follows.

They are consistent with the findings of the National Academy Panel on stage repository development, and let me for clarify here say that our word phase that we are using is consistent with and synonymous with the word stage.

So you will hear those used maybe interchangeably throughout. Our phased implementation is primarily focused on the surface and subsurface areas of the design. One of our main objectives is to allow for implementation of a smaller initial disposal capability and facilities.

Some of the benefits of these are that it adopts a lessons learned approach consistent with the National Academy's panel. It increases our confidence in meeting the schedule for 2010 initial construction. I mean, operation.

And it is also consistent with the NRC regulatory requirements for in situ testing. And in situ testing or performance confirmation testing is something that is certainly going to be a large part of all of our continued work.

We get some other benefits. We gain also in that it provides flexibility to adjust for future changes, and I am sure that you all know that when

funding comes around that that is always going to be a problem.

We also have had some schedule adjustments lately because of the funding, and we are also dealing with an incoming waste steam which is something that we cannot control at the moment.

For the design evolution, the preliminary design that we have or that we are now about to begin, will support a license application, and will consist of additional details and refinements to the design concept for that which was established for site recommendation.

The final decisions and approvals that we have for license application design have not been made, but they are in progress and we are progressing considerably from the site recommendation concept.

The license application design is expected to fall within the bounds that we have already established in the site recommendation, and also in our environmental impact statement.

Our LA design will continue to be capable of a range of thermal operating conditions, and that is being the high end of the range. Naturally, environment impacts analysis are part of the evaluation, and reflects the process of potential

repository refinements certainly take into account those decision making processes.

This is the design evolution process that we have been performing this year, and if you will take note of some of the studies that we list. These cover a pretty broad range of the spectrum of the repository work elements.

Notice that they involve the underground waste package, and also the waste handling surface facility, and from the conclusion of these studies, these conclusions flow down into an overall set of design concept recommendations.

And as we have worked with these recommendations, we want to fully document them and review them, and make sure that they are consistent and integrated. From that point, they flow into a preliminary change package,a nd we are now in the process of reviewing a baseline change proposal which will affect the change of going from a site recommendation to these new alternatives.

And the date that you see up there in the upper right-hand corner, going out from 8 to 10 of '02 (sic), that is the time frame that we are hoping to get this baseline change proposal through again. Next slide.

The potential changes that are now being considered as design solutions for the license application are as follows. In regards to surface facilities, the major change is changing from one large full capacity waste handling building to multiple smaller capacity buildings.

We have also changed our primary or predominant waste handling environment from that of a wet commercial spent fuel handling cool, to a dry hot cell environment.

We have also made some gains in reducing the number of crane lifts and crane handling, and we are doing that by the use of a wheel transporter, and that operates both inside and between the new buildings of our proposed options for alternatives.

For the surface, we have changed from one large panel to five smaller emplacement panels. We have also changed our mode of getting the waste packages from the surface to the underground from the rail system, to a wheel transporter system. Next slide.

Continuing on in the waste package arena, we are replacing the large full penetration weld on the stainless steel closure list, with a sheer ring and smaller seal welds.

We have also undergone evaluating the engineer study. It says that it is under way, but we are very near completion on that, to identify some potential improvements in design and fabrication.

And I have learned that there are some very good conclusions coming from that, and it looks like we are going to be able to save some substantial money due to the results of this valuable engineering study.

In order to enhance our capabilities and our timing on the project, we have decided to go with an off-site training facility, and this is going to be a non-nuclear or a cold facility.

It is going to be constructed off-site, and the location of that is not necessarily determined, but we are working on what aspects would go into that off-site facility, and we plan to use it for prototyping, testing, and operator training.

And we can get quite a jump on being able to put our facility in operation. Next slide. This is the site recommendation, sub-surface layout, and on the left, which is here, is what we call our upper block.

And in this upper block, we were able to replace the 70,000 mandated metric tons, and the lower

box, which is on the right, was proposed for expansion as needed.

And I will also say that on Slide 17, we have a blow up of this so that you can get some greater detail, but we will get to that in a moment. Well, go back to Slide 17. I don't know if anyone had any questions on this one or not. If there aren't, on to Slide 9.

Our present concept with the potential underground layout is now in smaller panels, and I realize that this might be a little hard to see because of the color scheme, but we also have a blow-up of it.

But I will go through this slide initially, and panels 1 through 4 that you see here I can point out. Panel 1 is a smaller panel, which is right here, with a small initial panel, and it is the only one that is really hard to see.

And then panels 2, 3, and 4, and those areas we are able to place the again mandated 70,000 metric tons. If we go on and use panel 5, we have a contingency of approximately 25 percent to use.

In this new layout, we also have an improved ventilation scheme, and that helps us with efficiency, and it also helps us with future heat

removal through ventilation.

Our modular development allows for adaptive staging, and so that we can apply lessons learned in one panel into the next panel. So we see that as a great benefit.

And as with the tunnel boring machine that we have already used, there have been lots of lessons learned. We also utilize the existing exploratory studies facility for construction of a small initial emplacement panel by 2010, and this happens to be panel one that I pointed out before.

And we have blow-ups of that which I will give get to shortly. A portion of panel one is planned for use for additional scientific and engineering testing and also for performance confirmation. Performance confirmation is something that is going to continue for many years.

Our construction schedule. For the first emplacement in panel one, we are estimating at about 27 months. Now, an astute observer may remember that in Eric Lundgaard's presentation, he listed that as 28 months. But I think I can explain that.

His department is just much slower in processing paperwork than my department. Next slide. This slide is just a comparison of the site

recommendation design and its overlay with our new proposed layout for the panels.

You will see that it was essentially very close with what the other was, and in the upper end up in here, we are able to eliminate some concerns that we had about the water table in the north end.

And at the southern end, down in here, there was some rock fracture areas that gave us an area for concern, and it looked like we can maybe avoid those, although those areas are still available for future expansion as necessary.

This proposed layout is essentially within the SR primary upper and lower blocks, and the potential layout that we have here had approximately 69 miles of replacement drift in all five panels, but we also had the benefit here that we save approximately 5.5 miles of excavation over what the SR design did. Next panel.

This is a blow-up of panel one that we mentioned earlier, which shows our potential test facility. In doing so, this utilizes a portion of panel one to acquire engineering and scientific data to support our cost performance confirmation activities.

It provides us flexibility for defining

performance confirmation testing in the future. This is something that is really a kind of a great benefit for us, and so you can plan tests, but if you don't know exactly where you are going to put them, it can cause lots of delays in getting them active.

So if we have a site already selected, it helps our planning, and it helps our funding profiles for that element to work. It also allows us to start our performance confirmation during the testing program in the early stages of the emplacement operation.

And this location happens to be a good representative location to evaluate the overall repository performance, and this location is good because it is in the overall block within the rest of the panels.

And it also has minimal impact on our underground development schedule. To help you get oriented, this is the ramp that comes down from our north portal, and comes in through here.

The ECRB is already existing and that comes down through here. The green lines that you see going across here, those would be the emplacement panels, and the pink that you see in this area, that is the test facility.

One other item on here so that it is clear, you see this ventilation shaft from ECRB, that does not exist now. That is for future construction, to go along with the emplacement panel in the testing.

CHAIRMAN HORNBERGER: Is this panel one in the same area as Alco-5, the heater tank?

DR. GARDINER: I am not that familiar with the underground layout. By the way, let me indicate that I have Gene Rowe here who works in surface and overall layout.

I have Al Linden here from subsurface for questions, and I have Mike Andersen also, who deals with the waste package. So these people are here for those questions, and I may defer.

MR. LINDEN: My name is Al Linden and I am with BSC. Yes, the heater test, and if you will look at that little drift that is sticking off there below the pink, we are actually utilizing the heater drift area right there to access the performance confirmation area.

DR. GARDINER: Thank you. We also have a back-up slide on this and that is Slide 20, which we will get to before long. Next slide. This is our obligatory overly-inclusive and unreadable slide.

It is a site recommendation design for a

waste handling facility, and this is at the north portal. It is the primary element that you want to be looking at here, is this building right here. This is the waste handling building.

All of the areas that you see that are in the orange coloration, that is within the radiologically controlled area. The area that you see down here, which is in the yellow, that is the balance of the plant.

That original site recommendation, single waste handling building, it includes all of the waste handling building functions that we need. And if it were our desire, this is what we would be looking for if we had adequate funding and if we have adequate time to build a facility.

This is a very large facility, and at one time the estimate for this building was about $900 million. But it has full capabilities, and from the beginning, and as soon as it started up, we could produce the 3,000 metric tons, I believe, of processing a year.

To go over some of the elements, it has cath receipt. and it has waste transfer, and it had a wet system for the commercial spent nuclear fuel, and it had a dry system for the high level waste and DOE

spent nuclear fuels.

It also had a waste package prep, and a welding area, and significantly it had four commercial spent nuclear fuel blending pools, and the capacity of those was about 5,000 metric tons.

Here again there is a blow-up of this on Slide 22 that we be getting to. Let me go on to the next slide. Now we have the phased surface facilities approach, and we will start off with our first phase, where we would have dry facility number one.

This is located right here, and dry facility number one is the finishing building, and it has waste receipt and dry transfer capability. And it is a smaller facility, but we would still have the capability to process between 500 and a thousand MTU per year.

So they have the full capability to process what is mandated, which is the 400 metric tons for the first year. We would also be building the cast carrier preparation building, which is here, and this is where the casts come in and are received.

And we also would build a disposal container building, which is this location. So that the slide is not confusing, it is not the disposal container pre-building that shortens the construction

schedule, and if you go over to the next bullet, which can emplace waste for emplacement of storage, and those are just some of the general aspects that we gain from the smaller and unlimited capability building.

So by introducing the size of that facility, we hope to shorten the construction schedule so that we are on-line by December 2010. In the phase two facility, we are going to build a waste remediation building. one of these, and we are going to also build a waste treatment building.

And the waste treatment building, again we will go back to having some wet pool capabilities for handling off-normal pool fuel, and damaged fuel, et cetera.

In Phase III, we would go back and we would build this facility, and this is another partial finishing building, plus a dry waste transfer line, and again this would up our overall processing capability to 2,000 to 3,000 metric tons per year.

Of interest, this all fits within our site recommendation footprint, and when all of these facilities are built, we have the same capabilities as the site recommendation design.

The next slide. These are some layouts of

the dry facility number one, which is here, and then phrase three, you would come on-line with this larger building, which is dry facility number two.

I don't know what you may want to know about these other than we do have the capability of receiving and processing, and getting finished waste packages out of the dry facility number one, and also dry facility number two.

Specific questions on the -- on how the flow goes through here, I would defer to Gene Rowe, and if you have some questions, please bring them up.

(No audible response.)

DR. GARDINER: Next slide. It says pre-emplacement aging option. The modular dry surface pre-emplacement aging was identified as an option, and this was to make sure that all of the potential scenarios were bounded by the EIS.

I realize that this is a little small, and we do have a blow-up of it also. The path sites may be needed for some aging, because we are maybe under restraints as far as total waste package output. We are kind of limited now to a range of about 11.8 kilowatts per package.

So in order to get that, we may have to blend some hot fuel with some cooler fuel. And if we

got in some five year fuel that is very hot, again it may not be capable of immediately placing all of it underground in packages that would exceed our waste package limits.

Places for pads have also been considered, because at some point in time we have to consider or accommodate retrieval, if that ever happens to be a reality. And that is near the end of the presentation. If you want to go on, we have some backup slides, to 17.

This is just another view of the repository block, and the main emplacement area, we are doing the shaded area right here.

MR. LEVENSON: Okay. Thank you. Ray.

VICE CHAIRMAN WYMER: First, I guess the upper and lower block means upper and lower?

DR. GARDINER: There is a difference in elevation there, but it is not significant, and it is primarily the difference in elevation is to get into more favorable rock.

VICE CHAIRMAN WYMER: It looked to me like the existing tunnel goes right through one of the blocks, instead of along the edge of it.

DR. GARDINER: In actuality, we tried to get as much information as we could on both of the

blocks, and the north ramp, which comes down through here, it passes above that lower block, and we have got some data from that lower block in so doing.

And we came down and this direction here was designed because it followed a particular fault.

VICE CHAIRMAN WYMER: My point was though that the north ramp goes right through the drifts in the picture.

DR. GARDINER: Yes, it probably does, but I think there is an elevation difference.

VICE CHAIRMAN WYMER: That's what I meant by upper and lower. There is a significant upper and lower, and not just a little bit.

DR. GARDINER: Al, can you elaborate on the elevation of those things?

MR. LINDEN: Right where the north ramp crosses over the lower block on this edge, there is approximately a 2 to 300 foot elevation difference.

VICE CHAIRMAN WYMER: That is pretty significant, yes. Okay. That takes care of that question. I have a couple of more. What is meant by an aging option study?

DR. GARDINER: Again, if we get in real hot fuel, it may have to sit a while before we can adequately work it into a waste package to keep the

overall waste package heat output to a certain level.

VICE CHAIRMAN WYMER: Okay. And is there a written performance confirmation test facility study? That is on one of your earlier viewgraphs. You refer to a performance confirmation and test facility study, and I wondered if that is written.

DR. GARDINER: What slide is that? Do you recall?

VICE CHAIRMAN WYMER: Oh, it is an early one. Let's see. It is five. It is called, "Design Evolution Study Process." And down in there, there is a performance confirmation and test facility study under design studies. Yes, she has it up there.

DR. GARDINER: Oh, yes, all of these studies have been completed.

VICE CHAIRMAN WYMER: I don't think we have ever seen a copy of that. Are those available?

DR. GARDINER: I would say go through our -- well, okay, we have an answer back there it looks like.

MS. HANLON: Thanks, Mike. Carol Hanlon, Yucca Mountain. We do have performance confirmation plans, and we have two iterations. I thought that I had provided them to the board, but I had spoken with Mike earlier that I will go back and see what the

status is, and get you the latest versions. I can get you both versions if you would like.

VICE CHAIRMAN WYMER: Okay. Thanks, Carol.

MS. HANLON: I will take care of it.

VICE CHAIRMAN WYMER: Okay. I have a couple of more. Why is a commercial field transfer wet and the DOE spent nuclear fuel is dry?

DR. GARDINER: What is it?

VICE CHAIRMAN WYMER: The commercial spent nuclear fuel transfer is done wet.

DR. GARDINER: Yes.

VICE CHAIRMAN WYMER: And the DOE spent nuclear fuel transfer is done dry. Why the difference?

DR. GARDINER: I believe the DOE spent nuclear fuel is probably already canistered.

VICE CHAIRMAN WYMER: Is probably already what? I'm sorry.

DR. GARDINER: Canistered. And put directly into a waste package.

VICE CHAIRMAN WYMER: And in another one of your slides, you talk about waste remediation and waste treatment are planned -- that facilities are planned for that in phase two.

DR. GARDINER: Correct.

VICE CHAIRMAN WYMER: What are those?

DR. GARDINER: If we get some spent nuclear fuel that comes in, and maybe it is damaged fuel, or it has got some off-normal fuel, and something that we didn't expect and don't know exactly how to handle it, that is one of the reasons for coming up a wet facility. It gives us more capability to deal with this type of fuel that we are not expecting to see.

VICE CHAIRMAN WYMER: Okay.

DR. GARDINER: We also have to have a remediation facility, meaning that if we have a waste package that has a bad weld, and we have some waste package that has some defect in it, you can take it over there and maybe correct that situation.

VICE CHAIRMAN WYMER: Okay. And finally what is a finishing building?

DR. GARDINER: Well, I will give it a try here. A finishing building, I believe, just meant that we can finish out a waste package. We can prepare it so that it is able to ship it under mount.

VICE CHAIRMAN WYMER: Okay. That's all I have for right now.

DR. GARRICK: I would like to look at

Slide 6. I guess it is Slides 6 and 7. Can you give us a little bit of insight as to what was the driver for some of these changes?

DR. GARDINER: I believe on a waste package that it is a new area that we have been dealing with materials, and we have been dealing with corrosion testing, and lots of things.

And as we get the results back, we have to continue to keep reevaluating. And at one time we had like I said this full penetration weld on the same steel closure lid, but on that full penetration weld, we would have to do heat treating and that type of thing.

And that got to be a very costly and difficult aspect to provide, and so we are always looking for ways to where maybe we can improve that. And we also got input from the Navy on how they do some of their canister closures, and we are adopting, I believe, some of their inputs, which seems to be a better system.

DR. GARRICK: On the heat treating issue, given that you have made this change on the basis that it first gives you better control of the heat treatment process, and second, there is less involved, is that

-- and this was an issue in the performance assessment as far as penetrating the waste package.

Is that design being incorporated into the performance assessment, that change?

DR. GARDINER: Mike, do you have any input on that?

MR. ANDERSON: Yes. Michael Anderson, from BSC. The particular change here is on the inner stainless steel shell, and not the outer shell, which is the corrosion resistant area.

And so what we have here is the inner shell is primarily the structural shell, which helps the waste package sustain pre-closure events, and let's say a drop took over some kind of vent occurring in the surface facility, or on its way underground and foreclosure.

So we are not talking any performance assessment credit for that. That's why we were able to move away from welding and go to mechanical closure.

DR. GARRICK: You are not doing anything with the outer lid?

MR. ANDERSON: Our engineering study is advocating some changes, but that is not quite final. So we won't know anything about that for now.

DR. GARDINER: (Off microphone) Just to let you know that the value engineering studies are underway and it looks like there are some good conclusions coming out of them, but I would say that it is premature.

It has not been through our internal BSC review process fully yet, and so it is probably premature to discuss that with Mike.

DR. GARRICK: Well, this is about the only mechanism that you show for access to the waste package for stress corrosion cracks, and I was curious as to whether or not this was going to materially impact those analyses

MR. ANDERSON: You are referring to the particular change on here?

DR. GARRICK: Yes.

MR. ANDERSON: Well, that has no effect.

DR. GARRICK: Well, yes, I know that has no effect, but I am thinking of the study where you say it is ongoing.

MR. ANDERSON: Yes. Certainly the issue of stress corrosion cracking and transport of water in, and waste form now is a focus of that study.

DR. GARRICK: Okay. On the subsurface facility, is the change from one large emplacement

panel to five smaller ones, and the change from rail to wheel transport, what is some of the reasoning behind those?

DR. GARDINER: By building this initial facility, like I said, it has sort given us a lot of lessons learned, but it also helps to assure us that we can meet this 2010 emplacement time. We can build a small facility which is -- well, we can come directly off the ESF which is existing, and we can have the room for emplacement and meet the requirements that were put on us.

And it just helps us construction-wise and I think there is also some phasing and other aspects that are of benefit.

DR. GARRICK: And one of the things that I was trying to get at here is how much safety had to do with these changes, and whether they were to enhance the schedule, through put, or costs, or other factors.

Because the other thing that is important here is that it may turn out that the greatest risk of operating this repository is such that we might have some insight as to safety and in particular the on-site handling, or better insight as to possible delays.

MR. LINDEN: Well, actually the biggest change that we have from a construction facilities standpoint is that we have done a lot of reduction on things like dust control, and we improved ventilation, and one of the changes was that we removed some of the ventilation controls from our subsurface design, which were hard to access from the SR design, and keeping our ventilation controls on our intake side allowed us to have full access.

One of the biggest changes that was facilitated for the sub-surface design would be to reduce uncertainties from (inaudible) and basically once we pulled in to smaller equipment, it kind of let us go to smaller panels, which just kind of flowed through and gave us better options.

Just a couple of more questions. Would one of you care to comment on what you see in the short term as the most critical path design issue? What is driving the design activity? And we might have better insight into possible delays. You must have a very clear cut critical path schedule somewhere?

DR. GARDINER: Lucky for me, the critical path issues have not gone through the design element as much as you would think. There is some licensing

issues, and Gene may have some other input here, too.

But we are close to it, and I say one thing that may be lagging now or is of concern is seismic issues.

We have some seismic analysis going on now, and we need to get to a final conclusion on what acceleration factors and that type of thing are.

I wouldn't say it is exactly on the critical path right now, but primarily we do have a very short design schedule. I will certainly admit that. We have a lot to do in a fairly short amount of time.

But we have resource loaded our schedules and we do feel that it is doable within the time frames that we are looking at. Gene, do you want to add anything as far as critical path? I think that is a very good question, and so I hope we can give you some information.

MR. ROWE: My name is Gene Rowe, of the Repository Design. From the design point of view, I think that the driving thing is to finalize the design to such a point that we can go through our event sequence evaluation, and do the PSA evaluation of those event sequences.

And I think that from a strictly design

point of view, I think that is what is really driving us.

DR. GARRICK: Thank you. Early in the project, we heard a lot about engineered barriers, and we also heard a lot about engineering in the natural setting. We have not heard very much about engineering in the natural setting of late.

And by that I mean the consideration of such things as ridges barriers and other means of altering the geology and the hydrology. Is there anything going on in that arena at the present time?

DR. GARDINER: I believe that is for underground, but I will say that some of those are pretty expensive items, and where possible, we have been trying to remove them if we can show performance elsewhere.

So the ridges barriers are essentially gone, and the backfill is essentially gone. We still have the drip shield over the waste package. So, yes, the expensive items, those are also costly as far as schedule goes, the construction schedule.

And so I think we have been successful, and there is adequate backup for the removal of some of those items.

DR. GARRICK: My final comment is maybe

more of a comment than a question, and that is you make reference to the recommendation of the National Academies to adopt a phrased design approach, and I guess the concern there is to not confuse a phase design approach with the failure to ever give a design.

It seems like there has to be some real strategic planning to avoid that being somewhat of an excuse to drag this thing out more than it needs to with respect to moving on with fixing at least that part of the design that will allow you to stay on schedule.

DR. GARDINER: Right.

DR. GARRICK: Do you have any comment on that?

DR. GARDINER: Well, a good point. We do know that some questions came up earlier about budget and what the funding was going to be and so forth. And we have some charts that show that, although I'm afraid that we don't have them with us now.

But there is some very steep increases and wrap-ups that we have to have in order to be able to start replacing in 2010. And I would say that some of those, the budget scenarios that we would like to have I would say are probably not likely.

You can already see in the recent budget phase where we are now designated as a site, but still coming back through Senator Reid. We got a $336 million case. So that is always going to play against us, and I think that what we have gone through now is giving ourselves flexibility to adapt to those situations.

We can demonstrate that we still have the capability that we need, and we feel it is a workable situation now. And, yes, we have got enough background now, and have worked enough of the elements to where our course for design, railway design, is pretty clear.

DR. GARRICK: All right. Thank you.

MR. LEVENSON: George.

CHAIRMAN HORNBERGER: You mentioned that in terms of the subsurface, one of the critical things that you are looking at are seismic. I am just curious. How confident are you in the details of your subsurface design, in terms of such things as support, rock bolting, and how confident you are about the invert design and those kinds of details. Are they pretty well set?

DR. GARDINER: My comment was primarily related to our seismic issues related to surface

facilities, and I will let Alan comment on the subsurface types.

MR. LINDEN: I can't really give you an answer. I know that the seismic stuff is being worked on, and we can probably get you some information later on it.

CHAIRMAN HORNBERGER: I just have one other question that is also subsurface. I am curious. Since you have gone through this and done these changes, or the potential changes to your design and your staging of different areas.

And even though right now you have said that there is not going to be any backfill. When you look at Joe's slide that suggests that this design might evolve, and if in fact you find out that for the ingenious activity scenario, for example, that you do need to backfill, and you make that decision somewhere in 2030, can you tell me if your design planning taking that into account? Can you go back and backfill after the fact?

MR. LINDEN: Yeah, we have not changed anything that would preclude us from backfill or anything like that. Essentially the mechanism for closing is the same as what it would be for the SR. Again, it would be a phased approach fill.

CHAIRMAN HORNBERGER: I take it then that no further work has been done, even in terms of -- well, even pre-preliminary designs for how one might accomplish backfill in these drifts after the waste has been in place?

MR. LINDEN: We have for prior studies that were done back 4 or 5 years ago have handled backfill, and essentially the method we have always used is still applicable.

CHAIRMAN HORNBERGER: Thank you.

DR. RYAN: I am asking this question as the new person on the ACNW, and so it may be something that is well known, but I don't know it. In these above ground facilities where the fuel handling is going to occur, that is the place where there is the highest opportunity, at least under abnormal circumstances, for occupational radiation exposure.

I think there was a comment earlier that you are looking to get the design to a point where you are going to begin or continue the process of that kind of safety analysis, and can you comment on how that is going, or how those kind of occupational radiation exposure assessments are proceeding, and that kind of thing?

DR. GARDINER: With some of the new

layouts, we have been able to have some of the areas to where there is very little radiation exposure. And to go into the hot cell approach also limits exposure, and also our ability to confine things in case there is some kind of an accident is pretty good in those environments in a hot cell.

Those studies are certainly going to be flushed out more as we are allowed to get into detail design, but I think all in all that our facility is such that we plan on having a fairly low exposure anyway.

And something that we will discuss here in a second is this wheel lift transporter that we have, and we can shield our packages when they are moved from one area to another, which provides a lot of protection. Gene, did you want to add anything?

MR. ROWE: Yes. A lot of our considerations are a foundation of the design. That's one of the main reasons or one of the driving reasons from going from a wet environment to a dry environment.

One of the basic philosophies that we have is that we want to be able to have access to any of the areas should off-normal events occur, and so that is why we are going with a shielded waste package when

it is moving on the surface.

So, yes, it is the foundation of where we are at, or a foundation of the design, and we are going to start doing some real detail to allow our evaluations probably at the beginning of the year.

DR. RYAN: Okay. And that is really the answer to my question, is that you have done some good conceptual thinking and applied good principles, and fundamentals, but you are really in need of -- and all these details have come up.

MR. ROWE: We are in the process of -- well, again, probably at the beginning of next year, we will be able to actually start doing some modeling of the lab test systems that allow you to evaluate not only just the ergonomics of the work environment, but also exposure, and we are planning to adopt some of those tools to do it.

DR. RYAN: Okay. Thank you.

MR. LEVENSON: First, I have got a couple of questions for orientation. These two pretty pictures showed up on the table. Can somebody tell us what they are?

DR. GARDINER: Yes. Those might be the only interesting slides of the whole presentation. They were not in your presentation, and we weren't

able to get them on an electronic file so that we could show them up there.

This little option, that is what they call an omni-directional wheel lift transporter. This is something that we have been evaluating recently, and one of the main benefits of this is that it can pivot on its own access.

Each one of those wheels that you see is hydraulically driven, and those are hydraulic units, where it can be lifted, and you can life tremendous weights with that.

By the use of this little device, we have been able to reduce the number of crane lifts in the building, which has always been problematic. Any time that you lift a package, you have the drop scenario that you have to deal with.

Now, in using these things, we have been able to save a number of steps, and as far as total processing time and going through the building, it has helped us to dramatically there also.

So if in fact we can qualify this type of a unit for application in the nuclear arena, why we will have gained quite a bit we feel.

MR. LEVENSON: So this is for use inside the above-ground building?

DR. GARDINER: Well, it has more than that. We use it inside the buildings themselves for moving the waste packages around, and waste packages, and shipping casts, et cetera.

We also, if we have to -- well, because of the phased approach, where we have separate buildings, we may need to be able to move a cast from one building to another.

So we can also use these to do that, and it is shielded, and so the transport from one building to another is actually very safe. They are also considering using this instead of rail to go underground, and if we can develop it as such, we would use this to transport the waste package underground also. So that stays at another transfer point.

MR. LEVENSON: If you take this underground that means that you need a paved tunnel about four times as wide as what you have now?

DR. GARDINER: We would need a smooth inverse, but the width is not four times as wide. It is really pretty amenable to what the rail system would be; is that correct?

MR. ROWE: Actually, those particular pictures don't represent the configuration for moving

it into the underground. The underground system has the waste package horizontally, and not vertically, and one of the benefits as Jim had mentioned is that this has a very good turning radius.

One of the lessons learned that we picked up from the Germans when they were over here a couple of months ago is that they were having difficulty with their emplacement system because of the sharp turning radius, and derailing of the prime mover.

That is one of the reasons that we looked at this system, and that problem goes away. This system has some unique properties to it. The wheels are linked together to maintain the bed of the equipment horizontally, and so if you go over non-uniform surfaces, the bed plate itself will maintain horizontally. And as Jim said, it will actually spin on a dime.

MR. LEVENSON: Does it have hydraulic power?

MR. ROWE: It is a hydraulic motor, and you can power that motor any way you want.

DR. RYAN: Is it a self-contained motor?

MR. ROWE: Yes, it will be a self-contained unit. We are evaluating now what the fuel will be.

DR. RYAN: Are they all wheels?

MR. ROWE: Yes, they are all wheels. Not all of them are powered, and I don't think we are far enough to know exactly how many would actually be powered, but they are powered, and there is redundant power for the wheels, et cetera, et cetera.

MR. LEVENSON: Does this require paving the tunnels?

MR. ROWE: The present plan was to have concrete access down, and so it is no different than what we had originally planned. We eliminate the rail line.

MR. LEVENSON: This is entirely remotely operated from outside somewhere?

MR. ROWE: We are not that far yet as to exactly how we are going to operate it. It is going to definitely be -- there is not going to be an operator on this equipment.

We would like to try to make it as automated as possible. I think the technology exists now to allow it to be pretty independent.

MR. LEVENSON: Does it have a diesel engine or something for power?

MR. ROWE: Again, we haven't made that decision yet.

MR. LEVENSON: Let me ask a different question for orientation. This is a design update. Does that mean that we can assume that anything -- well, I guess the answer is no, as I have answered it myself by what you just said.

I was going to ask does that mean that the temperature of the drip shield, the backfill, the inverts, anything not discussed here, remains the same? And I guess the answer is no, because what you just said is that you are going to have to change this.

So there are additional changes that you are seriously considering that are not in this update; is that right?

MR. ROWE: Well, I think the detailed design, when it comes around, is going to certainly finalize some of these things, and yet there could be some change from what we are seeing now. I think the presentation that you have got there was primarily the major items, the major items of concern.

We wanted to show you that we are not going outside of the SR bounding conditions or necessarily violating the EIS situations.

MR. LEVENSON: I was not very concerned about you going outside the bounds of anything,

because if you do, you don't get a license. So that is not really a concern. The concern is more of how it is being done.

I was interested in one flat statement that was made that I personally happen to not agree with, that for your waste handling building that going wet is simpler for unusual situations.

And you make the argument that the main reason that you are going dry with the main building is that potentially it is simpler, easier, and cheaper. If you are going to go wet, you have got all of the problems of pools and contamination.

And if I were handling defected fuel, the last thing I would want to do with it is stick it in a wet pool if I have a dry hot cell available. So I don't understand the answer that you gave before.

MR. ROWE: Well, it was probably my comments, and I had better defend myself a little bit. Yes, the construction of the pools themselves, and the building, and the supporting equipment that you have to have for a wet system is more complicated.

And so that is not the simpler part. We were trying to indicate that if there is an off-normal situation, if you can get in there and see it, and if you have better access to it, possibly in a pool, that

that may be the simplification. The system itself is more difficult.

MR. LEVENSON: I don't think it is simplification. I think viewing hot cells and flexibility has been demonstrated for many years, and people have been doing welding in hot cells for 50 years, and there is a lot of background and experience.

MR. ROWE: Well, yes, what you bring up is certainly something that has been debated over and over again, and there is some schools that say go wet, and they don't want to budge on that. And others say go dry. But it looks like the place where we are at that the dry method is probably more beneficial to us.

MR. LEVENSON: Has this design group or team accessed all of the -- well, not all, but a significant part of the hot cell experience that exists, because there is a lot of it around?

DR. GARDINER: Yes, we are trying to tap into as much as we can that experience at Lahague (phonetic) obviously, and we are planning a trip over to France to look at the lahague facility.

I just had two of my staff return from Hanford to look at the facility up there, and we are also planning trips to INELE to look at the plant

facility up there.

We are looking at bringing in some consultants, Foster Wheeler, or a couple of others that we are looking at to bring that expertise in. So our objective is not to reinvent the wheel, but to get that experience that is already out there.

MR. LEVENSON: On the design evolution, you make the statement that you are going to do the analysis at the high end of the range, with an implication that that is the safest end.

And therefore if you go colder, you don't have to do additional analysis. Well, I think that is a very controversial position to take. There are a lot of people that wouldn't agree with that, and that the colder repository may be easier to analyze, but it not be safer.

And I wondered why or what your feeling was about tieing your design to the high end of the range.

DR. GARDINER: It seems to me that has been controversial for a number of years, and it may never go away. I guess that the high end is -- well, it is a case that we have analyzed, and it is a case where we are able to present a performance assessment on.

MR. LEVENSON: Let me just say that in other issues you have said that the design is flexible, and I wondered why you aren't saying the same thing here?

DR. GARDINER: We have a volunteer here. Go ahead.

DR. ZIEGLER: Joe Ziegler, DOE. We feel that we need to go in the license application with an approach, a design, and a method of operation that gets us from the beginning to the end, and by saying, oh, we are going to make everything flexible forever doesn't mean that we can't change.

So we are going to build in the ability to accommodate going hot or cold, but we are going into our license application, we believe -- and they are supposed to be recommended right now is about 10 centimeters to the middle waste package spacing, and a configuration that will turn out to be above the boiling point of water for some period of time.

So we are doing that because we believe that for us and for the NRC to analyze a certain circumstance, that it needs to be a circumstance that we are taking to the license.

So in order to get a license, we think that is necessary. That doesn't mean that if some

information comes along in the future that says that not going above the boiling point of water is the better way to go, that we can't go in that direction.

But there are some issues associated with that, and the ease of analysis for colder which I think you mentioned may not be the case, because once you decide to go cold, then cold becomes an operating condition. In other words, 85 degrees, 96 degrees, you pick the number.

Well, then the degree of precision and the ability to analyze becomes more important. So cold may not be easier to analyze, and in fact it's probably not if that becomes the condition of a license.

So that is kind of misleading. We are trying to go with a solution that is a complete workable solution. We have to pick something right now that is to allow the temperature to go above the point of boiling water.

DR. GARDINER: I would add also that you start talking about a couple of degrees in temperature, which doesn't sound like much from a degree standpoint. But all of those conditions translate back into some bigger problems in other aspects of the project.

If we start going colder, that means that we have to have waste packages with less heat output, which means that we have to blend more fuel, which means that we have to take far more processing time internally to get the waste packages together.

We have to maybe receive more fuel so that we have the right inventory to draw from, and it gives us a lot more steps in surface facilities. So that hampers our through put capability. I mean, we could have built it and had the original 3,000 mtu capacity that was required.

But if those changes come back in, then our facility is no longer adequate again. So there is certainly a trail of effects that happen under circumstances where it may just appear to somebody to being a few degrees one way or another.

MR. LEVENSON: Sometimes the English language isn't very good for communication, but it is the only one we have got. And on one of your bullets, it states that the license application design is expected to fall within the bounds described in the site recommendation.

And I don't know about the NRC staff, and I don't speak for them, and I don't even speak for this Committee. But I can say that at least one

member of this Committee expects to see a lot more detail in your license application than anything in either site recommendation or environmental.

DR. GARDINER: Well, that is most definitely true, yes. We are looking to the point now where we can get preliminary design up, and it will be compatible with the Yucca Mountain Review Plan so that we know what we are providing is of the detail required for the NRC.

MR. LEVENSON: Let me ask a question which probably isn't part of what you were intending to cover, but the question has been raised, and since I have asked it about 8 or 9 times without being able to get an answer, I am going to ask you again.

And that is why -- well, not ask you again, but ask it again. Since we have added the Alloy-22 as the corrosion outside, why is the inner-containment -- and this is a taxpayer's question.

Why is the inner-container stainless steel, and its only role is to support the Alloy-22? Why isn't it carbon steel?

DR. GARDINER: I will gladly defer.

MR. ANDERSON: Back in VA, we had carbon steel on the outside, and Alloy-22 on the inside. When we went through a license application we had nine

selections, and a number of different options were looked at.

And one of them was the Alloy-22 on the outside and the carbon steel on the inside. And, you know, I just can't remember exactly what the motivation for that was.

It certainly is described in the license application and design selection reports. It was an issue I think of material compatibility, and oh, we have another volunteer.

MR. TURNER: My name is Joe Farmer from Livermore. I remember some of those discussions, and I think that we had received quite a lot of criticism for putting in a carbon steel possible generation of ferric ions and the like, and there was also concern as I recall about what was referred to as inside-out corrosion, and the possibility of wetness.

And I think that there was a feeling at the time that if they picked the more corrosion resistant material for the inner-barrier -- and you are right. It was picked as a structural support, and not as a corrosion resistant material, and they are not claiming any credit, per se, but they thought it might be a better material for trying to construct this inner-container that actually holds the fuel.

MR. ANDERSON: I think another thing is that at that time there was some hope that there could be some credit taken for the stainless steel inner-shell as another frozen barrier. Since that time, that has gone by the wayside.

MR. LEVENSON: When you move from a wet to a dry handling system, you reduce the probability of inside corrosion, too.

MR. ANDERSON: Yes.

MR. LEVENSON: Another question that I have is

-- and this is just for information. But I am not sure how you define site, and what I mean by that is could your off-site training facility be on the MTS?

DR. GARDINER: Yes, it could.

MR. LEVENSON: I am trying to find out what you are defining as site here.

DR. GARDINER: I think there is certainly going to be a lot of factors involved in that. One is accessibility to the people that we want to train, and access to utilities and other things that are needed to support that facility.

It may depend somewhat on the surrounding community, and what their facilities and their approach to things are. So there is lots of options,

and there is lots of areas where maybe we can gain benefits, not only to us, but maybe to others associated. And there is a regulatory aspect.

DR. ZIEGLER: Joe Ziegler, DOE, again. The site in 10 CFR 63 is the place where the preclosure dose limits were measured at the site boundary, and so I think what we are talking about is somewhere outside of that boundary, where you measure your preclosure does limit requirements, and it could be on property only controlled by the Yucca Mountain project.

It could be on test sites, and it could be on private property, and I think there is various opportunities to work within the community for each of those to be a viable option.

DR. GARDINER: I think another added comment to that is that due to regulations we are limited on what work we can or cannot do on the site as it relates to the repository.

So if we can somehow hasten develop of some facilities that are beneficial, and if we can go elsewhere to build those so that we are not under the set of regulations, why that is a benefit also.

MR. LEVENSON: I am a little curious. I understand needing to store some fuel to give you

flexibility for the aging option. But 40,000 metric tons is more than half the total that you are going to place in there over a hundred years or so. Is that a rational number to use for design basis?

DR. GARDINER: It is a rational number when you start getting out to the retrieval stage and so this is a long term look at things. It is not necessarily saying that we were expecting, or needing, or even planning to use that much. But we looked at our site, and said, hey, what are our capabilities and capacities overall.

MR. LEVENSON: If you find it for retrieval, it is a whole separate thing. On the slide, it is under aging option.

DR. GARDINER: We have gone through some changes on what the heat output of a waste package can be, and we also have to look at the bounding scenario, and since we cannot control what the utilities will send us, we could get a whole lot of very hot fuel coming initially. And that would give us some real problems on processing.

MR. LEVENSON: There is no way you can get 40,000 metric tons in the near term. There just isn't that much.

DR. GARDINER: No, I agree.

MR. LEVENSON: It can't be produced.

DR. GARDINER: I agree.

MR. LEVENSON: I mean, when we do performance assessments, it is okay to double or triple something because for conservatism it is just paper. You start engineering and building stuff, and you use unrealistic numbers, and you are wasting taxpayers' money in a big way.

The surface facilities, what we are looking at here is not even at the stage of being a cartoon, and it is just some boxes or squares. What will be the stage of the design for the above-ground facilities by the time of the license application?

Will the concepts of things like material handling and viewing, and ventilation control, and all those sort of things, will they have all been developed by then?

DR. GARDINER: Most definitely. We are primarily concentrating on the things that are safety related, and the detail design on those will be very extensive.

Items that are not safety related will have a lesser degree of completion, but still will be adequate to demonstrate to the NRC how the system will operate.

We will have mechanical flow diagrams and we will have PNIDs, and we will have substantial supporting documentation for that.

MR. LEVENSON: You are acting as my straight man. What is your definition of safety in this concept?

DR. GARDINER: The quality classifications that we have proceduralized.

MR. LEVENSON: I'm sorry, but I am not understanding your answer. Is it related to public safety or is it occupational safety of the single worker, et cetera.

DR. GARDINER: We have classifications that handle and deal with both of those situations that you mentioned, and so we have quality classifications, like one, two, and three, which deal with dose to the public, worker dose, and other things.

It is pretty well laid out in our procedures, and if someone needs to make a venture on explaining the whole thing, then I think --

MR. LEVENSON: Well, I mean, I understand that. My question really is which or how much of that will you have done by license application?

DR. GARDINER: Okay. We will be

consistent with the Yucca Mountain Review Plan, where the NRC is expecting a certain level of detail,a nd we will provide that at that point in time.

In some cases, it may be almost a complete or final design, and in other cases we may be at the 30, 40, or 50 percent level as far as what we feel is adequate to describe the system.

But let me have Gene Rowe a little bit.

MR. ROWE: As I indicated before, someone asked a question about critical path, and I indicated that the critical path was developing the design sufficient that we could do our event sequence evaluation.

Those event sequences are sequences that, one, lead to an off-site dose, and, two, lead to a worker dose. That will be very mature, and I don't want to say anything more than that.

But we will have identified dose systems that are critical to safety for both the worker and the off-site dose point of view.

MR. LEVENSON: Well, do the credible accident scenarios come in at that some point, too?

MR. ROWE: Yes.

MR. LEVENSON: I mean, in much more detail?

MR. ROWE: Yes. That is the process, and that is what will define what items are critical to safety, and that will define the level of detail that we will provide in the license application.

MR. LEVENSON: This is a first of a kind, and while there have been a lot of hot cell operations say for a lot of years, the weight and size of what you are going to be handling here is something significantly different.

That means that there is certainly no off the shelf equipment that you can buy. Is there an equipment development program in back of this that supports this activity, or is it going to be first generation equipment that goes into this facility

DR. GARDINER: That's one reason why we wanted to develop an off-site facility, so we can start doing prototyping and test this type of equipment. Yes, we feel that it is very essential.

We have it in our budget for proposed high heat waste package elements for items like you have seen here. And, yes, it is very critical to us. It would be I think very wrong to proceed much further down the road until we have that type of prototype information.

MR. LEVENSON: Well, I guess as far as

update goes, there is more to come than we have seen to date.

DR. GARDINER: Yes.

MR. LEVENSON: Staff.

MR. LEE: Mike Lee, ACNW staff. For drift excavation, are you going to use the tunnel boring machine that you currently have that you use for cross-drift? That is like the 18 foot diameter? Well, I guess I have kind of a two-part question. Are you going to use that one, and then if so, what is the preferred method for excavation for the cross-drift?

Is it going to be TBM or drill and blast? And if it is TBM, are you going to use the existing TBM that you have, or do you plan on getting another one as a back-up, or has that kind of worked into your decision making?

DR. GARDINER: Go ahead, Alan.

MR. LINDEN: Basically for the emplacement drifts, we are planning the TBM. The TBM that we have right now with the DCRB is slightly smaller than what the emplacement drifts are scheduled to be. So we will be getting new TBMs.

And basically for the life of the repository, there will probably be a number of TBMs, but they will all essentially be the same size.

MR. LEVENSON: Tim.

MR. GUNTER: I have a question. When the utilities would be sending out to you dual-purpose cases, ones that we they had on their pads, and loading the metal canister, and that canister was just transferred to a shipping cast, and then to be shipped out to your facility.

Then you take that and you unload the canister out of the shipping cast, and you open it up, and you take the fuel out, and you put that into the waste package. It is going to go into the mountain.

What do you do with the canister then that came from the utility? The shipping package goes back somewhere to move fuel from someplace else, but you are going to have hundreds probably of these other canisters.

DR. GARDINER: Right. That is a disposable problem that we are dealing with. There is a couple of low level disposal sites around the country. Of course, we have one right on NTS that we are looking at as potential use.

We have made a site visit out there and they certainly have plenty of room. The costs involved with that are from a national standard are very reasonable as far as cost per cubic foot and that

type of thing.

So hopefully if things work out and negotiations work, the Nevada Test Site may be a potential site to dispose of those. We will have to haul them, yes, from our surface facilities to the NTS.

If not, and if that is not a final location, they may have to go back east. There is a location or two back east. I do not know if either of those are a possibility or not.

DR. RYAN: To as a follow-up question. Where will you process these for disposal?

DR. GARDINER: We will process them on-site. We have a waste treatment building facility that we plan to build.

DR. RYAN: There was a comment this morning in one of the other presentations that you are not going to process waste on-site. I mean, I know that you are not going to deal with incoming fuel in any way, and so you will have low level waste processing on-site?

DR. GARDINER: That's correct.

DR. RYAN: And you are going to characterize the process.

MR. ROWE: What we are looking at is

having minimal on-site facilities to process waste, and we are not going to go with the evaporators for the liquid RAD waste. We might have some compaction for some of the solid RAD waste.

We are looking at trying to find a vendor, and as a matter of fact, there is a vendor at NTS that services NTS that will do the actual processing. We don't want a large processing facility.

DR. RYAN: If he is going to be cutting up the baskets, that is a little bit more.

MR. ROWE: The plan right now is not to cut up the baskets and dispose of them. Again, it will probably be a subcontract to a vendor to dispose of them. We don't want to get into the low level waste business.

MR. LEVENSON: Does the staff have questions?

(No response.)

MR. LEVENSON: Does anyone else have questions or comments? If not, I will turn it back to our august chairman, or maybe this time it is our September chairman.

CHAIRMAN HORNBERGER: Okay. Thanks very much. That was a good update presentation, and we look forward to hearing more as the design phase does

move forward.

DR. GARDINER: Well, thanks for going easy on me.

CHAIRMAN HORNBERGER: I did want to ask if there were any other comments or questions on anything that we have heard this morning? Judy.

MS. TREICHEL: Judy Treichel, Nevada Nuclear Waste Task Force. I just have to say that an awful lot of what you have heard is extremely enthusiastic, and I think you are probably right to ask money questions, because there is a tremendous amount of money.

And if you look at what is going on right now, it is just going up really fast within the next few years, and people are afraid that so much has been spent on this project that maybe it couldn't stop.

But if you look at what is coming up, and particularly with the new numbers that we have seen in the press for the military waste, you are looking at hundreds of billions of dollars now instead of what has just gone in it.

So it is actually pretty small, but we in Nevada believe of course that the place wasn't even ready to be recommended, and I think a lot of what you have seen here is why that is the case.

It certainly to me as far as you being a regulator, or an organization that would put a license on this thing, if you are concerned about money, this is like buying something that -- and the statement was made that I wouldn't buy a house that wasn't designed even more than this.

This is like buying something way bigger than a house, and I believe that this project will probably take as much money as anybody has for as long as they are willing to throw it at it.

So to even consider a license application, it seems very strange to me at this particular time, and I think you would have a much more interesting reading than reading the presentation that was given on the EIS.

If you read the State's lawsuit challenging the EIS, which it is hard to believe that it is the same thing that was getting such glowing reviews. But with the situation that we are in right now, where things go along and everybody is going to put a fix in later, the public really never has any sort of options.

And it all just sort of leads to lawsuits, and we in Nevada have different financial concerns. We pay Federal taxes, some of which go into the

military waste disposition budget, because that is Federal taxpayer money.

And we also pay from our State taxes for these lawsuits. So we are sort of paying twice, too, and we are willing to do that because we think it is worth doing.

And then the only other thing that I wanted to say was that I not only think that you should be extremely cautious about proceeding on towards licensing, and awfully cautious about your relationship with the Department of Energy , because the NRC is working very hard.

They come out here and they have little meets and greets, and little cookies and get togethers, and so forth to try and show Nevadans who they are, and how they work.

And the message has not gotten through lately. I got this from one of the t.v. stations here, and I have had it for about a week because last week the NRC came out to do an open house for the on-site reps, and Janet Slater was here, and so forth, and I was working around the house on Saturday doing stuff and they were doing the promos for the evening news.

And they kept saying that if you want to

hear what the nuclear industry is going to do to soothe public fears, tune in at 6:00. And I kept wondering what in the world, and I thought that the nuke guys had come up with some wacky benefit deal or something.

And it turned out that the news clip was while Nevada waits for the Yucca Mountain issue to go to court, the nuclear industry wants to soothe public fears over the safety of the proposed radioactive waste site. Next week they are hosting a public meeting where you can learn more about Yucca Mountain and meet with representatives of the Nuclear Regulatory Commission.

So I think you need to be aware, and I will give you a copy of this thing, and I found out that the press release wasn't badly written. There is just an assumption here that DOE, and the nuclear industry, and the NRC, are all sort of parts of one thing.

And it is hard sometimes not to believe that. We see in the paper last night where the nuke industry, NEI, is going to try and help DOE in any way that it can to get its license application written because the poor agency ran out of their attorney firm for big problems that they had.

And you saw John Kessler, who was part of the NEI's comments on the review plan here yesterday, sort of trying to work on getting that review plan a little bit easier as a hurdle to go over.

So you have got the industry working on the NRC to try and soften down, and helping DOE to sort of wrap up and to beat their time by a year, and to help them with their license application.

And the public sort of falls out in the center, and they are having a really hard time trying to figure out who is who, but they realize that the court is their avenue of first resistance, and I think you probably all know what the avenue of least or last resistance is.

The final fallback is to just plain fight any way you can. So, thank you.

CHAIRMAN HORNBERGER: Thank you, Judy. Let's see. We have another commenter.

MR. SHETTEL: Don Shettel, for the State of Nevada. My comment is not as political, but more scientific, and a follow-up to perhaps some of my questions on bacteria from yesterday.

But it seems from Joanne's talk that they make the assumption that perhaps there is enough radiation field from the waste package to sterilize us

forever, and I don't think that is a valid assumption.

I think that the radiation field being emitted from the waste package will vary over time, and at some point in the life of the repository the radiation field will not be sufficient to kill most of the bacteria.

And at that point, genetic mutations are possible, and thus my question is at time does the radiation field -- when does that become possible, and what is the time line after closure of the repository that that will occur?

CHAIRMAN HORNBERGER: That is of course a question that would have to be addressed ot the Department of Energy people who are doing the studies on microbial induced corrosion, and the performance assessment.

I don't think that there is anyone here to answer that question.

MR. SHETTEL: I can leave a business card with somebody if they want to put Joanne or somebody in contact with me.

MS. HANLON: Carol Hanlon, Department of Energy. You know, we have Joe Farmer here who may want to add something, but I recall that I took notes yesterday about one of the things that Joanne said,

which was that initially they expected the radiation and heat to sterilize the canisters and the environment.

And that subsequently as it cooled, and there was less radiation, they expected that microbes would be reintroduced. So I do think if we revisit the record from yesterday, we will find that Joanne made those comments. Joe, would you like to answer that? Joe Farmer.

MR. SHETTEL: My question is what is the radiation level, and what is the time frame into the 10,000 year regulatory period that that would occur?

MR. FARMER: Well, let me see. To begin with, I believe that -- I wasn't here yesterday for Joanne's talk, but I am familiar with Joanne's work for some number of years.

I don't think that the TSPA assumes that the waste packages are sterilized. In fact, there is a corrosion enhancement factor in the TSPA code that assumes that -- well, it doesn't assume. It is actually based on some of Joanne's measurements.

And that enhancement factor takes for each wipe deck patch, I think it enhances the corrosion rate, assuming that you do in fact have the worst-case scenario for microbial influence corrosion.

So in the current TSPA calculation, I believe that microbial influenced corrosion is assumed to occur throughout the entire waste package life, because for the very reasons that you mentioned, we realized that we couldn't determine whether or not these microbes are mutated over thousands of years, or whether or not they would live or die.

So we just took the worse rates, and the most aggressive rates that Joanne was able to measure, and we applied those to the waste package.

CHAIRMAN HORNBERGER: Okay. Are there any further questions? If not, thank you all for --

MS. HANLON: Just one more point. We had Jim Houseworth join us, and I think on the tour there were some questions that came to some of the testing that was going on in the tunnel, and there were questions that I think we said we would try and get in touch with Bo or with Jim.

Jim has taken the morning to join us and so if there are any remaining questions, Jim is here, and I'm sure that he would be happy to answer them.

CHAIRMAN HORNBERGER: Does anyone from the Committee remember the questions that were unanswered on the tour? I think that we have probably forgotten which ones had.

MS. HANLON: As I recall, it would be related probably to the testing going on in the niches and the cross-drift.

CHAIRMAN HORNBERGER: Okay. Let's see. In the cross-drift. Well, the only question I can remember was that I had asked a question on --

MS. HANLON: Jim said there was Alco-8 at niche-3 that Mark Peters thought that we had questions on.

CHAIRMAN HORNBERGER: Right. So the only ones I can remember were the ones that I asked, and they related to the testing relative to unsaturated conditions, rather than ponding conditions.

MR. HOUSEWORTH: Jim Houseworth, Lawrence Berkeley Lab. I believe you are talking about the Alco-8 niche-3 test where we do have a ponded infiltration test going on in that large plot.

We have a couple of reasons for starting with that, and that I should point out that the test plan starts with a ponded infiltration condition, and after we get some measurements based on that, then we will step down in rate and we will go to an unsaturated condition in that test.

And so we will ultimately get unsaturated flow and transport information from the test. The

reason for going first to a ponded condition is that -- well, there are a few reasons actually. First of all, it gives the quickest response.

And we do want to see before we spend a lot of time on the test whether you have a connection between Alco-8 and niche-3, and it is also the case where you would expect to be able to see whether you can get dripping or not.

And we have shown that that will occur now with this test. It also gives you the hydraulic conductivity of the test bed, which is an unknown, and if you don't know that, you can't do a rate controlled unsaturated test until you know that information.

And then finally if the test is mainly intended to look at transport, and if you don't let up the matrix, and you are doing an accelerated test, you will have a lot of matrix inhibition going on that would mask any effect of diffusion, which is the principal mechanism that we wanted to investigate in the test.

So it allows you to look at that mechanism independent of the matrix in the inhibition process.

CHAIRMAN HORNBERGER: So actually that does help. What I recall when we were on the tour was that the reason that I asked that question was that

there was some indication that you had attempted an unsaturated test that was not successful.

Now what you are telling me is that you are doing this in a staged fashion, and that all makes sense.

MR. HOUSEWORTH: Yes. Well, there was a preliminary test that we ran on the fault. If you recall in the back of Alco-8 there is a trench with water on it. And we ran that under saturated conditions, and then we did go to an unsaturated condition test.

And we didn't see a response to dripping under the unsaturated condition test, and because the main focus of the overall test was not the fault, but it was the fractured rock, we decided that rather than spending more time on that test at this time, we would move to the large plot of fractured rock mass.

CHAIRMAN HORNBERGER: There was one related question to this, and that was someone had raised the question as to what degree of -- well, actually, the term was used that the saturated tests were being used to validate the unsaturated model, and the question that somebody had raised was how can you use a saturated test to validate an unsaturated model.

MR. HOUSEWORTH: Well, ideally you would

be able to run the test at the flow rate and conditions that we expected in the future under repository conditions. But in a test that has 20 meters of rock between it and the injection point, and the collection point, we couldn't possibly hope to run this at those conditions.

Now, we will as I said run some unsaturated condition tests there. The saturated condition test is still useful. For example, in the flow model, although the rates on average are very low across Yucca Mountain, there is a wide variety of rates that occur locally in the model and presumably also in nature.

And because of that, you need to be able to operate over a wide range. Now, probably that is an extreme case when you get up to saturated conditions, but there is -- you range from a few millimeters per year in some locations, to thousands of millimeters per year in other locations, and this is in that category of thousands of millimeters per year. That is about the rate that they are putting water in now.

So it is on that boundary of what we need to know, but it is probably an area that is important, and that those higher rate areas are probably what

will control the earliest transport and arrival times of radio nuclides out of the repository.

CHAIRMAN HORNBERGER: Anyone else?

MS. HANLON: Carol Hanlon again. I would just like to call your attention to the USFIC unsaturated and saturated flow in transport key technical issue. And one of the agreements that we had was referring to Alco-8.

And Jim is going to correct me whenever I say something wrong. And the agreement that we put into that committee report, that report, was the fact that we would give the test plan for the phase procedures. So if you wanted to revisit, I think that you have all of those.

And then you can revisit the phasing in the test plan. Those were reviewed by the NRC staff, and we took their comments in, and reflected those in the testing. And I think Neal Coleman is also back there. Is that correct?

CHAIRMAN HORNBERGER: Very well. Staff, any questions or enlightenment on our tour? Okay. I think then what we are going to do is break, and we are actually going to break until 1:30.

Furthermore, when we reconvene at 1:30, we will not need the recorder. We will need the recorder

starting at 3:00. You will recall that I had suggested that we will move up our stakeholder interaction time from 3:00 to 4:00.

We will need the recorder for that period, but not for the period between 1:30 and 3:00. Between 1:30 and 3:00, the committee will be considering reports. We are adjourned until 1:30.

(Whereupon, the proceedings went off the record at 12:02 p.m. and resumed at 3:00 p.m.)

CHAIRMAN HORNBERGER: We are now going to go on the record. We are in session. Again, as I indicated earlier this is the time when we have opened the meeting for comments from anyone who wishes to make a comment.

Anyone from the public, from the Environmental Protection Agency, from Nye County, anyone at all. Does anyone wish to make a statement, or raise an issue for the record?

(No response.)

MR. LEVENSON: We sort of have a loose end. John had asked about approval to possibly attend the meeting, and I don't think we responded to the question. I think we should go on the record saying that it is okay if he wants to do it.

DR. GARRICK: Oh, you mean the SRA

meeting?

CHAIRMAN HORNBERGER: John Garrick has suggested that he may want to attend the Society for Risk Analysis, and I think that would be a good idea. We can do this off the record. So I am going to adjourn this meeting. Meeting adjourned.

(Whereupon, at 3:03 p.m., the meeting was concluded.)