



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 12, 1995

Mr. Ronald A. Milner, Director
for Program Management and Integration
Office of Civilian Radioactive Waste Management
U.S. Department of Energy, RW 30
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Milner:

The U. S. Nuclear Regulatory Commission staff briefed the Commission on April 25, 1995, on its vertical slice strategy for reviewing the U.S. Department of Energy's (DOE's) new Program Approach. During this briefing the Commission raised several questions related to the staff's approach. In a resulting Staff Requirements Memorandum, the Commission requested the staff to: 1) discuss its vertical slice approach with DOE and 2) advise DOE that it should include in its presentation to the Commission on June 9, 1995, information on its process used to identify key uncertainties.

Regarding the first request, you are aware that we have discussed our vertical slice approach with DOE and other parties at two recent NRC-DOE interactions: the April 11, 1995, management meeting and the May 4, 1995, technical exchange on licensing. The purpose of these discussions has been to describe our vertical slice approach, its relationship to our Overall Review Strategy in NUREG-1495, a preliminary list of key technical issues, and examples of the kinds of activities the staff might use to implement the vertical slice approach. We plan on additional interactions with DOE and other parties to mutually discuss the resolution of these technical issues at the staff level and NRC's audit role. These interactions also should focus on coordinating the plans of each agency in conducting the necessary DOE and NRC activities consistent with the respective roles of repository developer and regulator.

In response to the second request, I am enclosing the Staff Requirements Memorandum referred to above, a markup of the transcripts of the staff's April 25, 1995, Commission briefing showing where the Commission's questions for DOE are located (pp. 37, 38, 39, 42, 43, 45, and 54), and a list of questions based on the staff's interpretation of the transcript. This information should help you prepare a response to the Commission's questions

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NRC

R. Milner

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as part of DOE's June 9, 1995, briefing. If you have any questions or need further information please give me a call on 415-6708.

Sincerely,
Original signed by)
Margaret V. Federline, Deputy Director
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosures: As stated

cc: See attached list

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Addressees - Letter to R. Milner dated 05/12/95

SUBJECT: SRM - BRIEFING ON NRC STATUS OF HIGH-LEVEL WASTE
MANAGEMENT PROGRAM - 4/25/95

cc: R. Loux, State of Nevada
J. Meder, Nevada Legislative Counsel Bureau
W. Barnes, YMPO
C. Einberg, DOE/Washington, DC
M. Murphy, Nye County, NV
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
D. Weigel, GAO
P. Niedzielski-Eichner, Nye County, NV
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C. Schank, Churchill County, NV
L. Bradshaw, Nye County, NV
W. Barnard, NWTRB
R. Holden, NCAI
A. Melendez, NIEC
S. Brocoum, YMPO
R. Arnold, Pahrump, NV
M. Stellavato, Nye County, NV



OFFICE OF THE
SECRETARY

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

April 28, 1995

IN RESPONSE, PLEASE
REFER TO: M950425

MEMORANDUM TO: James M. Taylor
Executive Director for Operations

FROM: *A. B. Taylor*
John C. Hoyle, Secretary

SUBJECT: STAFF REQUIREMENTS - BRIEFING ON NRC STATUS
OF HIGH-LEVEL WASTE MANAGEMENT PROGRAM, 2:00
P.M., TUESDAY, APRIL 25, 1995, COMMISSIONERS'
CONFERENCE ROOM, ONE WHITE FLINT NORTH,
ROCKVILLE, MARYLAND (OPEN TO PUBLIC
ATTENDANCE)

The Commission was briefed by the NRC staff on the status of the high-level waste management program. The Commission requested that the staff discuss the vertical slice approach with DOE. In addition, the staff should advise DOE that the Commission is interested in hearing, during the June 9 briefing, whether they are also employing a systematic process to identify key technical issues and, if so, whether their process has identified the same issues. (NMSS) 9500062

cc: The Chairman
Commissioner Rogers
Commissioner de Planque
OGC
OCA
OIG
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)
PDR - Advance
DCS - P1-24

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Enclosure 1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON NRC STATUS OF HIGH-LEVEL
WASTE MANAGEMENT PROGRAM - PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Tuesday, April 25, 1995

The Commission met in open session, pursuant to
notice at 2:00 p.m., Ivan Selin Chairman, presiding.

COMMISSIONERS PRESENT:

IVAN SELIN, Chairman of the Commission
KENNETH C. ROGERS, Commissioner
E. GAIL de PLANQUE, Commissioner

STAFF SEATED AT THE COMMISSION TABLE:

KAREN CYR, General Counsel

ANDREW BATES, Acting Assistant Secretary

**HUGH THOMPSON, Deputy Executive Director, NMSS & Operations
Support**

**DR. MALCOLM KNAPP, Director, Division of Waste Management,
NMSS**

**DR. CARL PAPERIELLO, Deputy Director, Office of Nuclear
Material Safety and Safeguards**

**MARGARET FEDERLINE, Deputy Director, Division of Waste
Management, NMSS**

JOHN CARL EVES, Division of Waste Management

P R O C E E D I N G S

[2:00 p.m.]

CHAIRMAN SELIN: Good afternoon, ladies and gentlemen.

The Commission is meeting now to be briefed by the staff on the review strategy for the DOE High-Level Waste Program approach. In fact, this is one of a series of presentations that we're going to receive. We're looking not just for the review strategy, of course, Mr. Thompson, but for our impression of what the program is and what the key issues will be so that they'll set some hypotheses so that when DOE appears before us we'll be better prepared to ask them questions that will be relevant to our own program, since this is a major regulatory responsibility and a major resource responsibility, both for the Commission.

We were last briefed by the staff in October of last year. DOE will soon be with us to talk to us about three separate programs, the licensing support system, the multipurpose canister program in which I notice they've just let a contract, and the overall high-level waste program which includes site characterization at Yucca Mountain.

Congress is also considering several bills. Many of these bills do two things, they look favorably on the program approach and they all propose significant modifications for the existing statutory basis for storage,

transportation and disposal of spent nuclear fuel, in particular breaking the prohibition against doing some kind of intermediate storage until a decision is made on where to site the geological repository.

With all this near-term activity in the high-level waste area, we believe it's timely to hear from the staff about their strategy and to put all of this work into context for us.

Commissioner Rogers?

Commissioner de Planque?

Mr. Thompson?

MR. THOMPSON: Thank you, Mr. Chairman. Today's placards up here, as you can tell, seem to have been made last week when Bob Bernero was still the office director.

Bob, you can run but you can't hide. He's there in the office. After 23 years of service, Bob, we appreciate your contribution to the High-Level Waste Program.

Today's briefing will be given by Margaret Federline who's the Deputy Division Director of the Division of Waste Management in NMSS. We will discuss the staff's views on the status of DOE's implementation of the program approach and NRC's new strategy for reviewing the DOE activities which are directed in making a site suitability determination by 1998. We will explain the use of what we

call now a vertical slice approach. This is a new approach that we have devised which provides our ability to identify in a more proactive manner those key technical issues which we are going to make sure both the Commission and DOE are clearly aware of that we believe are critical elements that must be resolved in doing the site suitability determination.

We have accelerated this briefing at the request of the Commission to provide an early insight, as you said earlier, in preparation of meetings with DOE. We will obviously be prepared at a later date to provide more details to you with respect to the budget implications. I think we owe the Commission a paper on those details, but we believe this new approach has the ability to be flexible yet also allows us to be proactive in identifying the key technical issues.

Margaret?

MS. FEDERLINE: Thank you.

Good afternoon. It's a pleasure to be here today to discuss our change in strategy for the High-Level Waste Program. There are two things that have motivated us to make these changes. The first is John's and my perception that there's a need for more real time feedback and real time interaction with DOE, enabling us to examine data, look at field activities that are going on. So, that's one

component of our strategy.

The next is a need to husband our resources through an audit approach of the prelicensing period. We believe that it makes sense to focus on what we believe are the key technical issues for licensing during this period, knowing full well that we will conduct a full licensing review of all the aspects when we do receive the license application.

May I have the next slide, please, the overview?

[Slide.]

MS. FEDERLINE: In June and December of '94, Dr. Dreyfus outlined the program approach. We believe that by nature of the process the geologic repository is a first of a kind activity and therefore it's evolutionary and our interactions need to be iterative as we proceed through the program approach. Now, given the schedule for the high-level findings and the peer review process, we focused our program on those issues that are most important to licensing so that we can have an effective conversation and interaction with all the parties as the data is being collected and we can identify any needs for additional data collection when the data will be least costly to obtain.

So, our goal is to make a timely assessment of whether the program approach will result in the necessary information for licensing, but in a time frame when these

needs can be discussed as part of the site suitability process.

Can I have the next slide, please?

[Slide.]

MS. FEDERLINE: I wanted to give you some insight as to what's going on at the Yucca Mountain site, just so you have a perspective of what is going on with DOE and what NRC is involved in at this particular time. This slide provides an overview of the major facilities at Yucca Mountain. The next two slides were not in the package that we sent up to you earlier because we wanted to provide you with the most recent information.

You can see at the upper left-hand corner the crest of Yucca Mountain and the North Portal is the place where the tunnel boring machine entered the mountain. Of course, the south portal is where the south ramp will be complete. Now, there's a lot of activity going on at the site. The ESF, which everyone is familiar with, but there are also 33 deep bore holes that have been dug to date, multi-instrumented, many data sets coming out of the bore hold. There will be 54 bore holes by September 1999.

Now, NRC is fully involved in this process. We have bimonthly ESF meetings. We discussed design and construction in those meetings. DOE also by Internet keeps us informed on a daily basis about the activities and the

progress that's being made at the ESF. Our on-site representatives, of course, are involved on a daily basis.

Although no activities have reached the threshold for formal reporting, DOE still continues to keep us informed and lets us know about difficult conditions or problems as they did with the recent poor tunneling conditions at Yucca Mountain.

May I have the next slide, please?

[Slide.]

MS. FEDERLINE: This provides a little more detail of the ESF. The main tunnel is expected to be five miles in length at a diameter of 26 feet and there's an additional 10.5 miles scheduled to study the Calico Hills and the Solitario Canyon. Now, there are seven alcoves that are scheduled to be blasted and dug out of the main tunnel. Five alcoves will be in the north ramp. As a matter of fact, we learned this morning that they have completed the mapping for the second alcove and will be beginning construction next month.

The starter tunnel was constructed using drill and blast technology. They brought in the tunnel boring machine to construct the ESF because it minimizes damage to the rock surface and therefore minimizes damage to the waste isolation. As of this morning when we talked to the on-site reps., they were about 1900 feet into the mountain.

Now, in the past several weeks they've been encountering difficult tunneling conditions. They are in the area of the Imbricate Fault Zone. The Imbricate Fault Zone consists of broken rock the size of baseballs to beach balls and you can imagine that's pretty difficult to go through with a tunnel boring machine. What happened was that rock would fall around the cutter heads and create voids. Then it would be difficult for the tunnel boring machine to grasp the side of the mountain and pull itself along.

So, DOE implemented a couple of solutions. They pumped sand into the voids and they drilled bore holes ahead of the TBM and put grout in so that conditions would be more stable and they would be able to continue construction of the ESF.

Next slide, please.

[Slide.]

MS. FEDERLINE: We briefly want to summarize the status of DOE's implementation of the program approach and our concerns.

Slide 3.

[Slide.]

MS. FEDERLINE: Now, when Dr. Dreyfus met with you and discussed the program approach, he emphasized several management objectives for the program approach. One of key

importance to us is better integration of DOE's activities. He was also interested in facilitating stakeholder involvement and actually making more realistic schedules and making the program more consistent with budgets. So, currently, they are emphasizing the scientific and engineering activities, planning to provide a decision for technical site suitability by 1998. They are doing this by a sequential evaluation of the high-level findings which are found in the siting guidelines. They intend to have the technical basis reports reviewed by the National Academy of Science prior to making their high-level findings.

Now, in parallel, it's incumbent upon us to review this same information for its significance to licensing and we will be conducting those reviews. Now, if the site is found technically suitable, the focus will turn to the license application in 1998 and our responsibility is to submit a recommendation to the President in the year 2000 on the adequacy of characterization at depth as well as the waste package.

Now, DOE has indicated to us that they will continue performance confirmation for a longer period of time, possibly up to 100 years. So, all in all, we're generally favorably impressed with the increased integration of DOE activities, but we are very concerned that the scope of the data and the analysis methods can be completed in a

time frame consistent with the suitability decision.

COMMISSIONER ROGERS: Margaret, the technical basis reports, have any of those been completed yet?

MS. FEDERLINE: No, they have not.

COMMISSIONER ROGERS: Thank you.

[Slide.]

MS. FEDERLINE: The next slide is a slide from a DOE presentation. This was given in the March ACNW meeting and it was also used in the TRB meeting last week. As we understand it, DOE's waste isolation strategy is evolving, although the critical components, as you see them on this slide, are consistent. They plan to use a strategy of multiple barriers. They plan to depend upon the unsaturated environment and the engineered barriers with the natural barrier providing enhanced confidence that this waste isolation can be achieved.

Number 1 on this slide shows DOE's belief that the unsaturated rock will provide a favorable near field environment for the waste package. Number 2 represents DOE's intent to use a robust waste package to address the uncertainties in the waste package environment. Number 3 shows their belief that there will be limited mobilization of radionuclides within the waste package. Number 4 illustrates their assertion that there will be slow release of radionuclides through the engineered barriers and, number

5, they believe that there will be slow migration in the geosphere as well.

So, you can see this is the strategy that NRC is faced with and there are not many details at this point in time. But we must try to delve into it and probe the assumptions to ensure that they are collecting the right information.

COMMISSIONER ROGERS: Just before you leave that, the word "possible," what does that imply? Does that imply that they might in fact believe that to be an air gap and not put anything in there?

MR. GREEVES: That's correct.

COMMISSIONER ROGERS: And that decision has not yet been made?

MR. GREEVES: Dr. Dreyfus last week at the TRB meeting, which I was able to attend, he stressed that DOE wants to maintain its flexibility in these evaluations of designs and we've spoken to you about that in the past. It puts us in a little bit of a difficult position to be prepared. So, he very strongly stated that he wants to maintain his flexibility and does not want to be forced into an early decision. So, at the present time, you're keeping both options open, backfill and no backfill.

As a point of information, backfill would not go in until they closed the facility up. So, if they kept the

retrievability period, they're talking about 100 years now. But however long they kept that open, there would not be any backfill there. The question is would the design call for it at the end of that point in time. But this is one of the challenges that's facing us and part of the reason we're using the vertical slice approach.

COMMISSIONER ROGERS: Thank you.

MS. FEDERLINE: Now, staff has pursued many avenues to try and better understand the program approach. We reviewed their five year plan and their draft program plan and we, in fact, submitted two papers to the Commission outlining our concerns. We continue to be involved in the ACNW meetings and the TRB meetings and we're finding their technical program reviews to be the most revealing for us in terms of details. So, we're planning to be involved in those.

However, our focus on the progress report and the annotated outline show that those documents do not have significantly more detail on the program approach than they did about a year ago. So, this is one of the motivations that we've had in proposing this new more reactive approach.

On this slide I've summarized several of our major staff views on the program approach. You have seen these in our Commission paper, but just let me emphasize two of these. We're concerned that by streamlining the site

characterization it will result in additional uncertainty at the time of the license application because of the bounding analysis. For some issues, only short-term testing will be involved at that point in time. Data for suitability will need to be in by '96 and for licensing by '98. So, it's clear that there will be significant uncertainties at the time the application comes in.

Also, I just wanted to emphasize that since determinations on site suitability need to be made in the context of the repository design, a reasonably complete reference design and thermal loading strategy are very important for us to be able to conduct our reviews. We were pleased at the TRB meeting last week to understand that DOE is going to pursue a maximum design thermal loading concept. We're unsure of the details of this at this point in time, but we feel that this will at least allow us to see the maximum thermal load under consideration.

MR. GREEVES: Yes. The problem we had before was the concept of them coming in with an application with a low thermal load and then a number of years later trying to say, "Well, no, we want to go to the high thermal load." So, I was pleased at the TRB meeting where they basically reported that they have an internal white paper on the thermal loading issue. They know how important this is and they are bringing forward this maximum design thermal load concept

which I find to be a good approach. You tell everybody going in that, "This is the range I'm considering and I may go this high," as opposed to announcing that at some later time after the license application.

I've personally been concerned about it and I've found that approach to be one that seemed to make a lot more sense to me. So, we'll find out more about that, but each of these meetings we go to we find out a little bit more and the program is evolving. So, I look forward to getting that white paper after they do their internal review.

COMMISSIONER ROGERS: Is it clear that the maximum thermal load design has the most uncertainties associated with it or is it possible that you've got either end of the spectrum, that there are different kinds of uncertainties at a very low thermal load that don't appear at the high thermal load but the other ones do? Just one reference design of the high thermal load may leave you with -- I mean if that ultimately is not the design, whether it still may leave you with a collection of different kinds of uncertainties that you may have to deal with.

MR. GREEVES: It was expressed that there's uncertainties throughout the spectrum and some even voiced, "Well, we may be better off at the low," but other experts in the audience said you could have some problems at the low end you don't want to deal with also. It may be a mid-

range that would, in fact, have the lowest uncertainties. But from my perspective, I was pleased that they would bring forward an approach that describes the full range, tells the regulator, the public, "This is my maximum design thermal load." I was having some troubles with the concept of coming in low and six years later saying, "Well, I'd like to go to the high now."

So, as I say, they've got a white paper within the M&O under review and they revealed the mechanics of it in the outline and it to me made more sense than the things I'd seen in the past. So, I'm looking forward to it and possibly you'll hear some more about it when Dr. Dreyfus visits.

MS. FEDERLINE: In order to illustrate how we plan to audit DOE's program, I wanted to discuss with you our identification of key technical issues because this is the real heart of our program. We're moving more away from a reactive review in looking at DOE documents in sequence. You're probably aware that we've received study plans, topical reports, technical reports, AOs, progress reports. We're sort of drowning in paper. So, what our approach is now is to identify several key technical issues and pull all the relevant documents, data, exercises, assessment methods together and examine this issue in an integrated fashion. So, what I'd like to do today is focus on two of those

issues and explain how the process works. I regret we don't have time to go into all of them, but we could, of course, come back at another time and do that.

Next slide, please.

[Slide.]

MS. FEDERLINE: DOE right now is focusing on site suitability and we believe it's incumbent on us to focus on suitability in the context of licensing. So, what we have tried to do is benefit from the experience we've gained through our systematic regulatory analysis and our iterative performance assessment. Dr. Knapp briefed you last April on our work in SRA. What we're doing in formulating these key technical issues is capitalizing on what we believe is a broad basic understanding of the program at this point in time. We've been involved in this program for a number of years and we with some confidence believe that we can identify key issues for licensing.

So, you're aware that we have identified uncertainties whose existence we believe poses a high risk of non-compliance with the performance objectives. Our rationale for choosing these top technical issues is that they, most importantly, have a significant impact on performance. They've been gained through our experience, as I've said, and these issues have come up time after time in our prelicensing interactions with DOE and other parties.

Next slide, please.

[Slide.]

MS. FEDERLINE: Now, the next slide illustrates the list of key technical issues that we have under consideration. We're still in the process of finalizing this list and we have talked to DOE and other parties about these and they've expressed an interest in coming in and discussing the key technical issues because DOE is pursuing a parallel process of identifying key uncertainties. So, I think it's very important that we dialogue on these.

One point I wanted to make is that there are key underlying design issues like the thermal loading issue and others that relate to a number of these key technical issues. So, because you don't see design on the list does not mean that we have forgotten design.

COMMISSIONER ROGERS: How do you feel about the issue of human intrusion? Is that put in a separate kind of category? It has been an issue that's been discussed at great length.

MS. FEDERLINE: Yes.

COMMISSIONER ROGERS: Do you see that as not on some other kind of a list?

MS. FEDERLINE: That would fall in our list of scenario selection and calculation of consequences. Our prime areas there are climate change, human intrusion,

earthquake and fault displacement. So, these would be the disruptive scenarios that we're focusing on.

COMMISSIONER ROGERS: Good. Fine.

MS. FEDERLINE: The first issue that I wanted to touch on is volcanism probability and consequence. Volcanism is a potentially disruptive process which is really very poorly understood. Uncertainties exist in our ability to detect and describe past volcanic features and the effect that they will have on the repository. We also have uncertainties in the factors which control the volcanic processes, as well as a broad range of potential consequences.

Next slide, please.

[Slide.]

MS. FEDERLINE: How is DOE planning to address these issues? I've laid out a number of aspects of DOE's program on this slide. They are continuing exploration and mapping. We have urged them for a number of years to increase their use of geophysics to investigate the subsurface volcanic features and to provide insight into some structural relationships. They are, in fact, going to do that. So, we're pleased to see that.

The one that I would like to emphasize on this slide is the conducting of expert elicitation as a basis for probability estimates. You're aware that we're coming back

to brief the Commission on our guidance during the summer and we hope to publish it in the fall. But the thing that we did not want to do is keep a lid on any issues that we recognized and bring them out beyond the time when it was really useful to DOE and other parties. So, we have been participating in this expert elicitation as observers and DOE has given us an opportunity to speak at the end of each session. We have actually identified two issues which we raised to DOE in our last management meeting and we are having subsequent technical discussions with DOE. So, we believe that this more proactive involvement is going to raise issues earlier and set us on a course of focusing any differences that we might have among the parties.

Just to touch on our concerns, we plan to use our vertical slice process which I will discuss in a few minutes, to focus our reviews and our field investigations and our interactions with DOE in order to resolve the concerns that we identify. You're probably aware that there's a range of views on the part of the experts on the interpretation of basic volcanic features. The volcanic and structural investigations are not well integrated. Our modeling at the center indicates that there's a potential for structural control of volcanism. We believe that additional geophysics techniques should be used to explore the structural relationships and particularly any undetected

igneous features that might exist at the site. In fact, the center is going to be conducting some work at Crater Flats and will be publishing a report later in the summer on this issue of undetected igneous features.

I also wanted to point out that DOE's performance assessments, we feel, may not fully bound the range of probabilities and consequences, particularly those that the center has observed recently in its active analog work at Tebulchek.

COMMISSIONER ROGERS: So this is a kind of a criticism of how those performance assessments have been conducted so far?

MS. FEDERLINE: Yes.

COMMISSIONER ROGERS: I mean it's not a limitation by themselves imposed by the performance assessments.

MS. FEDERLINE: That's correct.

COMMISSIONER ROGERS: But just that they haven't covered the full possible range.

MS. FEDERLINE: That's right. And we really see progress in DOE, the performance assessment people coming together with the discipline people to make sure that the most recent data is incorporated in the performance assessment. So, I think we expect some improvement in this concern in TSPA '95.

The next issue that I wanted to touch on are waste

package degradation processes. I was thinking to myself when you raised the question about low and high thermal loading, the issue of microbial processes degrading waste packages is an example of an issue where at low thermal loads it's a problem, at high thermal loads it would not be as much of a problem. So, we have to be sensitive as we observe these degradation processes to the full range of potentially impacts to the repository.

Let me just touch on two of these. The evaluation of the engineered barrier system, including the waste package, is dependent on the repository design. The key issue here is the waste package environment and how quickly rewetting of the waste package occurs. This is largely due to thermal loading.

Also, the performance models for corrosion and material stability have significant uncertainties for the period of regulatory interest. For instance, there are great uncertainties as to how the microstructure of the metals might be affected from prolonged heat, from thermal exposure.

I would just note that the center has been doing some very useful work in this area of modeling. They developed a model as the moisture drips onto the waste package, contains dissolved salts, as that moisture is evaporated it leaves a thin layer of dissolved salts on the

surface of the waste package. As the package is rewet, that could increase the boiling point and could increase the corrosion potential of the waste package. So, this was sort of a new idea that now is being explored in the scientific community as a result of the center's work.

I wanted to touch on DOE's current approach. As John mentioned, we're learning more as we go to each of these meetings. As we understand it, they now intend to use a waste package design with two or more materials as a defense in depth. They plan to use both a corrosion resistant and a corrosion allowant material. At the TRB meeting last week, we learned that they're planning to evaluate four conceptual waste package designs with two backfill options and two ventilation options. So, we will need to stay on top of those.

I'll just touch on the last bullet. They're planning on conducting of laboratory and field tests to reduce uncertainty and provide bounding values. They're planning on conducting long-term corrosion tests and, of course, this is one of the areas of whether enough data will be in to make a decision early on in the process. They're also planning to conduct a large block thermal test to learn more about the environment that's going to be impacting the waste package. That's another area where we're concerned if the data will be in in time.

COMMISSIONER ROGERS: What does long-term mean here? How many years?

MR. GREEVES: I went to the meeting last week and they had a session on testing. They're doing tests now. I think the block test Margaret was talking about is actually outside --

MS. FEDERLINE: Yes.

MR. GREEVES: -- of the facility. So, it has the limitation that it's not underground. But one of the handouts we got last week put the tests in perspective. They'll do short-term -- and I'll just focus on thermal for the moment. They'll do short-term thermal tests which they can complete within about a year when they get underground. These are just single element heater tests and they will start room scale thermal tests when they get underground, get the room opened up, and do something on an MPC scale. But the data from that particular test, all you will have is the ramp-up portion of it by 2001. So, those types of tests take five years say. Part of the question we're going to be struggling with is how do we deal with a licensing process where a fair amount of data is actually going to come after the license application hits the door. You will have the ramp-up data if the schedules are met, but is this answering the question you had?

COMMISSIONER ROGERS: Well, it seems to me I

recall that the Technical Review Board was talking about decades.

MR. GREEVES: Some of the tests can take seven or eight years for the large scale thermocouple tests. I think by the license to emplace you will have a good handle on that. But at license application it's a little bit of a gradation.

COMMISSIONER de PLANQUE: Is there a clear understanding or agreement as to how long these tests need to be conducted or is that still an unknown?

MS. FEDERLINE: This is what we're trying to achieve through the vertical slice as having sort of one on one discussions between the scientists, all the parties among the scientists to try and identify what are the key tests. One of the next slides that I'm going to talk about, one of our concerns the center has is that the range of environmental parameters is not broad enough to evaluate the impact on the waste package. So, that's a question, what is broad enough in terms of environment parameters. Those are the kinds of things that scientists need to sit down and discuss face to face. Articles need to be published in peer review journals and that's an approach that we're going to be pushing in our new approach.

I'm not sure we answered your question about how long is long-term, but I think that's what we have

recognized, is that we have to attack this on an issue by issue basis and understand how significant is this particular parameter to the performance of the repository. That will tell us how long the data needs to be collected and how significant it is for reasonable assurance.

MR. GREEVES: Was your question how long these tests are needed to be evaluated?

COMMISSIONER de PLANQUE: Is there some agreement as to how long they --

MR. GREEVES: My impression, and again there's a bunch of experts pouring over this issue, the experts agree that the suite of tests DOE presented to the TRB last week is what needs to be done. They do span -- as I said, the shorter term ones can run for a year. There's a mid-term group that runs from a few years and others that run for like seven or eight years. The comfort I got out of it was that it looks like you have enough time by emplacement to have that under your belt, understood and confirmed.

So, I think that's a partial answer to your question. But this type of a licensing activity is nothing like anything I've dealt with in the past. I think the support grounds that we look at for other types of activities, I'm not sure how useful they are in this particular arena. So, they will continue to run some of these tests for at least a decade, some of these longer term

ones.

MS. FEDERLINE: And I think there's precedence for that in the reactor program. There was a confirmatory research program run for a number of years to confirm issues. So, it's the question of what's necessary for reasonable assurance.

Next slide, please.

[Slide.]

MS. FEDERLINE: On this slide a major concern that we have as we've discussed is the need for an understanding of the thermal loading that will be pursued. Our concern is if it's delayed and DOE pursues it as an amendment late in the process that there will be near field conditions that will be raised as a result of a higher thermal loading that may not have been accounted for or data may not exist for.

Let me touch on the third bullet, the approach for rating alternate materials is subjective and does not consider coupled performance factors. They've taken what our experts believe to be a good process in examining corrosion and weldability and strength, but they've considered these separately and have not integrated them. So, our scientists believe that there's a need to evaluate these in combination.

Also, we believe there's an need for increased emphasis on a mechanistic understanding of the degradation

processes. We're worried that some of the programs that they're designing using a laboratory approach are perhaps too empirical to result in the kind of understanding that we believe is needed.

Next slide, please.

[Slide.]

MS. FEDERLINE: Now that we've given you some insight into what we believe the key issues are, we'd like to discuss how we plan to review DOE's implementation of this approach. We presented this approach to DOE and other parties in our April 11th management meeting and we've received a letter back from DOE indicating that they believe it will complement the ongoing issue resolution process and that they're eager to talk to us about the identification of the issues as well as how we document that the issues are resolved.

CHAIRMAN SELIN: They must have really been afraid of the alternative if you got a letter back in ten days from them.

MS. FEDERLINE: May I have the next slide, please?

[Slide.]

MS. FEDERLINE: Now, the vertical slice approach is intended to answer the question of whether the program approach process will result in sufficient information for licensing through an audit approach. We're not going to

look at everything in detail, but we believe that by looking at key issues we can infer enough about the process that we'll be able to provide feedback to DOE on a real time basis and that more data can then be collected in the most cost efficient fashion.

So, the vertical slice approach will focus on prelicensing reviews on the key technical issues that I've been discussing. We will place more emphasis on proactive reviews. Those are our infield verifications, our site visits and our data, our review of significant data to obtain real life information. Also, we'll be focusing our research and our technical assessment method development on key issues. This is an approach that we've just embarked upon and we are developing vertical slice plans for each of these key issues so that we can pull together all of the key elements. One thing that came out of the very first one that we were doing was two very important areas of research. This is the active analog work that Research is doing at Tebulchek to look at volcanic consequence analysis as well as the geophysics techniques to evaluate undetected igneous activity.

So, we believe as we look at these issues in an integrated fashion that we will be able to identify certain research projects which are more important than others and accelerate those, place more emphasis on them.

We'll also be developing the necessary license application review plans and we'll be able to do this in an appropriate time frame since we will only be focusing on certain key technical issues. We will continue our performance assessment on a systems basis to identify any vulnerabilities that we might be missing. Once shortcoming which I'll talk about on the next slide, when you conduct an audit approach there's a risk that you'll miss of vulnerability in repository performance. But we believe if we continue the iterative performance assessment on a systems basis, that we'll be able to identify uncertainties that we may not have recognized intuitively.

I touched on the in-depth integrated review in my last slide. Another strength is that we will be providing real time feedback to DOE in the face of an accelerated program which we think will be best for the national program as well. This allows us to more efficiently evaluate DOE's program. As I mentioned to you, we were getting in 10 or 12 different document types and we have now told DOE that we plan to focus on progress reports and annotated outlines. We will be preparing a safety evaluation report when they deliver an annotated outline so there will be a way of documenting at the staff level when issues appear to be resolved. This will also allow us to focus prioritization of our activities in the face of level or declining budgets

as well, and as I mentioned, it will allow us to focus our research on technical assessment work.

CHAIRMAN SELIN: What gives us confidence that the sequence of vertical slices will, in fact, cover the major issues if they're all done?

MS. FEDERLINE: We're basing that judgment on our experience. We've done a systematic regulatory analysis to see were there any loopholes. This was a systematic analysis which went through the whole repository system to decide if there were any loopholes. Plus we're now doing iterative performance assessment and we have done several phases of that which looks for vulnerabilities in repository performance. So, it's our combination of experience plus the large amount of expert judgment that we have on staff. We really have an extremely talented staff in a wide variety of disciplines. So, we're basing our judgment of these key technical issues on these three factors.

MR. THOMPSON: But as I understand it, we went through the process of identifying all the technical uncertainties that we were aware of, licensing uncertainties and technical uncertainties. For each of those, evaluating the difficulties that a meeting of the Part 60 licensing criteria would present and the state of the knowledge and the programs, and for those that seemed to have the most difficulty, those were the ones which were selected as the

key technical ones. Then that's checked against your performance assessment approach that the staff uses.

MS. FEDERLINE: That's correct.

MR. THOMPSON: And that's the way we did it.

MS. FEDERLINE: With everything good comes some weaknesses. I've identified a few of those on this slide here.

[Slide.]

MS. FEDERLINE: The focus on key issues means that some aspects of DOE's program will not be as rigorously reviewed during prelicensing. That may seem like a vulnerability, but many of the aspects that fall into that category, like preclosure radiation safety and surface processes, are things that are really well understood, are understood for operating facilities at this point in time and we believe that we will be able to conduct a rigorous licensing review without spending a lot of time during the prelicensing process. Also, some application review plans will not be complete until the year 2001.

The third item is both a strength and a weakness. High-level findings which are related to key technical issues will receive the most robust review. For instance, geohydrology and transport will receive a significant review as well as post-closure tectonics, including volcanism. Those will all receive very rigorous reviews. For instance,

preclosure radiation safety will not receive as rigorous a review because we believe that those issues are well known and can be reviewed during the licensing process.

I've touched upon the last bullet.

COMMISSIONER ROGERS: Just on that, I think you've kind of assured me on it because of your mention of the performance assessment approach to continue to bridge across these key technical issues. Just a little concerned that the research efforts don't get focused entirely on the key issues, that somehow that also is there to support the performance assessment approach, the systematic approach that could turn up something else.

MS. FEDERLINE: Right.

COMMISSIONER ROGERS: Some little bit of research has to be left open --

MS. FEDERLINE: Right.

COMMISSIONER ROGERS: -- for that kind of a possibility.

MS. FEDERLINE: One good aspect, as Hugh mentioned, our research has been focused to date on those issues where the least is known, the least knowledge is available and we will continue those programs. We will not disrupt that.

MR. GREEVES: These vertical slice approaches, in fact, could reveal something for us that we need to pass

onto Research. I think that was one of the plans that you had included in the program.

MS. FEDERLINE: Next slide, please.

[Slide.]

MS. FEDERLINE: Let me just walk through a couple of these quickly to give you an idea of how we will be conducting these vertical slice reviews.

As I mentioned, we're going to be developing vertical slice implementation plans and this will cover the activities from now until the time of licensing. But we also plan to conduct intense windows of review in a six to nine month period when a particularly significant activity is occurring at DOE. We're in the middle of a vertical slice review for volcanism right now and there are two key aspects. The expert elicitation which I discussed earlier is ongoing and that's a critical aspect, as well as DOE is just about to come out with a report that summarizes the last 12 to 14 years of volcanic research and we need to review that in depth to see how our comments have been addressed. So those are some of the issues that drive this six to nine month intense review. At the end of that point, we will provide a review to DOE which will be publicly available and we will be conducting interactions so DOE understands our view.

Of course you can see on this slide we're also

planning to emphasize our in-field work. The center will be conducting some ground magmatics at Crater Flats. We're going to be -- one of the most interesting things that has happened recently was a site visit where DOE, NRC, the center, DOE contractors and the states and counties were all in the field at the volcanic site at the same time and they were able to discuss some of their differences regarding the volcanic features and we hope that more of that can go on.

Again, IPA will play an important part of this. We'll be able to review DOE's TSFA and, as I mentioned, we'll provide feedback to DOE and other parties.

COMMISSIONER de PLANQUE: Margaret, before you go on, when Dr. Dreyfus was here in December on the subject of expert elicitation he said that a policy paper on that was to come forward early this year. Did that happen? Do you know?

MS. FEDERLINE: No it is still under development and we are -- as a matter of fact, we've spoken with DOE several times since the management meeting and are trying to arrange a technical discussion that would bring out some of the elements of that before it gets cast in stone.

We're finding on groundwater travel time that it's important to have scientific dialogues, not necessarily a decision-making meeting but at the technical level, and that's what we would hope to do before that gets cast in

stone as well.

Let me just touch on our vertical slice for waste package. This is another example. Our intense window for waste package, we believe, probably would be best spent around the receipt of the waste package advanced conceptual design. That means before we get into Title I and Title II design DOE will understand our issues with the advanced conceptual design and that will be in late '95 or early '96, so we will plan sort of an intense window of review around that period of time.

We're going to be reviewing DOE's lab and field tests, as I've noticed on this slide. One thing that we're concerned about is that they are looking at five year data for predicting cracking, corrosion cracking, and the center is concerned about that and we need to have some technical interactions on that.

We're also developing an independent understanding of near-field environment and, Commissioner Rogers, this is where your suggestion, a very good one, we have developed an integrated near-field research project which focuses on the integration of thermal hydrology, geochemistry, microbial degradation as well as waste package issues because they're all interdependent and we need to examine them together, so we are developing an independent understanding there.

I'd also on this slide emphasize we want to

consider reactor and other engineering experiences and there's long-term experience from pressure vessels. Although the fluence is higher certainly in reactors, you have a long time history for thermal effects in the repository so we want to look and see if there's any feedback that we can gain from that program.

CHAIRMAN SELIN: Ms. Federline, what I'm missing is whether this is a first of a kind analysis or DOE will be doing comparable analyses themselves, because it would seem to me that as part of the design evaluation licensing and all licensing that the same type of work would have to be done.

MS. FEDERLINE: Yes. Yes, DOE is doing the same type of near-field work.

CHAIRMAN SELIN: I meant the whole vertical slice.

MS. FEDERLINE: I'm sorry.

CHAIRMAN SELIN: The same issues that you say are licensing issues are issues that address the design and suitability of the -- well, the suitability of the design, so wouldn't they be doing the same vertical slice work?

MS. FEDERLINE: They have in fact identified what they're calling key issues and they've presented those. I saw them at the ACNW meeting and they largely overlap the issues that we're talking about here today.

As a matter of fact, I think there have been six

major performance assessments conducted by various organizations and all those performance assessments have showed that the same issues are key.

MR. GREEVES: Let me try. You're asking --

CHAIRMAN SELIN: You're not going to like the next question, so you better give a good answer to this one.

MR. GREEVES: -- is DOE doing the vertical slices like we are, is what your question was.

CHAIRMAN SELIN: Right. That's basically it.

MR. GREEVES: My impression is no, that they aren't. They've got people working on projects and they have reorganized the M&O so that all of the other organizations report now to the M&O, so whether the M&O will be conducting what we call vertical slices I don't know, but I haven't seen them in the past. Margaret may --

CHAIRMAN SELIN: It seems to me that we better find this out because we're talking about a huge amount of work here. And if what we're doing is auditing their own vertical slice work we have one approach and if what we're doing is original work then the question comes why don't we require this work instead of doing it ourselves and go more to a -- not a reactive thing. I mean, I believe that even if you did no further you've done an enormous job by indicating what are the slices that have to be analyzed and what are the criteria for doing the analyses, but I don't

see why we have to do all this analysis.

I don't see why we can't say that "we tell you now five years in advance or six years in advance that part of the license application will be -- you will have to submit these analyses to us. We'd like to keep with you as they go along and do more of an audit and less of original work." I just have the impression there's too much original work going on here.

MS. FEDERLINE: Well, perhaps it's limitations in the way I'm describing it. That's really what we're planning to do. As I indicated, what is triggering our vertical slice are key activities in DOE's program, so we will in fact be looking at their data collection. We will be reviewing their reports.

CHAIRMAN SELIN: That doesn't answer the -- I mean, clearly we're not going to do independent data collection. I mean, you know, at no point do we do this. But what we need to have and what the Commission needs to have before we get too far along is a clearer understanding, and you've already done something that's very valuable which is you've shaped some of the questions that we'll have for DOE, but one of the questions I will have for them and I hope you'll transmit it to them is, "Are you doing something comparable to the vertical slices? And if so, what is it appropriate that we do? And if not, why not?"

This is also an iterative educational process, but it just sounds from the presentation that, A, it's a terrific set of things to do, B, it's the right kind of things to do, but, C, why are we doing them rather than specifying them and -- I mean, it's as if we're doing the basic safety analysis rather than having a reactor licensee doing the analysis and then ours doing the review, the evaluation.

MR. THOMPSON: I think this does -- is an attempt to do in a parallel of what we do with the reactor licensees where they do lots of the technical work and then we take a-

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CHAIRMAN SELIN: Slice, yes.

MR. THOMPSON: -- hard look at one area of it as deeply as we can to have assurance that the context of it is tied together because we have fairly limited resources, certainly, compared to what DOE is applying to this. This is the first time we've kind of put this all together.

CHAIRMAN SELIN: I think this is terrific. I really do. But the next question comes, if it's so terrific why are we doing it and why aren't they? I mean, we don't do a safety evaluation until we have a full safety analysis on the reactor side. Is that the right model? Or, in effect, are they going to do a whole lot of things and then we're going to do some cross checks that go across them?

And that's really what I'm missing and I don't expect to get that out of one briefing or one paper, but the basic question is what's the proper balance between what we require of DOE and what we do ourselves? Where does the confirmatory analysis stop and the supplementary analysis -

MR. THOMPSON: This is somewhat different. As you know, this is the first time we've had a Yucca Mountain and Congress did ask us to have consultation.

CHAIRMAN SELIN: Right.

MR. THOMPSON: It's a slightly different role than we've had in --

CHAIRMAN SELIN: It's a very different role, I agree.

MS. FEDERLINE: We'd be happy to talk to DOE about this. I think your idea is -- we've been encouraging integration in this program and this will push --

CHAIRMAN SELIN: Well, we can do more than encourage it. There are two separate pieces. One is what's the work that has to be done? I think you've done a terrific job in saying this is an approach to it. Then the second is what's the proper division of labor in having this work done? Or another way is given that DOE does "the right thing," how much do we have to reproduce to be comfortable that the results are right?

MS. FEDERLINE: Yes.

CHAIRMAN SELIN: But then it's not just the division of labor. It seems to me that -- first of all, I think we have to do a fair amount of what you're talking about before we're able to say, "These are the right issues and this is the right piece." But it seems to me that we need to signal far in advance what we expect in a license application. If we want vertical slice analyses done as part of that license application so that we can audit them or reproduce them, we need to know that in the next year or so, not in 1999 to go back. Maybe you need to do everything you're doing just to get to that point. But I'm uncomfortable that this presentation is so unmoored to what DOE is doing other than collecting data and doing good piece-wise analysis. I'm uncomfortable. Mr. Greeves says he doesn't know whether DOE is doing this or not. Maybe it's okay that we don't know this now, but it's not okay that we not know this for very long. I assume we'll have an effect on what they do.

MS. FEDERLINE: Yes.

CHAIRMAN SELIN: It's not just an independent thing.

MR. GREEVES: DOE right now is focusing on the site suitability issue. They're preparing these technical baseline reports that one of you asked for and they're

building pieces of the annotated outline and the progress reports. I don't see the vertical slice process associated with that.

Margaret or Mal, if you do, let me know.

DR. KNAPP: I don't think they have a vertical slice at this point, but I think it's important to think about what John and Margaret are really achieving here. Maybe a year ago, two years ago we had a lengthy and I think a reasonably sound approach in taking a look at the license application review plan and looking uniformly at what DOE was doing. There was a faith, if you like, that if we continued in that process that the important technical issues would surface and we would be able to handle them. What they've accomplished is a departure from that. Based on their computer work with the performance assessment and so forth, they've identified these technical issues which really do demand our attention, which are the ones that are, if you like, the potential show stoppers.

CHAIRMAN SELIN: Right.

DR. KNAPP: I see that as the achievement and within the NRC staff at least devoting less attention to the issues which may be interesting technically which aren't critical.

CHAIRMAN SELIN: That's all terrific and I think it is terrific.

DR. KNAPP: Give me one second.

CHAIRMAN SELIN: Yes.

DR. KNAPP: What I see us doing with this vertical slice is looking at what DOE is doing. If they are going at the same level we are and they're ahead of us and they're getting the data, great. If they're not, I see us as driving them in that direction to make that happen and I see us doing that now as a part of the higher level findings.

CHAIRMAN SELIN: I think that's terrific also, but what I don't want us to do is say, "Somebody has got to do these and if you won't, we will." What I want us to do is say, "We've done the sensitivity analyses and the safety analysis is critically sensitive to these issues." Then we've done a structure and said, "In order to do the volcanism issue, here are all the different pieces that have to be done. Are you collecting the data?" But then I want us to go to the next step in most cases and say years in advance, "We think these are the five major issues and the slice is in it and we require as part of your application that you do these vertical slices."

MS. FEDERLINE: Right.

CHAIRMAN SELIN: So, I agree with everything you said, Dr. Knapp. We couldn't have done this last year or the year before. We were just sort of taking them as they come. We've set some priorities. We've said, "These are

the most important things." That's all very, very good.
But I just want to make sure that we don't end up doing
DOE's job.

MS. FEDERLINE: Yes. Yes.

CHAIRMAN SELIN: Nor do we end up sandbagging them
and not telling them what we expect of them until it's too
late for them to do it.

DR. KNAPP: I agree entirely and where I see the
vertical slice coming in -- in I think one or two
presentations to you, I mentioned that we were going to get
very actively involved in the higher level findings from the
perspective of, "Okay, it may serve you for site
suitability, but we're looking at it from a license
application in 2001 and will it serve us." I see the
vertical slice as bringing a focus to that interaction --

CHAIRMAN SELIN: Absolutely.

DR. KNAPP: -- and driving such things as our
interaction with the National Academy of Science as they
look at the technical basis documents.

CHAIRMAN SELIN: I'm very leery of leaving the
staff with the last word, but why don't we continue?

COMMISSIONER de PLANQUE: Well, I have a question.
I'll save the situation.

CHAIRMAN SELIN: Thank you.

COMMISSIONER de PLANQUE: In a similar vein, I

keep seeing development of independent models. It's not quite clear to me why we need to go as far as developing truly independent models. Is that necessary? What do we really hope to gain from that as opposed to auditing or checking their models and what happens when we differ?

MS. FEDERLINE: There are a small number of issues, the key technical issues. There are only eight of over a hundred and some. But we have identified in those issues an area where there's such a lack of understanding and I mentioned to you the model that the center came up with of the thin film on the waste package, increased corrosion potential. Some of these ideas are non-intuitive. In other words, you cannot sit at your desk and review these. So, our independent model development is not directed at developing a tool, but more or less developing the understanding of the individuals as they construct the model so that they are able to review what DOE is doing.

COMMISSIONER de PLANQUE: So this is a different sense or use of the word "model" here?

MS. FEDERLINE: Yes, that's correct.

COMMISSIONER ROGERS: Well, I'm not going to let you have the last word either because I think the point that you've just made is an extremely important one. I agree with the Chairman that we should not be doing DOE's work for them, but unless we have bought in ourself to developing a

kind of expertise that there's only one way to get it, I mean you don't learn how to judge whether a heart surgeon does a heart surgery correct by just looking at a textbook. You've got to somehow buy into that to be able to make judgments and that's the tricky thing here. The question is how far do we have to go to develop enough expertise to be able to exercise critical judgments and not go beyond that in doing their work for them?

MS. FEDERLINE: Correct.

COMMISSIONER ROGERS: That's the tricky point. But I do think there is an expense and a big expense in buying into developing an in-house expertise to be able to make those judgments and to raise those questions. I don't think there's any way around that. I don't think you can do it by the seat of your pants. I think that somehow you've got to participate and you've got to go through a certain number of exercises here to develop the muscle to be able to be the regulator and to make the judgments. I think the Chairman's point is a very important point, but I do think that we have to recognize there is an expense, there is a learning process, if you want to call it that, that we have to go through in order to get to the point to be able to say, "We can make a judgment that this is a good result or it isn't a good result." Otherwise we're just walking off the top of our heads.

CHAIRMAN SELIN: I agree with that. We need to do the homework. We need to understand. We need to be able to recreate a sample. We can't just passively react to somebody who would come in and say, "Oh, I think I see a programming error or an arithmetic error." That's not the - - I'll save the rest of my remarks for the wrap-up, but I just want to make sure we're in surgery and not just become the patient.

MS. FEDERLINE: Yes. We're very sensitive to what you say.

Before I close, I just wanted to briefly discuss our role in the MPC disposal issues. We will be participating in the prelicensing process to review the MPC design. Based on the approach in the February 15th letter, we will review available information and we will raise any objections that we see early on, but the ultimate approval of the MPC and the waste package will come through the repository licensing for disposal. We'll do our Part 60 reviews --

CHAIRMAN SELIN: For the disposal aspect.

MS. FEDERLINE: Only for the disposal.

CHAIRMAN SELIN: Storage and transport will be done well before that.

MS. FEDERLINE: That's correct. That's correct.

CHAIRMAN SELIN: I mean we would actually license

this as a dual purpose canister in advance or not? Are they asking for a dual purpose license or are they just asking for the full multipurpose?

MR. THOMPSON: It's a certification in the licensing process and we need to marry those two. I believe it will be looked at as a licensing for the dual purpose, but I don't know that we have finalized precisely how that's going to be accomplished right now.

CHAIRMAN SELIN: Dr. Knapp?

DR. KNAPP: We will provide certification for transportation, I want to make sure I have my terms right, and licensing for storage consistent with those parts of what we do with respect to disposal. What I anticipate we will do is to provide DOE with a letter which, although we can say more until licensing, that at this point we see no fatal flaws and no reason why it wouldn't work.

CHAIRMAN SELIN: If Ms. Federline will excuse me just for a second, do we have problems between the two Part 71 and 72 in reconciling the storage and the transportation? Can we do the same analysis to cover these two points or are there any inconsistencies between our two rules that we're going to have to reconcile to deal with the dual purpose aspect?

DR. KNAPP: I'm aware of no difficulties because we already have a couple of -- we've looked at systems like

this. Now, again, recognize that this multipurpose canister is --

CHAIRMAN SELIN: I understand that --

DR. KNAPP: -- in pieces.

CHAIRMAN SELIN: -- disposal is a joker. It's a wild card for us at this point, but at least the two purposes, we don't have any problem in reviewing the single design for those two purposes.

DR. KNAPP: I'm aware of no difficulties at this time.

MR. THOMPSON: And we are currently conducting a review for, I guess, the Rancho Seco cask right now. So, we're proceeding on that.

MS. FEDERLINE: Only one last point I wanted to make. We're working closely with Bill Travers and Charlie Haughney in the Proposed Spent Fuel Project Office to try and see what aspects of the regulatory infrastructure can be used by them to get up and running very quickly, like our advanced computer review system and our open item tracking system.

So, in summary, the three points that I wanted to leave you with is that we feel that the vertical slice will allow us to focus on the most important licensing issues in a time frame when we can raise them when site characterization data can still be collected and they can be

discussed as the site suitability findings are made.

That completes my briefing.

CHAIRMAN SELIN: Commissioner Rogers?

COMMISSIONER ROGERS: I just wanted to say that I thought it was a superb briefing and I thought it was really excellent and that the approach appears to be really well thought out. There are some important questions that are - - I think it was very helpful to hear from you today. Some of the questions that have been raised, I think the Chairman's question was very important, but I just want to say that I think you're doing a superb job. It's a tough problem that you've been handed here in some ways because you don't know everything you'd like to know. But I think it is important though to keep coming back to us. I think issues such as those that we've discussed today are important to return to to make sure that we are doing what we have to do, but we're not doing a lot beyond that. It is very important that our resources be used in a most effective way and we can't afford to squander them. But on the other hand, we have to recognize that there is a price to getting into the game. In this case I think it's a fairly high price, but it shouldn't be any higher than necessary.

I'd just like to compliment the staff on an excellent presentation and what appears to me a very well

thought out program.

MS. FEDERLINE: Thank you.

CHAIRMAN SELIN: Commissioner de Planque?

COMMISSIONER de PLANQUE: I would agree with that and I have no further questions.

CHAIRMAN SELIN: I'd like to say this. I think this is a terrific presentation. In fact, were it not for the amazing progress that's been made the question I've asked could not be asked. Furthermore, I full heartedly agree with both of Commissioner Rogers' remarks, his closing remarks and remarks he made about you have to put up the ante if you're going to be in the game. We can't just be passively going on. Furthermore, I do appreciate that -- it's much better that we have both the analytical tools and get going on the work so that we can identify the important issues ourselves and not only important issues but the things that are going to drive them rather than just sort of waiting for that stuff to come in. We do have to get way out in front and tell the licensed applicant what we expect in the license piece.

I'm not going to repeat what I said about the importance of saying that this is really important how much of this are we going to require. However, I do want to come back to something you said. I can't find the chart right now, but the one that says that we might miss something and

you can't count on the audits.

MS. FEDERLINE: Yes.

CHAIRMAN SELIN: Which chart is that?

MS. FEDERLINE: Yes. That is slide 16.

COMMISSIONER ROGERS: Yes, the weaknesses.

CHAIRMAN SELIN: Yes. Okay. Now, this is just saying life is dangerous and risky and you can't do everything. That's fine. But if this chart is meant seriously, not just we might but it's likely we're going to not be ready in 2001 or we're going to -- if you're just saying you can't rule out that some issue comes up that won't be settled until later, that's fine. But if you're saying there's so many issues we really can't get to all of them, you can't mean exactly what this slide says without coming back and asking for more resources or something else. The plain reading of this slide is not acceptable. So, make sure you mean that we can't guarantee that if we look harder at A that B might not come up and bite us. I understand that. But if you mean more than that, you need to redesign your program to make sure that you have the resources in hand.

DR. KNAPP: At this time what we mean is it's your earlier term. It's a recognition that there is a risk we might miss something. We don't expect that we will, but it's possible.

CHAIRMAN SELIN: Fair enough. Okay.

Look, it's a wonderful job. I can't tell you how pleased I am to see an approach where you're sort of doing an analysis of what are the dependencies, what I would call the contingent probabilities and conditional probabilities and therefore focusing the work. It's really a performance orientation towards repository licensing that really makes a great deal of sense. I think my caveat is exactly the right caveat. I don't want that to undercut the satisfaction and the huge successes that you've taken to get us this far.

So, I thank you very much for this presentation. I hope that these questions will be transmitted formally to DOE before they come in. What do they think of the vertical slice? What are they doing in this area? Does it look as if we're going to have to produce this work or will we be in a position to audit their work and if we're going to require vertical slices in the application, when do we have to tell them what we mean by that in order for them to be timely with their application? While we're at it, you might ask them are there any other things that they're afraid we're going to sandbag them on in the application because that's really -- you know, your cooperative work with them has been too good for that to happen. So, we ought to make sure none of that happens.

MR. THOMPSON: We'll do that.

CHAIRMAN SELIN: Thank you very much.

MS. FEDERLINE: Thank you.

MR. THOMPSON: Thank you.

[Whereupon, at 3:12 p.m., the meeting was
concluded.]

**QUESTIONS FOR DOE'S BRIEFING TO THE COMMISSION ON THE
HIGH-LEVEL RADIOACTIVE WASTE MANAGEMENT PROGRAM**

1. What are DOE's views on the NRC staff's vertical slice approach for precicensing activities, which primarily includes systematically identifying key technical issues and conducting detailed reviews, in-field verifications, quality assurance audits, independent modeling, and research for each of these issues?
2. Does DOE have a similar systematic process to the staff's vertical slice approach to identify key uncertainties? If so, describe it.
3. What are DOE's views on the key technical issues the NRC staff has identified for the vertical slices? How do DOE's key uncertainties compare to NRC's key technical issues? Has DOE identified the same issues or what are the differences?
4. How will DOE address the staff's key technical issues for licensing? Will DOE be doing analyses and research, and how does this work relate to the staff's analyses and research for the issues? How does DOE keep the staff informed about how it plans to address the issues?
5. When and in what forms does DOE need NRC guidance on how to address the key technical issues?
6. Are there any other topics that DOE needs staff guidance on for the license application?