

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON STATUS OF ACTIVITIES

WITH CNWRA AND HLW

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PUBLIC MEETING

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Nuclear Regulatory Commission  
Commission Hearing Room  
11555 Rockville Pike  
Rockville, Maryland

Wednesday, May 14, 1997

The Commission met in open session, pursuant to notice, at 1:33 p.m., the Honorable SHIRLEY A. JACKSON, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

- SHIRLEY A. JACKSON, Chairman of the Commission
- KENNETH C. ROGERS, Member of the Commission
- GRETA J. DICUS, Member of the Commission
- EDWARD McGAFFIGAN, JR., Member of the Commission
- NILS J. DIAZ, Member of the Commission

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STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

- JOHN C. HOYLE, Secretary
- KAREN D. CYR, General Counsel
- MARGARET V. FEDERLINE, Deputy Director, Division of Waste Management, NMSS
- MALCOLM R. KNAPP, Deputy Director, NMSS
- L. JOSEPH CALLAN, EDO
- WESLEY PATRICK, President, CNWRA
- MICHAEL J. BELL, NMSS

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P R O C E E D I N G S

[1:33 p.m.]

CHAIRMAN JACKSON: Good afternoon, ladies and gentlemen.

The purpose of this afternoon's meeting is for the NRC staff and the Center for Nuclear Waste Regulatory Analyses, or we'll refer to it as the Center, to provide the Commission with a periodic briefing on the status of the NRC high-level waste program and activities of the Center.

The Commission is pleased to welcome Dr. Wesley Patrick, from the Center, who will be providing at least part of today's briefing. The last time the Center briefed the Commission was in April of 1996.

Today's briefing will be the first of three briefings on high-level radioactive waste that the Commission will receive in the next day and a half.

Tomorrow morning the Commission will be briefed by the U.S. Department of Energy on its high-level waste program. At that briefing the Commission also will hear from representatives from the State of Nevada, local governments, and affected Indian tribes. Tomorrow afternoon the Commission will again be briefed by the NRC staff on the progress that has been made in the area of performance assessment for high-level waste disposal, as well as for low-level waste and for SDMP sites.

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Mr. Callan, the Commission looks forward to hearing from the NRC staff and the Center today on the status and accomplishments of the NRC's high-level waste program, and unless my fellow colleagues here have any opening comments, please proceed.

MR. CALLAN: Thank you, Chairman. Good afternoon, Commissioners. With me at the table this afternoon are Mal Knapp, the Deputy Director of NMSS; Wes Patrick, the president of the Center -- I'll use that same phraseology; Margaret Federline, the Deputy Director of the Division of Waste Management; and Mike Bell, a branch chief in Margaret's division.

Margaret Federline will lead the staff's discussion this afternoon.

Margaret.

MS. FEDERLINE: Thank you.

We appreciate the opportunity to be with you this afternoon to discuss our progress and accomplishments in the NRC high-level waste program. As I'm sure the Commissioners know, external factors and uncertainty still continue to influence the high-level waste program, and what I'm going to talk about today is our program strategy in the face of this uncertainty and how we see it meeting our statutory obligations.

Dr. Patrick of the Center is also here with me

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today. Wes and I will describe some of the major technical progress that has been made in the program in spite of the constraints that we're facing. I also want to discuss our progress in meeting program objectives and provide some perspective on how we see the national program and its progress.

May I have the next slide, please?

May I have the next slide, please?

Because of the uncertainty and external influences on the high-level waste program, we feel it's really important to regularly review our program assumptions to ensure that we have the ship steered in the right direction. As you are aware, the Nuclear Waste Policy Act of '87 and the Energy Policy Act of '92 are currently the guiding statutes for the high-level waste program. You are of course aware of the legislation that's been introduced in Congress, S. 104, which has passed the Senate, and H.R. 1270, which is under consideration by the House. We don't expect the key scientific issues at a potential Yucca Mountain site to change based on the passage of these key pieces of legislation. However, we can see that adjustments to the regulatory framework would be needed if these pieces of legislation do pass.

Another one of our key assumptions is that the EPA standard will be proposed in 1997 and finalized in 1998.

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CHAIRMAN JACKSON: Do you have, you know, some sense of what level of confidence you can -- that you have

that EPA would meet that, you know, actually promulgate a standard, a draft standard, this year?

MS. FEDERLINE: I would say we had more confidence about two months ago. They were telling us it was in a couple of weeks, but now the message that we're getting is it's uncertain as to when it will be published.

CHAIRMAN JACKSON: Now how would the NRC program or for that matter the whole high-level waste program be affected if, you know, assuming we're operating under the existing statutory requirements, how would that be affected if the standard were delayed beyond these projected dates?

MS. FEDERLINE: DOE has told us that they -- the standard could be on the critical path. They've told us that July 1999 is important for them to have NRC's standard in place, and I'm sure they've told EPA a similar thing.

CHAIRMAN JACKSON: Same thing.

MS. FEDERLINE: We believe that DOE will continue to implement its revised program approach. As you know, the appropriations language for 1997 directed DOE to focus on the core scientific issues, and we believe that this is consistent with NRC's refocused program. And of course future budget estimates are highly uncertain.

I would just touch on the next slide. My reason

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for including it is to illustrate that both NRC and DOE have experienced significant reductions over the past two years, although as you can see from the chart, DOE's budget has been somewhat restored. The Commission requested the staff to continue on a path under DSI 6 to keep pace with the national program at an appropriate level of funding, and this has been difficult, and will continue to be difficult if current budget levels persist.

CHAIRMAN JACKSON: Yes, please.

COMMISSIONER MCGAFFIGAN: A question on budget.

If the current legislation, and the Chairman testified on this a few weeks ago, but if the current legislation were to move forward with either the House or Senate time line in interim storage came into the picture, we have nothing budgeted for that, and it would have to be budgeted in the high-level waste area, right? We would face a tradeoff between money devoted to the repository and money devoted to reviewing DOE paperwork related to interim storage. Is that correct?

MS. FEDERLINE: Yes, I think as the Chairman mentioned in her testimony in the hearing, that there is a pending collision of the programs in this --

COMMISSIONER MCGAFFIGAN: Weird vapors, as --

CHAIRMAN JACKSON: Oh, yeah, running on --

COMMISSIONER MCGAFFIGAN: Running on fumes.

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CHAIRMAN JACKSON: Fumes. Yes, thank you so much. Those were my very words.

[Laughter.]

COMMISSIONER MCGAFFIGAN: My recollection is that DOE as expected -- and this is not your office, so maybe Joe -- as expected did just submit something to us about a generic interim storage facility, and -- how much resource goes into reviewing, you know, their generic paper? Do you --

MR. BELL: We have two FTE's budgeted for the spent-fuel project office review, activities under the high-level waste fund, and that would fall into that area, and since we're already half -- more than halfway through the

fiscal year, that should be adequate.

CHAIRMAN JACKSON: Okay.

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

We're entering a critical time in the repository program. For those of us who've worked in the repository program for a long time, it's a welcome sight to see the critical decisions approaching. I would note that decisions in which NRC will play a key role, I won't go into detail on each and every milestone, but I would just note that NRC has either a statutory responsibility to be involved in these milestones or in the case of the viability assessment, we expect the Commission to perhaps have views solicited on the . 10 acceptability of the viability assessment. So as you can see, there are many activities coming down the pike for us, and this is the context that we want to present our program strategy.

The next set of the slides provides an overview of our refocused program, where we are currently in prelicensing concepts and where we see ourself going as we get closer and closer to licensing.

On slide 8, considering the approach of these important milestones for the national program, we've really identified three major goals which sort of drive the objectives that you have listed on the slide here.

The first is to provide a reasonable and implementable regulatory framework. We have been cooperating with EPA in the development of implementable safety standards. The NRC staff with the Center staff has been conducting detailed analyses and have provided these to EPA. I would just emphasize that we've not focused on this acceptability of the repository, but rather on the implementability of the regulations. We are also planning to come to the Commission with an options paper discussing how such regulations might be implemented in our regulatory framework so that we can ensure that any approach we're considering is consistent with the Commission's wishes. And, you know, as I emphasized earlier in the briefing, DOE . 11 has indicated that they would like something in place by July of '99.

The other objective that I want to really focus on today is we've attempted to define a program strategy which focuses on what really makes a difference. You're aware that it's a very unique engineering and scientific problem, and there are a lot of issues that could be studied and studied and studied. What we're trying to do is using a systems approach through performance assessment get an understanding of what really makes a difference, and make sure that our comments are directed at those areas. And the objectives that I have listed on the slide that coordinate with that goal are to set program priorities based on key technical issues that are most important to repository performance. One of our key elements of our prelicensing strategy has been to communicate early with DOE. We don't want there to be any surprises when the Commission's asked for its comments on the viability assessment. We want it to be clear what our scientific programs are finding and what potential vulnerabilities we see for the licensing program.

We also have initiated a program to resolve key technical issues at the staff level prior to the viability assessment. I would just note that under the NRC/DOE procedural agreement resolving issues means that NRC staff has no additional questions at this point in time. It

doesn't preclude us from asking questions at a later point if new information comes up.

The other objective that I wanted to focus on was in reviewing elements of DOE's viability assessment and preparing to answer questions, we have felt that a focus on potential licensing vulnerabilities is the correct approach, and what we're trying to do is for each of the KTI's we would develop acceptance criteria, which would provide some guidance for DOE as well as for the NRC staff on what the NRC staff would find acceptable. And we're defining these acceptance criteria not only on a discipline basis, that's issue by issue, but on an integrated systems approach, so we make sure we consider the significance of the issue to performance at the time we develop the acceptance criteria.

And the third goal that I want to focus on on this slide is we've been working on improving our efficiency and interdisciplinary understanding of the processes that are going on a Yucca Mountain. What we have tried to do through involving greater numbers of staff in our systems analysis is to enhance their understanding of how their relative disciplinary knowledge fits into the big picture and really affects the end point, the compliance point, which is DOE's.

Another goal that we've set for ourselves is to never have an interaction that doesn't have a predetermined objective. We want to make sure that our interactions are

focused and well-defined, that we just don't get together for the purposes of getting together. We want to make sure that it's clear from DOE's side and clear from our side what we would like to accomplish.

CHAIRMAN JACKSON: Let me ask you a couple quick questions. Has the cooperation between the NRC and EPA staffs on the EPA high-level standard been favorable?

MS. FEDERLINE: I would say generally we made some good progress. We have not seen a copy of the draft standard recently. The last copy of the standard we saw did reflect some of the progress that we felt we had made, sort of an agreement and consensus on how to implement such a standard. There are two significant issues that remain, and we've discussed those with the Commission. This is the need for a separate groundwater protection standard as well as the level of individual protection that might be necessary at a repository. There are still remaining differences on those issues.

CHAIRMAN JACKSON: I was going to ask you about those. When do you actually plan to initiate the development of a risk-informed performance-based standard specific to, you know, rule specific to Yucca Mountain?

MS. FEDERLINE: Our plan is to come to the Commission in the early fall with an options paper that would outline some options for the Commission in terms of

revising the regulatory framework. We -- hopefully the Commission would give us early guidance at that point, and we really believe that we would like to go ahead and proceed.

CHAIRMAN JACKSON: And does your schedule for finalization of the rule track with the DOE schedule to submit a license application in 2002?

MS. FEDERLINE: Well, that's highly dependent on the availability of resources. If we are to --

CHAIRMAN JACKSON: So assuming you had the

resources, what you've laid out would track with that is what you're saying?

MS. FEDERLINE: Yes. Correct.

CHAIRMAN JACKSON: Okay, but it's very resource-dependent.

MS. FEDERLINE: Yes, it is.

CHAIRMAN JACKSON: And the last question is, you mentioned improving program efficiencies, you know, as budget's been squeezed and squeezed. What other ideas do you have for improving --

[Laughter.]

MS. FEDERLINE: One thing we have worked with the organizational development staff in the Office of Personnel, and we are going through team training to help engineers and geoscientists speak to one another. As I'm sure you know,

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they're very different disciplines, and each brings a special expertise to the program, and we just want to make sure that we are interfacing as effectively as we possibly can. Another efficiency that we've done in the Center has been a great contributor to this. We have revised our total system code to be much more user-friendly, and we have defined it so that more staff members can actually use the code. That allows us to conduct more sensitivity analysis in parallel, taking advantage of the various staff expertise. Now in the past we were forced to use a Cray computer at Idaho, but putting it on a work station in a work-station environment it allows us to have real-time feedback from the analysis.

CHAIRMAN JACKSON: Commissioner McGaffigan.

COMMISSIONER MCGAFFIGAN: Let me ask a couple followup questions to the Chairman's.

You said the last time you saw the EPA standard, am I accurate that that was some many months ago?

MS. FEDERLINE: Yes, my best memory is, let's see, it's probably been about 2 months, but I'd have to check.

COMMISSIONER MCGAFFIGAN: And the Academy of Sciences on the issues that are in disagreement our staff position is much more compatible with the NAS study's recommendations on this issue of groundwater and level of individual protection than the -- what we know of the EPA

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position at this point?

MS. FEDERLINE: Yes, the National Academy on the issue of groundwater protection said they made no recommendation for a separate groundwater protection standard, so that is consistent, and our recommendation in terms of an adequate dose level was within the risk range the National Academy recommended.

COMMISSIONER MCGAFFIGAN: Finally, there's this other actor in this area, and Nuclear Waste Technical Review Board, and the reason I'm raising the question now is it says other parties at the bottom here. How do you see the relationship between us -- their role as I understand it, set up in the 1987 act, is to advise the president and Secretary of Energy on -- as a separate, independent body on technical progress being made, and there seems to be a bit of an overlap there. They've made recommendations that are resource-intensive for DOE with regard to this east-west tunnelling. Did their recommendations ever get in the way of our recommendations as to where DOE should be focusing its resources in order to meet what we need, and how do issues like that get resolved?

MS. FEDERLINE: Well, we see the roles of the two

organizations as somewhat distinct. The Nuclear Waste Technical Review Board in our mind is an independent group that was put in place to advise DOE on the operation of the

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program. Our role is not to tell DOE how to run the repository program. Our role is more to serve as an independent regulator, to look at DOE's approaches to things, and to identify vulnerabilities that we would see for licensing.

So we really see the roles quite differently, and the recent -- the recent report that came out from the Board I think was a good example of that. You know, they were emphasizing the importance of an east-west drift and the operational aspects of looking at enhancements to the waste package design, and also looking at transparencies. I don't think we see inconsistencies, but I would just say in terms of an east-west drift, GAO had talked to us about this a couple of months ago, and we had explained that NRC does not see a need to dictate the necessity. We see the value in collecting additional information. So we don't see ourselves in conflict with the Board, but we would not make such a requirement.

CHAIRMAN JACKSON: And so you've not seen any evidence of competing priorities in terms of what they may be trying to do to work with us vice the recommendations of this Board?

MS. FEDERLINE: Let me just ask Mike Bell if he would like to add anything.

MR. BELL: Yes. Actually there have been cases in

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the past where essentially they help reinforce a staff position. For example, originally DOE was planning to sink vertical shafts to construct the exploratory studies facilities. The NRC staff first suggested they consider ramps, and then some time later that was also recommended by the Technical Review Board, and eventually DOE in fact changed their program.

COMMISSIONER McGAFFIGAN: That brings up the issue of is there a way to leverage them, given how -- I mean, we may be already on fumes in some of our core programs here, and they have -- I don't know what their budget is, the Nuclear Waste Technical Review Board budget, but they are independent of DOE, we're independent of DOE, we have a regulatory function, they have an advisory function. Have you thought about whether there's any efficiency in trying to leverage them more than we have thus far?

MS. FEDERLINE: Yes, we have. We approached the staff of the Technical Review Board with our issue resolution strategy to see if there's a way that we could try and coordinate meetings. Meetings can be a big sink in time and resources and, you know, looking at based on DOE's waste isolation strategy if we might have meetings so we could get our information and they could get their information, and we have a very good working relationship with the staff at the Review Board.

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CHAIRMAN JACKSON: Please.

COMMISSIONER ROGERS: On the key technical issues, is there an agreement now with DOE as to what they are? At one point we were in disagreement on a couple of issues, and do we now have a common set that we agree are the key technical issues?

MS. FEDERLINE: I think DOE continues to place

less emphasis on the disruptive processes. We did have a recent technical exchange on igneous activity and we discussed some agreements in that regard, but I think there's a feeling on the part of the NRC staff that we need to at least work through to consequences on disruptive events, because they are the potential for high-consequence events, and as a responsible regulator, we need to make sure that things that could result in more serious exposure truly are a lower-risk event. So I think there may be a mismatch. I think DOE believes that this issue, you know, does not warrant much more consideration. Although we did agree -- in our last technical exchange they agreed that more consequence analysis did need to be done, and they're going to set about doing that.

COMMISSIONER DIAZ: We're talking about consequences and igneous activity. You're looking at this probability, of course.

MS. FEDERLINE: Yes.

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COMMISSIONER DIAZ: And isn't that probability very low for that area?

MS. FEDERLINE: Yes, it is, and we believe that we're at the point where we can agree on what the range of probability is, but this is just to keep in mind their own peer-review panel identified that there are three orders of magnitude of uncertainty in their range of probability. So, you know, there are significant uncertainties in these numbers, but I think we have -- we are comfortable at this point agreeing on the probability.

Next I wanted to touch on our current program strategy.

May I have slide 9, please?

Thanks.

We believe that the focus on key technical issues is still the right strategy at the current funding levels to ensure that vulnerabilities are identified for the viability assessment. As you are aware, budget constraints have forced us to eliminate the Center support in three key technical issues -- that's design, source term, and radionuclide transport. Now we have great concern about this, because from a technical perspective, I think we believe that all of the technical issues, key technical issues, are very important, and it was very hard for us to, you know, eliminate any of the issues, but --

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CHAIRMAN JACKSON: Do you have any contingency plans for how to bound them or deal with them?

MS. FEDERLINE: Yes. This is -- currently we are addressing -- design we deferred because we felt that there was more flexibility in the future on design. In the area of source term and radionuclide transport we are addressing as part of our performance assessment some of the key sensitivities to really understand how severe the problem could be, which would then go back into our prioritization process, and we may start those KTI's. But I would just emphasize that under the \$17 million program that we've requested we could pursue all ten KTI's.

I'll just touch very quickly. As I said, one of our main goals is prompt feedback to DOE. I've identified three ways that we're doing that. I'll discuss the annual progress report in a little more detail in a future slide. We are developing issue-resolution status reports. For each KTI we will be preparing a report which documents our views on DOE's path to resolution and perhaps presents our own

path to resolution. Through doing this we will define acceptance criteria which we will use to review the viability assessment. We actually believe that our interactions have been more fruitful. The focused nature of the interactions has been beneficial, and we're trying to make sure that we actually understand what each other are

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trying to say before we send letters back and forth and people become more entrenched in their positions.

May I have the next slide, please?

COMMISSIONER ROGERS: Yeah, just before.

MS. FEDERLINE: Sorry.

CHAIRMAN JACKSON: Please.

COMMISSIONER ROGERS: Before you leave that, on the question of design, our position as I understand it has been that we really want to see that the entire design is conceptually fairly well defined in arriving at our conclusions with respect to the Center. So how are design-related issues being dealt with if the Center doesn't have a program in this?

MS. FEDERLINE: Well, we have concern about that, because we only have one staff member who is focusing on design at this point in time.

Let me just ask Mike Bell to add anything that he would like to add.

MR. BELL: Well, as Margaret mentioned, although the Center support and design area has been eliminated this fiscal year, we are still trying to do what we can with in-house staff, and one important aspect of the repository design that we have under review is a topical report DOE submitted on their seismic-hazard design which the review is progressing very well, and we think we're close to resolving

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that question, and it's an example of an area that I think has worked quite well.

DOE came in to us because they wanted to use a probabilistic seismic hazard assessment methodology. We had some exchanges with them. Eventually I sent them an issue resolution status report agreeing with the methodology, and they're in the process of conducting an expert elicitation on that topic, which is following guidelines that we sent out and a branch technical position on expert elicitation, and so I guess we think with the resources we have, we're trying to do all the necessary things to be responsive to the things that are important to the DOE program at this time, but it's going to be hard to keep up if the Department's program keeps growing and we're straight-lined.

MS. FEDERLINE: I think this issue just makes the bottom point on my slide, that the \$17 million request for '98 is really critical to be able to work on all and key technical issues.

COMMISSIONER DIAZ: It's just a continuation of the same question and the priorities when the priorities are established. Of course I imagine every year you set the priorities.

MS. FEDERLINE: Yes.

COMMISSIONER DIAZ: And it seems to me like the design and source term, radionuclide transport are very

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important priorities. You know, how do they get placed when our, you know, resource allocation seems to me a very critical issue.

MS. FEDERLINE: Yes.

COMMISSIONER DIAZ: And I don't know whether they're being revised or you have, you know, the terms in that they are now more important. In other words, we might only have money for seven or eight.

MS. FEDERLINE: Right.

COMMISSIONER DIAZ: But the question is which seven or eight, and I know that at the beginning there is, you know, some exploratory research and some issues that come, but eventually you have to come to the bottom line.

MS. FEDERLINE: That's right.

COMMISSIONER DIAZ: Like these issues are kind of the bottom line.

MS. FEDERLINE: Right. Just to give you just a quick glimpse into our prioritization process, we've worked very hard to get to the point where our system code can have enough substance to it where, you know, we can really count on our sensitivities and importance analysis. We're scheduled to complete those analyses late in the summer, and in the fall we will have the sensitivity analysis to help us prioritize. But another sort of measure that we use is tying it to the DOE program. In other words, DOE had told

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us that they were not going to rely on sorption. And so that was one of the reasons why we ascribed a lower priority to radionuclide transport. They're now, I believe, going to depend more, so in our upcoming prioritization I think a reprioritization of the is going to be required.

Now because the licensing review will focus on the complete license application, it'll be necessary to examine other issues. These preclosure safety issues will be important as well as postclosure. So at the end of viability assessment we feel that it's necessary to shift to what we call the comprehensive approach. This will allow us to pursue the other statutory requirements such as the comments on the sufficiency of at-depth characterization and waste form which are to accompany the President's recommendation, as well as to review and adopt DOE's environmental impact statement.

Now you may question how is the comprehensive approach different than the current refocused program. We believe that the comprehensive approach will need to include refined independent performance assessments. This will be our complete review methodology for postclosure issues. We also believe it's necessary to develop a standard review plan for the license application review.

As I mentioned, we're developing acceptance criteria for postclosure for use in the viability

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assessment, but we need to develop a full review plan for the licensing -- review of the license application. And we also feel that increased focus on quality assurance activities are necessary, and we're currently recruiting additional resources in this area right now.

As you'll recall, early on in the program we had concerns about DOE's QA program. They did strengthen their program significantly, and we think they're on the right track, but I think as we've learned in other regulatory experience in this agency, lack of attention to QA is a bad plan. So we want to make sure that we have the right focus there.

CHAIRMAN JACKSON: With the main tunnel at Yucca Mountain completed, is there a basis for this at-depth site characterization, you know, moving that forward in any way?

MS. FEDERLINE: Yes, the primary data for the at-

depth site characterization and waste form will be from the exploratory facility. DOE has shifted an additional about \$10 million into the experimental program to collect some information on saturated and unsaturated flow, which is a key issue at the site, and so we'll also want to have the benefit of that in our --

CHAIRMAN JACKSON: So that's being moved forward to be done earlier than originally planned?

MS. FEDERLINE: Yes. Yes, additional resources.

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CHAIRMAN JACKSON: Yes.

COMMISSIONER MCGAFFIGAN: The standard review plan, if I were DOE I'd want to have that in good time before I submitted license application in 2002. What is the current plan for when the standard review plan would be -- would be completed, so that the, you know, I would know how to structure my application?

MS. FEDERLINE: Our current plan is to have acceptance criteria for the postclosure done by the time of viability assessment. It will take us and depending upon budget levels -- we have different assessments depending upon the budget level -- it could take up to an additional three years to complete the review plan. So, you know, this -- depending upon budget uncertainty, this is an area where we could be on the critical path.

COMMISSIONER ROGERS: Commissioner Diaz.

COMMISSIONER DIAZ: Yes, I just, really on the same question, I, since this is kind of a unique case, I wonder if the standard review plan as you're developing has some clear objectives and milestones, because it might be that it's sometimes more important to get the work done timely than just a review plan, but I have no idea how it's actually --

MS. FEDERLINE: Right. The standard review plan is growing out of our work -- our work on the postclosure

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issues. We've not even been able to focus on preclosure safety issues at this point in time. So, you know, this will depend upon, you know, the budget level that we're seeing. And the EDO has requested us to look at some options and, you know, more information will be available on that.

COMMISSIONER ROGERS: Please proceed.

MS. FEDERLINE: I wanted to touch on one subject that you requested in the SRM on the meeting. When our budget was reduced from \$22 million to \$11 million in 1996 we had to make some severe cuts, and the way we did that, managers from the Office of Research, from NMSS, and from the Center sat down and laid out all the activities that we believed would be needed before licensing, and sort of worked through a prioritization in terms of what activities needed to be completed and were most important. And in doing that we found it necessary to reduce some of the research projects, all but the highest priority research projects could not be fully funded.

The group of managers also recommended that to achieve some efficiencies that the management of the technical assistance and research should be consolidated under one organization, and this was recommended to the EDO, and of course the Commission was advised of this. And in your SRM you asked us for an appraisal, you know, of how

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this was working.

Well, I think all of us would prefer to have a fully funded research program. That's entirely desirable in a program of this nature. But I think under the research -- or under the budget constraints that we're experiencing at the current time, this was the only option that was open to us.

Now research has initiated a generic environmental transport research program, which we think will be very important. It will be broadly applicable to all the waste management programs. We think that is an advantage, and John Greeves and I not too long ago met with the management of the Office of Research to review the status of this generic program, and in a way this more closely parallels the traditional role with research performing generic activities and the licensing office doing site-specific activities.

Let me turn to --

COMMISSIONER ROGERS: Is the Center involved with that work?

MS. FEDERLINE: The Center is involved in receiving feedback from the work that is going on, but they are not conducting the work for the Office of Research.

I just wanted to note on this slide just some efforts that we're making to make sure that the independent

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expertise that's available in the Office of Research is brought to bear on our waste management problems. NMSS, we're continuing to work together. As a matter of fact, there was an Appendix 7 at the University of Arizona to look at some extraction techniques from TUF, and the Office of Research participated. Even though they have a very limited budget, they contributed their expertise to that.

Research does monitor activities. They attend the weekly branch chief meetings and the weekly Yucca Mountain team meetings, and of course we provide them with copies of products and Center reports. We do participate in their research workshops when possible. As the generic research advances, we hope to have an annual meeting where we can have a dedicated exchange on the generic research that's being conducted.

May I have the next slide, please?

COMMISSIONER MCGAFFIGAN: Does this generic research activity get funded out of high-level waste, or is it funded out of the appropriated budget that we get separate from --

MS. FEDERLINE: Yes, it's funded out of the appropriated budget, not high-level waste.

Next I wanted to turn to what we feel has been significant progress in meeting the program objectives. On slide 14 I wanted to talk about one of our new products. In

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fiscal year '96 we produced an annual progress report, and this was an attempt to describe in an integrated fashion all of our technical work and show how it relates to DOE's waste isolation strategy, and define what we see as the path forward to resolution of these issues. We've had several meetings with DOE. We introduced the report to DOE, and we've recently discussed it in a management meeting, and our feedback that we're getting is that they've found that it was useful and it facilitated a dialogue on the issues. It's been a top seller. We're thinking of selling copies to fund the high-level waste program.

Now I'd like to turn to Dr. Patrick, who will summarize some of our key areas of progress.

DR. PATRICK: Thank you. I appreciate that.

Chairman, Commissioners, the remainder of our briefing today I'd like to focus on what we feel to be rather significant progress that we've made, both the Center staff and the NRC staff over this past year, and some plans that we have looking out ahead in meeting some of the high-level waste program objectives.

I'm going to start with an overview of the progress, touch briefly some comments on our plan for the future, a few general views about the DOE program at this stage, and hopefully in doing that to lay out a framework for the remainder of the discussion, which will be to

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present in four broad program areas some specific examples of progress that we've made.

There are a number of bullets on those charts. I'll probably be touching on just a few of those, and would encourage and be open to your questions on those that I might not have put high priority on in addressing here. I'd certainly be happy to cover those.

Slide 15, please.

We dedicated our efforts during FY '96 to establishing what we consider to be a sound technical basis for proceeding with issue resolution. Those considerations and those efforts have continued in early FY '97, and as Margaret has indicated, we're going to be later this summer initiating a series of detailed sensitivity analyses that we believe will be instrumental in doing several things which I'll be touching on a little more as we move through the discussion.

If you look at the second, third, and fourth bullets there, they highlight three broad areas where I feel that we've made significant progress if you look in broad brush. First, we've improved our understanding of a number of very critical processes, critical from the standpoint of repository performance, things like igneous activity. This has been done through review of a variety of sources of existing data as well as collection of some selected new

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data ourselves.

Second, we've enhanced or completed the models for representing those processes, again, processes that are important to performance. We've developed an ash dispersion model which will be instrumental in understanding the second part of the risk equation that you alluded to earlier, Commissioner Diaz, to understand not only the probability but to get at the consequences portion of that issue. We've also done development in the container corrosion and we'll speak to that as a specific example a little bit later on in the presentation.

The third areas that we will be conducting sensitivity studies on some of the individual repository systems and processes that are believed to be important to performance. We're going to have the results of those studies appear in two key documents, the annual report, which was just alluded to, for FY '96. We'll be doing another one of those reports this fiscal year as well. And then within these ten key technical issues we'll be publishing issue resolution status reports where we will use these sensitivity analyses to try to understand better what the priorities for future work should be, and also to determine which ones of those subissues can be closed because we have determined at this point that there are no

further questions, that the sensitivity is such that we

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understand that particular subissue well enough to set it aside until we move forward into the licensing process. Again, recognizing that there is the option as new information, new understandings become available, as the designs are solidified and come forward to us from DOE, that we will once again examine and be sure that our initial findings are appropriate and are substantiated.

We feel that the approach we're taking here has been quite successful. There's been progress in three particularly notable issues closing in on the tectonic models that are applicable for the site, coming to an agreement on the probability of extrusive vulcanism at the site, and the one that Mike Bell alluded to earlier, developing and coming to agreement on a seismic design methodology. We're very close to closure on that issue as well.

Slide 16, please.

Just kind of carrying over from 15, unable to show both of these at the same time, but one of the last items there, which carries over onto slide 16, deals with the broad area of total system performance assessment. This has been an area where significant effort has been devoted by both of our staffs. We've been involved in developing a new version of the code.

Several of you will be familiar with the general

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approach that we've embarked on a number of years ago. We use the phrase iterative performance assessment, indicating the evolutionary iterative process that is needed to address a complex issue like this where information is evolving both about the site and about the design as well as the performance standard against which the eventual performance of the repository will be judged.

Those code modifications this year have focused in several areas. We have tried to incorporate in the new code not only some enhanced models with respect to this geology, but we have also made some improvements with regard to including some of DOE's new design considerations. The previous version of the code, for instance, had a vertical emplacement. That was the design that was in vogue at the time. We've since revised that to consider DOE's more recent in-drift emplacement. And of course to be able to make this code more efficient for a broader base of this staff to use it and operate with it, we have moved it onto the p.c. platforms, able to use this on your advanced computer system, and with that we have had to make some improvements in the computational efficiency of that code.

The version 3 of the code will be very shortly in this hands of a very broad cross-section of the staff. You have a number of staff who are currently involved in reviewing and evaluating this version of the code that we

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delivered in mid-March. We hope by early summer to have completed the development and refinement of that code and turned it over for the sensitivity analyses and importance analyses that will be conducted not only by your staff here at White Flint but also by Center staff members.

COMMISSIONER MCGAFFIGAN: Is this code available to the public, if somebody at a university wanted to be looking at the same sorts of issues?

MR. PATRICK: The code has not yet reached a point where we have put it under version control and have

solidified it as a code which we would be comfortable I think either from a regulatory perspective or technical perspective in releasing it. The specifics with regard to release I would defer to NRC management on what their plans might be there. We did not release TPA version 2, but 3 I guess we've not discussed.

MS. FEDERLINE: That's correct, we've not made a final decision, but our general policy is under our procedural agreement that we would share the code with interested parties.

MR. PATRICK: I would note in an allied area there are other codes, detailed system-level codes, which we have completed development on, developed user's guides. NRC has made decisions on a case-by-case basis to release those to the public or to allow the Southwest Research Institute, the

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Center, to copyright those and make those available. Regardless of which path is followed, there's a provision in the copyright that allows any party to the NWPA to gain free access to that code, as well as your staff to have access to it. So that is a part of the puzzle that we have worked, but the total system.

Touching on that first bullet on slide 16, we feel that in addition to its purely technical role, the total system performance assessment code and the analyses that we do with it fulfill some very important decision-aiding processes. It's a tool box in that sense. It has enabled us to and continues to enable us to reevaluate the importance of the various technical issues that are under consideration. It's the only tool we have available that allows us to do that in a quantitative way, to move beyond the qualitative judgments that we feel confident in making but only reasonably confident until we have made an assessment against risk. It also is providing us with the basis to develop a risk-informed performance base acceptance criteria which appear first in our issue-resolution status reports and which we believe will be instrumental in both development of the standard review plan and also in assisting in the eventual development of a Yucca Mountain-specific regulation.

And finally, it's being used as a very important

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tool to help us develop the methods that we will use to conduct various reviews, starting with a viability assessment and a site-suitability report and so forth on through the construction authorization process.

I've noted here a couple of vehicles that are very important in communicating with the Department of Energy and documenting the progress that we're making as well.

COMMISSIONER ROGERS: When do you expect to have that completed, that work on risk-informed performance-based acceptance criteria?

MR. PATRICK: That is an ongoing process. We anticipate having the first round of issue resolution status reports completed late this calendar year or early next calendar year is the current schedule I believe that we're --

MS. FEDERLINE: Yes.

MR. PATRICK: We want to have information in DOE's hands about six months before the viability assessment comes in. And with the current resources and the current schedule we're working to and realizing that this is all being pushed by the development of the TPA code as well, that's -- I

think we can make that kind of a schedule.

Slide 17, please.

Turning now to some general views on the DOE program at this point, and I'll try to focus primarily on

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technical issues, but there are always programmatic implications to those. I would say that our most important observation is that there has been a very clear improvement in DOE's overall program management and planning process. An example of that was alluded to earlier, where we're seeing a flexibility to reallocate resources. As they did some of their performance assessments and began to realize the credit that they would need to take, want to take, for mixing in the saturated zone, they have now directed resources to examine in better detail how the saturated zone behaves in the vicinity of Yucca Mountain, and we're very pleased to see that sort of responsiveness.

Likewise, I think the communication between NRC and the Center staffs and DOE has improved. That's come about through focusing all of our interactions, having very clear objectives for each of those. I would cite several very important examples. We had an appendix 7 meeting on tectonic processes where DOE, Center, NRC, and State was represented. Very important in terms of narrowing down the very broad range of processes we're examining. The seismic design methodology and the igneous activities technical exchange would be similar examples in that area.

Certainly the completion of the exploratory studies facility has been a major milestone for DOE, and it has opened up in both a figurative and literal way access to

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seeing the geology and allowing DOE to make measurements, not so much in the tunnel itself but in the various alcoves that have been developed. And we continue through the NRC's on-site representatives and through various interactions with the Department of Energy staff and its contractors to follow very closely the testing that they are doing, the designs of those tests, as well as the results that are coming out of those.

CHAIRMAN JACKSON: Is DOE conducting surface tests?

MR. PATRICK: Surface-based testing continues. They've one area that they've reached a conclusion in. They've completed their trenching activities and actually have made a decision to begin backfilling a number of those trenches.

That brings to mind another point of coordination. That was coordinated very carefully. NRC staff had an opportunity to give them feedback as to whether the NRC needed additional information from those trenches before the bulldozers moved in and filled them back in again. So I think it was another area that worked quite well.

Yes, certainly the sea well complex of surface-based testing, looking at both reactive and nonreactive tracer testing at that complex is an important surface-based testing.

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One of the items that we alluded to earlier, just to touch on that last bullet, we've seen substantial progress in the quality-assurance area. This has been an issue between the NRC and DOE staffs from the outset. It's one of the original objections that was filed when the site characterization plan was submitted. We've seen significant progress there in some very measurable areas. They're

developing what they call a binning process, which will help not just in this quality assurance area of applying a graded quality assurance approach, but it'll help greatly in this design process.

And I might note that some of the areas that Mike alluded to earlier, the focus of activities there on DOE's are going to be in the novel areas of design. They, like us, given the constraints that they have, are not going to pay great attention coming into viability assessment. They're not going to pay great attention to things that they believe can be handled in a routine fashion based on existing engineering capabilities within their organization and their contractor group.

Slide 18, please.

I mentioned moving into a brief discussion on four areas where we have made significant progress. The first of those deals with NRC progress and views on this site characterization program. That's the first of the four

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areas I'd like to touch on.

Staff work including some limited field studies, probabilistic volcanic hazard analysis conducted by the Department of Energy and technical exchanges on this subject, as well as a follow-on meeting with the Advisory Committee on Nuclear Waste, have moved us to the position where we are able to reach agreement on the probability of extrusive vulcanism. We're concluding that the probability is low, but not so low that we cannot give attention to the consequences. So there's an issue, a very visible one, where we believe we're going to be able to close that within just the next few months. The issue resolution status report on that is due out the end of November. It's a little bit of additional work that we want to finish up to be confident that we have no further questions at this point.

Development of a model for shallow infiltration is continued through this year, another area that is potentially quite important to performance. In fact, it comes up in the top of the list for almost everyone's performance assessment, because shallow infiltration in turn drives the deep percolation through the repository level, and down to the saturated zone. Interestingly, we're finding considerably higher estimates than were originally conceived, and that is an important finding from the

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standpoint of our modeling, and we're beginning to see confirmation from the results of DOE's testing in that particular area.

I note here and I mention it because of a question you had raised earlier, Chairman, with regard to the sorption area. We have completed some work in that area, and have translated or transferred a critical portion of the sorption studies into the performance assessment area, so that what we learned experimentally before the research program was consolidated and the activities at the Center under sorption were reduced, we've been able to capture that information and develop a module which will be incorporated in the total system performance assessment code. So we will be able to consider the kind of phenomena that I mention here, importance of pH variations, for instance.

And again, just the last bullet, we've touched on that a couple of times with regard to their flexibility in bringing in additional studies.

Now the second bullet on this chart 18, I'd like to address a little bit further with the figure that is shown on chart 19.

COMMISSIONER ROGERS: Before you go to the next one --

MR. PATRICK: Certainly.

COMMISSIONER ROGERS: How do the third and fifth

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bullets relate to each other, the chlorine-36 measurements that come from fracture flow presumably and your shallow infiltration models?

MR. PATRICK: We have not --

COMMISSIONER ROGERS: How do they relate to each other? Are they totally disconnected?

MR. PATRICK: No, they're not disconnected at all. In fact, I would say that from chlorine-36 information gives very keen insights and confirmation of what the shallow infiltration studies show, namely that infiltration is not homogeneous across the mountain. No one expected it to be purely homogeneous, but we're finding that there are combinations of surface cover, vegetation, and so forth which seem to -- as well as fracturing, of course -- which seem to enhance the infiltration.

What the chlorine-36 is saying is not only is there enhanced infiltration in those areas, but that enhancement continues to depth. The moisture is not sucked back into the matrix, at least in some locations where the chlorine-36 information indicates rather short groundwater travel times. So they're very, very closely related to one another, and we're considering them in that integrated fashion.

If we could take a look at the figure then on slide 19.

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A and C gives you a picture of a sandbox model, an inglorious name that is used for a very sophisticated physical analog technique. I believe the Chairman and Commissioner Rogers may have had an opportunity to see that on their visits at the center in the past. I don't recall whether it was up and running at the time.

CHAIRMAN JACKSON: I saw it.

MR. PATRICK: But it was through that type of modeling work as well as what has been learned in the trenches through DOE and its contractor studies that we were able to sit as a group in an Appendix 7 meeting in a very open forum and discuss as professionals the variety of models, more than a dozen, that were on the table at that time and talk about an efficiency factor that Margaret Federline was mentioning earlier.

We were able to zero in on less than half of those models, four or five depending on the way you want to count them, that seemed to be most supportable given the wide variety of data that is available from the site as well as these confirmatory kinds of studies with the sandbox models, which give us insights into how these processes play out over time.

You can see -- there are a variety of little symbols on there I don't have time to go into in detail, but you'll note that we find, for instance that there are -- the

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BF stands for -- there are boundary faults which align the edges of the basin and they can be controlling factors in the dominant seismic risk that exists at the site.

There are faults which develop at some point in

the development of the basin but become inactive as time goes on. That's very important to know from a design perspective as well as from a performance assessment perspective in the very long term.

This kind of physical modeling has been very, very helpful in leading us closer to issue resolution, and we anticipate publishing an issue resolution status report in this area as well in the next year.

Slide 20, please.

Moving to the engineering area from site characterization as part of the closeout activities in the area of container life and source term, we have taken the repassivation potential model that was developed under the experimental research program and worked within the licensing program a little bit later on, and we've incorporated that into the total system performance assessment code. We're trying to, in these areas where there have been restrictions, to harvest what was able to be learned in those early years, and I think we're being quite successful in doing so.

Another design related area where we encountered a

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little bit of a good news/bad news situation is in the third bullet there. We did some benchmarking this year. We wanted to understand whether there were any areas of disagreement between the NRC and the DOE staffs regarding the kinds of computer codes they were using.

The good news part is that we found we had very good agreement as we went through that benchmarking study. The bad news part is that there has been some laboratory work and field studies done that indicate that those equivalent continuum models, as they're called, may not be adequate for capturing some of the details, details, for instance, like nearby dripping from single fracture such as what we see documented in the Chlorine 36 data.

So that's an area where we believe some additional work is going to be needed before we can close that particular issue.

As I've noted before, we're seeing some improvements evident in the DOE design control process, and it appears at this time that their design control process is adequate. We'll be continuing to monitor that. We in this case will be Mike Bell's staff. The center has no longer any tasking in this particular area. So they will be monitoring that with in-house engineering staff.

The staff continues to evaluate DOE's testing program as well. The thermohydrology testing area is one

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that has caused concerns in the past. We again have had open dialogue in this area, and it's my understanding that rather shortly, DOE will be replying to a particular set of comments that we sent out with regard to the degree of heating, the spacial scales of their testing and so forth, which could be important from the standpoint of understanding the processes that are taking place. Those processes in turn have to be accurately reflected in the performance assessment models so that we can be confident of the results of those determinations.

I would like to touch on that second bullet on slide 20 as we look at the figure on slide 21.

DOE noted in their most recent TSPA a possibility that galvanic coupling could occur between their complex waste packages, waste package configuration where there are

different metals and roughly concentric cylinders around one another.

We factored that into our calculations and did a study, the results of which are indicated here, and a key point, if we were just to look at, for instance, the blue curve there, you'll notice that at a low -- well, that's actually DOE's moderate thermal loading strategy, around 40 metric tons uranium per acre, that you would predict a waste package lifetime on the scale of tens of years for low galvanic efficiencies. But if this galvanic coupling

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efficiency factor has a value something about .08 or so, you get a dramatic increase in the performance of the entire waste package because that outer container acts as a sacrificial anode protecting that inner container.

We wanted to be sure that that phenomenon continued at other thermal loads and I've indicated here for an 80 metric ton uranium per acre case, you would see an improvement in waste package performance from on the order of 2,000, 2,500 years again jumping up to something in excess of 10,000 years based on these calculations.

Now, the big question is, what is the real galvanic coupling efficiency factor? And some work is going to be needed there, both from our standpoint and also from the Department of Energy's standpoint. We envision that some additional calculations to examine how sensitive performance is to this factor will be taking place as we complete the TPA code and do this --

CHAIRMAN JACKSON: That's material dependent also?

MR. PATRICK: Very much so. So the ultimate design in the selection of materials is going to be very important. As I think you're aware, there are many materials in the mix right now, both for the outer overpack and the inner overpack.

The other factor that is critical is whether water comes into contact in the interface, because if there is not an electrolyte between those two materials, this factor is zero, and there's nothing to be gained.

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Slide 22.

A third area I would like to speak briefly to is the total system performance assessment program. One of the early contributions to the program in the total system area was development of timely guidance to the Department of Energy in the area of expert elicitation.

Because DOE is relying quite heavily on expert elicitations, we're interacting with them to ensure ourselves that that Branch Technical Position that was issued by the staff is being implemented in a manner that is consistent with NRC's guidance, not only to be confident that the process is working, but also that the product that that process results in is also working well.

CHAIRMAN JACKSON: May I ask you a question back on slide 21 for a second? You know, given what you just said about the galvanic coupling, and you need a galvanic coupling efficiency that apparently, you know, is larger and larger as the thermal load increases --

MR. PATRICK: Yes.

CHAIRMAN JACKSON: -- is there not a question having to do with the likelihood of achieving that thermal coupling as a function of thermal load?

MR. PATRICK: There can be. I believe that the

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answer to the question is found in a combination of when you

need it, if it is hot enough, there is no water there.

CHAIRMAN JACKSON: That's right.

MR. PATRICK: So galvanic coupling neither works, nor is needed.

CHAIRMAN JACKSON: Nor is needed. Okay.

MR. PATRICK: So for a hot enough repository, this issue will have zero sensitivity. And by the way, you've hit on a very interesting aspect of all of these sensitivity studies, is that you base your determination of sensitivity at any given point on a particular understanding. As that understanding changes, it gets wetter in the repository, it stays hotter and dryer longer, then you have to revisit those things. That's very important.

Anything else on that one?

Coming back, then, following on from the Branch Technical Position, moving into the core of the TSPA program, the Department of Energy submitted total system performance assessment '95, TSPA '95. We conducted both audit and detailed reviews of that TSPA and provided timely comments to DOE, and we're involved in a technical exchange with them to sit eyeball-to-eyeball and hear one another out on those issues.

We raised what we feel are a number of important concerns in areas such as lack of conservatism and

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infiltration. I touched on that earlier. We're now beginning to see a coming together of our thinking there at a higher infiltration level. The role of dilution, waste package failure models and so forth.

We're currently examining DOE's TSPA viability assessment plan, and it appears that a number of our comments have been taken into consideration there. Of course, we're quite pleased to see that, and our view -- you'll hear from DOE tomorrow, but our view is that that's been a significant positive contribution, both in moving us toward issue resolution and also moving the program forward to decision points.

I have noted previously the modifications to the total system performance assessment code, enhancing the process models, revising it to handle DOE's planned drift emplacement and improving the computational efficiency. We've also modified it to include the anticipated dose and risk based performance measures. Those were not present in TPA 2, which was, under the old standard, was a release based assessment of performance.

I've noted that a key thing that has been done is this code is now available to a much broader cross section of staff, both at the center and at the NRC, and I think that's very important to develop that broad user group from an efficiency point of view and also strictly from the

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standpoint of the volume of analysis that we're able to complete within the time that's available.

My observations to this point apply predominantly with regard to how we have influenced DOE's program using this total system code and the total system approach, but I think equally important are the impacts that we've seen internally, and we've touched on those, alluded to those a little bit before. It has helped us greatly to align our key technical issues to DOE's waste containment and isolation strategy.

To your earlier question, Commissioner Rogers, they are not exactly the same, but we have an explicit

correlation between the two, and as issue resolution status reports are published, each one of those will explicitly identify which items within DOE's waste containment and isolation strategy are being addressed by that particular key issue resolution status report.

So that kind of close coupling I think is very important. It's assisting us and we think it's going to assist DOE as well. It has helped us focus our plans on these issue resolution and also on the inputs that are needed to the total system performance assessment code, enabling us to develop a consistent set of data for those analyses and, of course, has led to increased integration and broad participation. Conducting team training goes hand . 54

in glove with the staffs working together in this total system performance assessment area.

The final, the fourth area I would like to touch on deals with NRC staff interactions with the EPA regarding the development of a Yucca Mountain specific standard and the support that the center has provided to aid NRC staff in progressing in that area.

There will be a NUREG document which will be published shortly that contains the results of the supporting calculations that have been done. Three particular areas here that we have addressed are noted. We have evaluated the relative radiological hazard of a repository as time goes on. That has given us insights into what a reasonable period of compliance might be. That was an area that was questioned.

We have used core body equivalent types of analyses to examine that. We've also examined how peak dose is location specific, something that the Academy did not specifically address but which ends up being quite important if one chooses to go to a peak dose determination or standard. And then, of course, NRC policy and public comments are going to need to be considered in this process.

We calculated following the NAS recommendation a stylized human intrusion scenario and found that both the consequences and the probability of inadvertent human . 55  
intrusion were relatively low for a Yucca Mountain type repository design. Finally, we've looked at the relative importance of disruptive events and, not too surprisingly, although it seems to surprise some, as the time period of performance gets longer, those take on an ever-increasing role.

CHAIRMAN JACKSON: Repeat what you said about the calculated effects of human intrusion.

MR. PATRICK: Based on our calculations, the probability and the consequences of inadvertent human intrusion are relatively low, quite a different conclusion with regard to probability than, for instance, WIPP would decide, and that has a lot to do with the relative area containing waste with regard to the total target area that a driller could intersect.

CHAIRMAN JACKSON: I see.

COMMISSIONER ROGERS: The next bullet after that, the relative importance question, is that just simply that the longer you wait, the more events you're going to have or --

MR. PATRICK: Exactly.

COMMISSIONER ROGERS: -- or is there anything more --

MR. PATRICK: No. It's, again, it's intuitively

obvious once it's brought to one's attention, I guess.

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The interaction --

CHAIRMAN JACKSON: That's what intuitively obvious means, right?

[Laughter.]

MR. PATRICK: Intuitively obvious, but you have to prove them often.

The interaction between EPA and NRC regarding the NAS recommendations -- NRC staff has been in frequent contact, up until just a few months ago, with EPA. I think the general assessment there is that we have general agreement on the approaches that they are suggesting, things like the 10,000 years being a reasonable time period for a standard, using an individual dose, stylized treatment of human intrusion, definition of the critical group and so forth, but there are a few critical issues, two in particular, and we've mentioned those already and I'm sure those will continue to be points of discussion.

The final item, one that we've touched on just briefly, is we have begun examining options for a risk-informed performance-based regulation, and staff will be coming forward to you with a Commission paper in that particular area, and we anticipate supporting those activities.

COMMISSIONER DIAZ: Is that going to happen this year or do you know what's the time table for that

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performance-based rule -- you know, when?

MS. FEDERLINE: We will be getting up to the Commission in early fall with an options paper, and assuming you provide us guidance, we would intend to begin at that point.

MR. PATRICK: If there are no further questions for me, I'll turn the floor back over to Margaret Federline.

MS. FEDERLINE: Yes. I just wanted to emphasize three points in summary on slide 24.

We feel that feedback and interactions with DOE have resulted in significant progress, even at reduced budget levels for both agencies. We've demonstrated that focused interactions can result in agreements and improved understanding of differences, and we believe that this is going to be key to making reasonable national decisions about a waste repository.

I would also like to emphasize that enhancement of both the NRC's and the Center's total system performance capability have been fundamental in achieving this progress. The experience that the staff has gained in being able to focus on a system's perspective rather than a disciplinary view is key to determining when enough is enough in terms of data and when bonding is sufficient.

The final -- I would also like to emphasize that maintaining the infrastructure is key here. In order to do

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the calculations, we need to maintain the equipment and software that enables us to do those calculations.

Finally, I just wanted to note that future funding is uncertain and we believe that keeping pace a national program depends upon obtaining funding at higher levels.

CHAIRMAN JACKSON: Thank you.

Commissioner Rogers?

COMMISSIONER ROGERS: Well, just on that last slide, our total system performance assessment capability,

have we slipped in that?

MS. FEDERLINE: No. I think we have made significant improvements in that area. We have -- between phase 2 and phase 3, we've added some significant additional conceptual models allowing us to look at two conceptual models in the thermohydrology area. So there really are some significant enhancements in terms of being able to look at repository performance.

There are also significant enhancements in the simplicity of the code and the ability for multiple people to use and benefit from the code.

COMMISSIONER ROGERS: Well, the capability involves not only the codes and the hardware, but also people.

MS. FEDERLINE: That's correct.

COMMISSIONER ROGERS: Have we been able to

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maintain our staffing level there?

MS. FEDERLINE: Well, I think it's fair to say that the staffing level has been reduced, but we feel we're spreading the experience within the staff that we do have. So I think there is more of a focus that performance assessment is all of us, it's not one unique aspect.

COMMISSIONER ROGERS: That's all I have.

CHAIRMAN JACKSON: Commissioner Dicus?

COMMISSIONER DICUS: No, no questions. Just thank you for your presentations.

CHAIRMAN JACKSON: Commissioner Diaz?

COMMISSIONER DIAZ: I would just comment on the idea of funding and the issue of closure. You know, this program is completely starved for providing closure on a series of issues, and it might very well be that closing some of those as early as possible would be a very, very good impetus to the program.

CHAIRMAN JACKSON: Commissioner McGaffigan?

COMMISSIONER MCGAFFIGAN: I would like to raise one question that's slightly off the subject, but there was a separate large computer effort relating to public involvement when we got to the licensing stage, and I forget the --

MR. PATRICK: LSS.

COMMISSIONER MCGAFFIGAN: The LSS, the licensing

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support system. Thank you.

My judgment when I first looked at that was that you had already reviewed it, it was gone, but it was one of these systems which was going to be typical of the federal information system, was going to be obsolete before arrival.

You're now looking at something different. That's a different group of people that are doing that? And how is that budgeted? Is that budgeted within the DOE high level waste budget and they basically, you know, have to design the system to whatever standard we ultimately give them?

MS. FEDERLINE: DOE is responsible for the operation of the system, but we must budget to -- audit to ensure that the documents and to certify -- I believe in part 2, there is a certification role for NRC to assure that the documents have been properly entered.

COMMISSIONER MCGAFFIGAN: And so that's a future budgetary issue for us. And relatively small or --

MS. FEDERLINE: Let me ask John --

MR. GREEVES: John Greeves.

MS. FEDERLINE: John Greeves is the steering committee member.

MR. GREEVES: We participate with IRM on this issue and I think if you look at our current budget, you'll see it's running something like 1 FTE and 100K for the next few years.

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There's always this debate about when is LSS going to really happen, and what's been going on in LSS territory is all the groups have recognized that an Internet-based approach is on top of us now. There is no point in going with this old approach that will be this megasystem that will cost a bunch of dollars and is housed by DOE solely. So we've talked with all the parties about an Internet-based approach and it's been running on what I call a small budget.

So I think the crunch on this is going to come and I believe IRM put numbers in '99 where it just depends on what happens to part 2. Are we going to switch to an Internet-based approach where each party, like NRC, puts all of our documents up on the computer, makes them available on the Internet -- by the way, we have that capability now; we have a test case that exists -- and whether all the other parties would do the same thing. It would be obviously much more cost effective to do it that way.

I think the knotty question is what will IRM have to do in terms of auditing something like that and I think out to about '99, it's not a big budgetary issue, but the last number I looked at does become significant in '99 if IRM has to do this audit process in terms of hiring a bunch of people or a contractor to do it.

So I think it's probably worth your time to talk

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to us separately on that topic, but right now, it's pretty much a level of effort and we're working with OGC on looking into how this would be accomplished with part 2.

CHAIRMAN JACKSON: Okay. Thank you.

I have one last question for Dr. Patrick.

Are there any of the activities in which you've been engaged or are currently engaged that have any potential fungibility in terms of being applicable to an interim storage facility?

MR. PATRICK: I believe so, particularly in the engineering area, both in material sciences and also in the staff that has supported what we call the repository design, construction and operations group.

In fact, interestingly, those who crafted the original request for proposal for establishing the center included monitored retrievable storage under the repository area. So skills and civil engineering and structural engineering, material sciences, corrosion issues and things of that nature, as well as seismic risk and the like, those are areas where I think there's quite good fungibility. That is a relatively small percentage of our total staff, but those skills are available.

CHAIRMAN JACKSON: Okay. Thank you.

Well, the Commission would like to thank you, Dr. Patrick, and the NRC staff for a very informative briefing.

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The information you presented us provides us with a perspective on where we are and the challenges the NRC's program faces and the Commission commends you and commends you and the Center for working through these issues in very difficult circumstances, yet developing and maintaining a credible program, and needless to say, what you've presented

will be useful in our future considerations.

I just want to make a comment. If you flip back to your viewgraph 5 and we look at the -- you know, the DOE budget has been itself buffeted, but if we look at the NRC and DOE repository funding levels and if we look at where we were in FY '95 relative to our request, or even where we were in FY '97 where we used 3 million carryover, that the DOE budget had gone below the dip it had earlier by a factor of about 15 percent, and a 15 percent, if we were assuming the same kind of a scaling, from our funding level would have put us at 18.7 million in appropriated funds from the Nuclear Waste Fund.

The point I'm making is that I think we all know and it gives me the opportunity for the public record to say that the issue of our keeping pace with the national high level waste program at a level commensurate with the responsibilities that we have and with additional responsibilities that we may be asked to have is a very, very serious issue.

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It is one that I, in fact, did speak to at the congressional hearing on the high level waste bill pending in the House. It is one that you should know that the Commission has not lost sight of, will not lose sight of and, you know, we intend to fight this issue, because there is no way we can do what we are asked to do in the law if we don't have the money to do it. That kind of simplified comparison shows the level of difficulty that we have.

So the Commission requests that you keep us informed, you know, of the progress and we'll have to stay on top of it. We look forward to hearing from both the staff and the Center on this important issue.

We're adjourned.

[Whereupon, at 2:59 p.m., the briefing adjourned.]