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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE

(ACNW)

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162nd MEETING

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THURSDAY,

AUGUST 4, 2005

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ROCKVILLE, MARYLAND

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The committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Michael T. Ryan, Chairman, presiding.

COMMITTEE MEMBERS:

MICHAEL T. RYAN, Chairman

ALLEN G. CROFF, Vice Chairman

JAMES H. CLARKE, Member

WILLIAM J. HINZE, Member

RUTH F. WEINER, Member

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JACOB PHILIP, Office of Research, NRC

PRESENTERS:

LES DOLE, Oak Ridge National Laboratory

EDWARD GARBOCZI, NIST

DAVID KOCHER, SENES, ACNW Consultant

ANNE SMITH, Charles River Associates International

VERNON ICHIMURA, Chem-Nuclear Systems

CRAIG BENSON, University of Wisconsin

RANDY POSTON, WDP & Associates

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

12:49 p.m.

CHAIRMAN RYAN: All right, it is the appointed hour, and we'll come into order, please, and we're on the record. We're scheduled for a briefing, and I'm informed that even though the calendar says 12:45 to 3:45, we probably won't use that entire block of time, but we'll certainly have plenty of time to discuss with staff the status of repository design issues. And I believe Tim Kobetz is leading us off. Welcome Tim and colleagues, and we appreciate you being with us today. Thank you very much.

MR. KOBETZ: Thanks Mike. Yes, I'm Tim Kobetz. I'm the Senior Project Manager in the Office of High Level Waste Repository Safety. It's responsible for all the pre-closure activities, and that includes making sure that the staff's prepared in the event that a potential LA would be submitted for our review.

CHAIRMAN RYAN: Tim, I'm sorry, just one minor comment before we start. If I could ask the folks on the other end of the videoconference, if you could create a sign-in sheet, please, and provide that either by fax or something to Mike Lee, that would be helpful for our complete record. Thank you very much.

Sorry Tim.

MR. KOBETZ: Okay. But what, you know, I appreciate you inviting us here today. What we want to do is provide to you an overview of what we're doing to prepare in the event that the LA does come in and we need to review it. So we're going to go through basically the regulations, all the way through some of the independent evaluations we're doing.

Before we go on I want to go ahead and introduce Mike Waters. Mike's our Senior Systems Performance Analyst that's responsible for pulling the whole pre-closure safety analysis together, our review of it. And Mahendra Shah, who's our Senior Structural Engineer. And Mahendra is responsible for ensuring that our review of all the surface facilities is adequate to support Mike's review of the PCSA. As you know, we do have some people on videoconference. That's staff in the Center who's very integral to our pre-closure teams.

We're not going to discuss a lot of technical issues in detail. Certainly if there's something that you find interesting and you want more detail on, we can set up a future meeting when we're prepared and we have enough information that we can make it meaningful for both sides. So like I said,

we're going to go through the regulatory framework of Part 63, specifically how it applies to making the decision for 63.31, which would be of grant a construction authorization if we were to receive the license application. We're not going to focus on the parts of the decision that deal with, you know, physical protections. We're focusing on making the safety decision here today.

We're going to talk about staff challenges associated with performing this review, because as you know this is really the first performance-based, risk-informed review that the staff's done, and it's very different than doing a deterministic review. And in reviewing some of the information in your April meeting I guess with Department of Energy, I think you find yourselves kind of going into the deterministic mode in looking, well, what's the general design criteria, or what are the design-basis accidents. And we don't have that kind of thing here. So there's a certain amount of challenges involved with that.

We're going to talk about how we are preparing the staff, the teamwork that we'll pulling together to make sure that everyone's ready. We're going to talk about the pre-closure topics that we're pulling together, the things that we think we should

focus our attention on until the time that DOE would submit an LA, if they do submit it. We're going to talk about some independent staff evaluations that are being performed both here and at the Center to prepare us, because there's a certain amount of confirmatory analysis that we would do with any license application. We're going to talk about some of the stuff that we're doing with that.

We're going to talk about some of the past interactions we've had with DOE, some of the technical exchanges, what we've tried to get out of that, and where we're going forward with those. And then we're going to talk a little bit about the essential elements of design. And when we say that, we mean those elements of the design that are going to be required to support DOE in performing a pre-closure safety analysis that would demonstrate compliance with the dose objectives of Part 63.

Okay. I'm going to start out with Part 63. I'm going to talk briefly about two regulatory decisions we would have to make, the first one having to do with whether or not to grant a construction authorization, and then the second one in the event that we did grant a construction authorization, the decision whether or not to grant a license to receive

and possess high-level waste.

The first one, 63.31 really focuses on the design of the facility. You know, will the design -- or can DOE demonstrate that the design is sufficient to either prevent or mitigate the event sequences that they've identified as items important to safety, and then can demonstrate that the regulatory requirements, the dose objectives can be met. We expect all of the design that we would need for them to demonstrate that in the license application when it first comes in. We would not expect to have to be receiving other design information after we've made a decision whether or not to grant a construction authorization. If a construction authorization was granted, that's when we start performing inspections, and follow-ups, and things like that. Are they taking what they stated in the safety analysis report, and we documented in SER, and are they adequately transferring that design into the facility? Are they building in accordance the way they said they would? Are they procuring material the way they said they did? Are they fabricating waste packages the way they said they did? And then there's a point at the end where they would have to prove operations through pre-operational testing which is required.

So, with that, 63.31, and the part I'm going to focus on today like I say is safety. It's not going to get into some of the other, the quality assurance and things like that. But it requires that DOE describe the proposed geologic repository in accordance with 63.21. And that you take the design as it's described, and that you demonstrate through a pre-closure safety analysis that you've identified the appropriate hazards, that you've identified initiating events, that you've identified the event sequences that your design can prevent or mitigate those event sequences such that you still meet the dose requirements of 63.11 for Category I or Category II events, and that then can be used to identify those items that are important to safety.

Now, one of the things that I think people get caught up on is you'll read in 63.21 that the safety analysis report must include a description and discussion of the design of various components of the geologic repository operations area and engineered barrier systems, including dimensions, material properties, specifications, and analytical design methods, and it goes on and on. And we had a lot of discussions as I'll talk about near the end with DOE on what that means, and what we're looking for there,

and what the regulation is requiring more specifically. Because just to say we need dimensions, we need materials, that doesn't help a lot. We have to tie it into performance. Again, this isn't deterministic where we can just say design it in accordance with this general design criteria and we'll review it, you know, our engineers will review it and perform these accident analyses based on design-basis accidents. No, they have to demonstrate compliance with the regulatory dose requirements.

So what does that mean? That kicks them in, then, from 63.21 into performing the PCSA. What we're going to need is sufficient design for them to perform an analysis in accordance with 63.112(e). The analysis has to demonstrate the ability of the structure systems and components to perform their intended functions, assuming the occurrence of event sequences. We're going to need that at the time of LA to perform our review. We don't intend to look at information, design information after construction begins, unless it changes for some reason which we understand in any construction process designs can change for a number of reasons, or new technology might come out that is better intended for the function that they want to provide. But we're not

intending to look at, you know, confirmatory analysis in that. Everything that they need to confirm that that design is going to operate the way it's intended to needs to be provided in the LA up front.

So what kind of challenges does that bring up to us? Well, like we say, this is a first of a kind activity for a couple of reasons. One, it's the first risk-informed performance-based regulation, and we've already talked about that as far as deterministic. So we have to get our minds set in that. And then also there are new facilities, or things that we haven't licensed before, such as some of these subsurface systems. You know, the transporter, the locomotive that would move the transporter down into the tunnel, the emplacement gantry. So there's things that we have to look at from that standpoint. There's some things that, you know, we've moved fuel, or we've licensed the movements of fuel for a number of years. There's certain other challenges still there with the risk-informed, but some of that we've done before. DOE's design is evolving. From the time that I've been here a couple of years we've seen different things. The HVAC system going from important to safety, to not important to safety, to important to safety for

various design reasons, whether they're finding new methodologies, or better methodologies, or whatever. But that certainly presents a challenge for us in that if we review something early on, it may change, and we have to go back and rethink, well, are we really still looking at the most important stuff now.

And then the integration of information between staff. And this is extremely important. This is where we really need a team. Again with deterministic, you know we have a team of engineers, but you have engineers that might review certain structures, certain systems, certain components. But here we have to integrate information. We have to integrate information about the site characterization to build the hazards. We have to integrate information dealing with the design to identify internal hazards. We have to take that and be able to integrate that with the safety evaluations that they're performing, with the event trees. We have to take that and integrate it with the design, and then make sure that the consequence analysis are reflecting all that, and that we're identifying the right things that are important to safety. We also have post-closure and pre-closure. There's certain things that are going to be done in the post-closure world that

are going to affect post-closure, such as with the waste package and that. So we have to integrate information that way. That's a new challenge. And then we also have the integration of information with the Center. And that's important because that's where a lot of our technical expertise is. And we've all worked with contractors, but I don't think ever on such a large scale with such a long distance. Yes?

CHAIRMAN RYAN: Quick clarifying question there. I agree with you, I think that integration question is probably where the committee's focused a good bit, and it seems -- and I'm just going to say what I think here talking about is that you sure want to avoid stove-piping there, you know, the HVAC folks versus the electrical folks versus the mechanical folks. And that's where you identify maybe more subsystem and system questions that could be -- interactions and, you know, other kinds of perhaps failure modes, or fault trees, or you know, other kinds of things. And that is probably -- I mean, you're saying that's your biggest challenge, I think we would agree. Are we understanding that right?

MR. KOBETZ: Yes, you are.

CHAIRMAN RYAN: Okay.

MR. KOBETZ: Yes, you are. Yes. This is,

you know, I've worked on a lot of licensing projects and that, but this is the one that I've had to focus the most team-building.

CHAIRMAN RYAN: Sure.

MR. KOBETZ: You know, trying. Because we have a large number of people from a variety of places and that.

CHAIRMAN RYAN: Yes, and conversely somebody may be a knowledge -- or an engineer in a particular discipline and think something's very important, and it may or may not be important to safety. So it's kind of a two-way question I think, and I guess my view of it anyway is the unifying kind of principle is it's a system. I mean, it's got to work as a system. Fair enough? Okay.

MR. KOBETZ: Yes. You're absolutely right. Okay, so what have we done for this team-building and that? Well, we've established some different teams within the pre-closure team, and the pre-closure team's over-arching, but we have a performance assessment team which Mike leads up. We have an engineering team which Mahendra's involved in. We have site characterization team which overlaps with post-closure, and then we have a health physics team. Now, we have a lot of team meetings, you know, which

really aren't technical in nature to make sure we all understand everyone's expectations. We've had a couple of things, actually three of them, I guess, that we call mega-meetings, where we get together with the Center, and we sit down for three days, and we just talk about what are those challenges, some technical, but others just in communication, setting up databases, making sure that we control an SER when we're writing it, and there's just one version of the SER, and people aren't emailing things back and forth and like that. And then the real technical work gets done by the team leads, and you know, underneath engineering we have sub-team leads where you have things for the surface -- one for the surface facilities, one for the sub-surface facilities. Then -- well, and I already talked about the integration of the teams with both NRC and the Center, and the challenges there. So far it's been working real well, but you know it's something you have to keep pushing at.

So what are we doing now that we've got these teams integrated and we're meeting and that? Well, we're trying to develop what are those things that are risk-significant that we should focus our attention on between now and LA. You know, what is it

that we need to find out the most information on, or that our resources are best spent on looking at? So we've used our backgrounds. You know, we've got a lot of operational experience, licensing experience, engineering experience. A lot of that is deterministic, but we also have performance assessment experience that we're pulling in. We've incorporated what design information and that we have been able to understand from DOE, or you know at least as the baseline, or as it changes. And then we've performed some visits to relevant facilities, and that's kind of an integral process. As we identify things, we identify maybe another facility to look at, which then identifies something else that we want to continue to, you know, something else we pull into the picture.

Since we have limited time we're obviously focusing on the hazards and event sequences that seem to be the most significant, you know, a higher probability, or higher consequences associated with them, and that provide probably the greatest prevention or mitigation of event sequences, such as shielding walls for the hot cells, you know. I mean, they're pretty important for seismic and for aircraft hazards. And uncertainties, and that may not be the way that you think of uncertainties, but it's what is

it that we don't know about this type of facility that we should focus on, you know, from industry experience and that.

So with that we developed -- we started out and we developed about 28 - 30 different topics that we wanted to look at. Now, that's a lot, and we wanted to be able to better focus, you know, what do these areas really mean so that we don't have -- we're not redundant, we're not repeating ourselves in some areas, and we can converse easily with stakeholders and with DOE on, you know, where we think need to focus our attentions, and what we think appears to be some of the more risk-significant issues. So I'm going to talk briefly about these, and if there's anything here that you may want to discuss like I say in the future, as we go on, we'll talk about the technical exchanges we're doing, our path forward, then we can talk about it at the end of the meeting or whatever, and highlight that. But the aircraft crash hazard and event sequences, this is something we've had quite a bit of dialogue with DOE on. We started I think even before September 2003 when I sat in on a technical exchange. At that time it appeared to DOE they could probably look at the probability, and it was beyond a Category II event sequence, and they

wouldn't have to perform any sort of design analysis. That's changed over the last year and a half or so, and now they're using a certain amount of probability, and a certain amount of taking credit for system structures and components with the robustness to withstand impacts and that. So this isn't just a probability issue, it's also an engineering issue that we're working with them on.

And the same goes with site characterization and event sequences. What we're focusing on here are the seismic events and the ground characterization and that, but also the structural integrity of the walls and things that would be required to prevent or mitigate event sequences. Spent fuel source terms under normal and accident conditions. We're looking just what are they using for their spent fuel source terms, and are they taking into account things like oxidation which you may have heard about is, you know, handling the fuel in air. Is that an issue? Is that something that we should focus more attention on? How is DOE handling that?

Performance of surface facility mechanical systems. And I'm going to talk about surface facility and sub-surface facility, and just kind of tell you our views on how we look at these systems, and what

we're trying to glean. You know, we sort of break them down into three categories. And this isn't, you know, in the Yucca Mountain Review Plan or anything, but it's a way for us to understand when we can take credit for certain codes or standards, and when we need to look at something more deeply, and the way they're using and applying codes and standards. First you could have a crane. You know, cranes have been used in the nuclear industry and other industries for a long time. There's a lot of data out there on how it performs and that. So if they are going to design it in accordance with certain codes and standards, and they show that data, that may be sufficient for our review. Then there's other system structures and components, such as HVAC systems that are built out of components, which all have certain reliability figures, have all been used in the industry, but in different configurations. That we might have to look at a little closer, make sure that that system is going to perform the intended function that it needs to. And then we have the things that we call unique, or DOE refers to as non-standard equipment, you know, an emplacement gantry. You know, there's none out there right now, but they're going to have to design it, or at least portions of it to perform its intended

function during an event sequence, whether it's a runaway, or whether it's preventing a drop, whatever it is. Now, are we going to have to review the design of the whole emplacement gantry? No. We're going to focus on those things that are important to safety, that are used to prevent and mitigate the event sequences, things such as if it is a runaway, and this could apply to the train or to the transporter, what codes and standards are they using to demonstrate the reliability of braking systems, of coupling systems. You know, how are they using that to demonstrate reliability. Because when you're performing an event tree, you know there's something that's either going to prevent it, or there's some probability that it's still going to fail. We know that through all of engineering, that there's always some probability that something's going to fail. So we have to understand what are those reliability values.

CHAIRMAN RYAN: Just to push that a step further, you could even think about as you described it, there's probably a pretty fair knowledge that such a transporter could be designed to bear a certain weight and load. That's pretty straightforward, and so that aspect of it could be a fairly routine part, versus the runaway and then anything that might

involve the package and the fuel thereafter would be the unique part. So I guess what I'm asking is I kind of suspect that in any one of these things where you're seeing something unique, it's probably made up of a hybrid of parts that aren't so unique, but maybe used in a unique way, or part of a unique system. So you're really starting from scratch, and are you challenging those more routine aspects now that it's in a new environment and so forth? Is that also on the table?

MR. KOBETZ: I'm not sure what you mean by "more routine." We are challenging the use of certain codes and standards, you know, in ways -- or if they're being applied in ways that maybe aren't the way they've been applied in the past.

CHAIRMAN RYAN: Fair enough. You've answered the question.

MR. KOBETZ: Okay.

CHAIRMAN RYAN: So you are starting with a clean sheet of paper. As you look at something, it may have some standard components and some new uses.

MR. KOBETZ: Absolutely.

CHAIRMAN RYAN: And you're challenging all of it in that setting.

MR. KOBETZ: Absolutely.

CHAIRMAN RYAN: Okay, all right, thanks.

MR. KOBETZ: Okay, so that's the mechanical SSCs. Criticality event sequences is something that we want to make sure we understand well. Aging facility performance. You know, you probably saw our October 8 letter, and we'll talk about that a little bit, but we need them to supply a sufficient amount of design information so they can show, or they can demonstrate that if they do have an aging facility, and it is integral, and it needs to be used, that it can withstand whatever event sequences. You know, we would need that much information.

Pre-closure safety analysis, and that's kind of looking at the methodology. You know, do we agree with how they're identifying hazards, how they screen them in or out. Do we agree with their event sequences, you know, do we think that there's any other hazards about their event sequences that can go on. How are they taking that information in performing their dose calculations and that. And then the licensing process, that's really focusing on things like if we were to grant a construction authorization, what would it look like, you know, what kinds of conditions and standards -- conditions, I guess, in the construction authorization -- would we

expect to see in there, or do we think we should put in there. And then we take it a step further. In the event that we were going to grant a license to receive and possess, what would that license look like. Because as you were saying, this is kind of a hybrid of several types of facilities. So we want to try to get an understanding. And we want to get an understanding of that early because that does -- as we're doing our review, we want to make sure we're identifying those things that should go into potential tech specs.

MR. THADANI: Mike, may I?

CHAIRMAN RYAN: Please.

MR. THADANI: Tim, how did you develop this topics list?

MR. KOBETZ: Through -- like I said, through experience. Basically through our pre-closure team meetings, through experience looking at, okay, what are those things that appear to, you know, either have the highest consequence, or the greatest probability. And aircraft crash hazards, you know, may be low probability, but it could be a high consequence. The same with site characterization, or like we were saying, for seismic events. Source term. You know, there's kind of an unknown still that we

want to make -- that could affect the consequence analysis or the dose calculations to a great extent. So we wanted to make sure we understood those. So that's the kind of thought process.

MR. THADANI: So this is your best shot up front?

MR. KOBETZ: This is our best shot up front.

MR. THADANI: If you find something --

MR. KOBETZ: And it's from information from DOE also, you know. We don't always agree with what they have, and you know we're going to challenge them this way. Why isn't this --

MR. THADANI: Sure.

MR. KOBETZ: And we'll talk about that even in a little bit.

MR. THADANI: Another question. In terms of -- are you talking about establishing some sort of reliability goals for structure systems and components? I wasn't sure when you said trying to make sure the reliability's maintained and so on, whether that means you -- a la maintenance rule for reactors. Are you thinking along those lines?

MR. KOBETZ: I'm not sure I'm thinking along the lines of the maintenance rule. Again, I

haven't been involved in that in a long time. But -- go ahead.

MR. WATERS: DOE has established reliability goals for several systems to meet the performance objectives. The first step of the pre-closure assessment is categorizing the chance of event. I mean, if you see on first principle levels there's many systems instructors where they assume a certain reliability or design to do so. So that's in part what we're reviewing as well.

MR. THADANI: May I add to that? The reliability goals are dependent on what the initiating event or the hazard is. If you -- you have to have a process event sequence 1 in 10,000 during a pre-closure period. So it's related to that.

MEMBER HINZE: Following up on Ashok's question, I understand you're in the process of developing performance assessment codes for analyzing the safety analysis. Part of coming up with the pre-closure topics of course is to hopefully use performance assessment to identify those things which are most important. And this is an iterative procedure of course. And I'm wondering what's the status of your performance assessment? Have you used performance assessment to really look critically at

these topics or additional topics that might be of concern.

MR. KOBETZ: Mike's going to talk about that in about four or five more slides.

MEMBER HINZE: Sorry.

MR. KOBETZ: No, it's fine.

MEMBER HINZE: Okay. Okay.

MR. LEE: Can I -- I have one question. Tim, this is kind of a follow-up to Dr. Thadani's comment or question. You said you started about with 28 to 30 topics, and then you distilled these into these subject areas that you have here, and you reinforced the notion that you're trying to better understand what DOE's approach might be in a potential license application to document approaches, and assumptions, and design bases, and things like that. A similar approach was used in post-closure, and that led to a number of agreements to make sure that sufficient information would be available on the license application. Just, I'm not trying to steal your thunder, but does that information exist in your judgment, or is this just what you say it is, just to better understand where that information's going to be? Or to reach shared expectation that the information would be in the license application?

MR. KOBETZ: I guess I'm not quite sure of your question. Let me -- can I couch that one also to the end?

MR. LEE: Sure.

MR. KOBETZ: Because I'm going to talk about our path forward, and our interactions with DOE.

MR. LEE: Okay.

MR. KOBETZ: And I think that might answer your question.

MR. LEE: Well, let me just state it a little differently. The understanding is that the application is written, and subject to the, you know, some budget issues and a few other things that DOE's on the verge of submitting it. Now, maybe I'd better wait and see what you have to say towards the end.

MR. KOBETZ: Okay. Okay. I think that covers the topics. Site visits. I think all engineers are touchy-feely people. They like to go out and see the types of things that have been designed in the past and that, and I'm definitely like that. So we've tried to get staff out to as many of these places and different things, and I think you're going to see it's kind of a broad range of things that we've been looking at. And coming back, and again trying to figure out how that works in the review, and

I'll talk about that a little bit. And I believe even in your letter, gosh, was it in 2003 maybe? You mentioned that yes, you should get out and see more facilities and that too. So you know, it's kind of like I say an iterative process. We've taken our topics and looked at what kind of facilities match that. Then we come back from these visits and say, well how does that figure into our topics.

So I'm going to talk first about our visit out to INEEL. And the reason we went out there is because the hot cell at the Test Area North facility is supposedly what the fuel handling facility, the first facility to be built at Yucca Mountain was based on. So we wanted to see, this is a, you know, a one throughput. And we want to look at, you know, the types of radiological controls, the types, the walls, look at the windows, you know, all that kind of thing to try to look at well what are the -- you know, are there any structural weak points here that we don't, you know, we've never licensed before, or we haven't thought about. Looked at fuel movements. Looked at the way the interlocks, and how you move the spent fuel in, and the transportation cask, and that kind of thing. So that was a real eye-opener for -- I shouldn't say a real eye-opener, but it was a good

experience for us, and to just understand the size of these facilities, the types of facilities, and what we would potentially be granting construction authorization for. Looked at, you know, HVAC systems, and that kind of thing.

While we were out there we also visited -- actually let me go back and talk about this. One of the things I didn't -- you know, we did ask them about operating experience out there. Had they ever dropped an assembly. And I guess in the, what, 50 years it's been operating they couldn't recall, anyway nobody there could recall. I don't think they did a record search, but you know they didn't know of any fuel drops. We also looked at the welding and NDE processes out there for the waste package. That's where they're developing those things. And that's important because we had some questions, and I think we still have some questions on the types of volumetric inspections that they can perform on those waste packages when they weld them up before they put them into the mountain.

We also looked at the Idaho spent fuel facility, or got an overview of it. We couldn't look at it yet because it hasn't been constructed. That's a Part 72 facility, but what was important there is

that's where they're taking peach bottom 1 fuel that is stored out there now. They're going to repackage it into canisters that we'll talk about the drop testing on in a minute, that they would then ship to Yucca Mountain. They would take those out, and never open up the fuel again, and put those cylinders into a waste package, and then put that into the mountain. So we would see -- we had a firsthand look at the types of cylinders that they would be actually moving this fuel in.

We went out to the TMI fuel storage, and the reason we did that is because if they do have an aging facility there's two types of casks that they can use out there. They could use a horizontal type cask, such as the new Holmes that is used for TMI-2, or they could use a vertical one. So we wanted to just get a physical -- let people look at, see what it was, and talk about some of the experiences that they had with loading and things like that.

Hanford. We went out to the Hanford facility, and there we looked and we saw the K-basin. We saw the fuel that's in the K-basin, you know, some of the old N reactor fuel, some of the -- the condition it was in. Some of the reason that they just want to put into a cash one time out there and

ship it to the mountain, not have to open it up and deal with it. There's some corrosion products on there that they can't get rid of and things, so they just want to be able to seal it up once. So we saw the types of casks that they're going to be putting that in, talked to them a little bit about drop tests, and things like that. I'll talk about that in a minute. Talked about the welding processes. And we talked about some of the cranes that they used to move the fuel around, to use the canisters around. They're different types than would probably be at Yucca Mountain, but we talked about interlocks, and you know, how you prevent collisions, and things like that. And that gave the staff, especially the performance assessment staff, a good idea of the reliability of those types of things.

We went to the Columbia Generating Station. The reason we went there was they have an ISFSI that uses Holtec Hi-Storm casks. We wanted to see the vertical casks, understanding any potential problems or differences that they might present for storage because that's something else that if they did have an aging facility, and they did use certified casks, and they can show that they bounded the types of conditions that would be at Yucca Mountain through

Part 63 and through the performance assessment, there's certain loading operations that they would have to perform out there. We wanted to get an understanding of that and the types of fuel moves.

You know, obviously Yucca Mountain, I put that on the list because that -- every time you go out to Yucca Mountain, I think you know, I think ACNW probably goes out there every year. I know when I was on the staff I went out there a couple of times. But you get a good perspective, okay, here's the plain, here's where the facility's going to be, you know, and just getting a description. You know, going into the mountain, just getting an understanding so that we can open up a dialogue as to what we think might be important to safety, and what we should look at closer.

The Joseph Oat Corporation. The NRC does observations of DOE audits, just to make sure -- and these are really quality assurance type functions. But in doing so we'll send some of our technical people out there. And in this case we sent some to Joseph Oat Corporation out in New Jersey, and they're fabricating one of the first prototype waste packages. So we wanted to see the challenges that they might have, and you know, working with the stainless steel

for the inner package, and then the alloy 22 for the outer package. And you know, how is it to roll, how is to weld, and that. So we got some firsthand experience on that.

MEMBER HINZE: Were you involved with any of the testing of that, or observing the testing of the canister?

MR. KOBETZ: What type of testing do you mean?

MEMBER HINZE: Well, I understand the Joseph Oat Corporation is doing some testing on the characteristics of their canisters, and I'm wondering if --

MR. KOBETZ: Can I defer that to one of our staff? Al, you were out there.

MR. CSONTOS: Al Csontos. Yes, I've been out there twice. The testing, is that what you're asking? They're just basically fabricating the prototype waste package 21 PWR UCF uncanistered fuel waste package right now. The testing they're doing, they're really not doing any testing other than NDE of welds at the present time.

MEMBER HINZE: Thank you.

MR. KOBETZ: And then we've also gone out to Sandia National Laboratory to watch some drop

testing of the MCO, these multi-canister overpacks that they would be storing. I talked about the peach bottom 1 fuel that they would be moving into basically their 2-foot round, 14-foot long cylinders. We watched drop tests of that, and also of the -- I'm sorry, I got that backwards, I believe. The MCOs are at Hanford, and they're using the N fuel reactor. Then there's another very similar type canister that they're going to be using at INEEL to put the peach bottom fuel in. But we saw the drop testing of that to give us at least some understanding of the types of tests that they did, and if the application came in and they take certain credit for the robustness of those, and we looked at the drop test results and that, we at least also have seen it firsthand. And from what I understand in those dropt tests they compared very favorably to the finite element analysis that they would run before they would do the drop test. Any questions on U.S. facilities? Okay.

And we also sent a small group out to COGEMA La Hague because COGEMA La Hague has done some design work for DOE with the dry transfer facility and the different moving equipment and that. So we wanted to get a firsthand look on what we could there. And what you see in the picture there is on the left the

transportation cask being put in place, a collar being fit up to it, and then if you go to the top right you can see we're looking down at the canister now. That's where they're removing the spent fuel. And then there's the facility to the bottom there where they would then transfer it into -- in their case, they transferred it into a, basically a 9 x 9 storage rack that they would go store in a spent fuel pool until they needed it. And I'll talk about that in a second. But I want to talk more specifically about some of the things we learned there, because it was interesting. At the COGEMA facility they do prefer dry movements over wet, and it had to do with a couple of things. One, the dose is less because it takes less people. There's less radioactive waste. And also there is less heavy lifts that they would have to perform. Now, they can't do all of their unloading dry, and I'll talk about that in a second.

They really haven't had any major events since the newest facility anyway, and that's the one we were focused on, went online in 1986. They have had a couple of fuel drops. They didn't consider them major events because they didn't really see any radioactivity where it shouldn't have been, any radioactive material. But what we did that was kind

of interesting out of those, when you think about fuel drops and that, you think about crane failures. Well, one they talked about they had trouble getting information from the fuel vendor on the fit-up at the top of the assembly, so when they had to make their gripper, they didn't make it properly, and obviously I guess didn't test it properly. But that's something that, you know, just it really doesn't -- you don't think about right away, but now that's something that we're going to have to think about and look at.

The other one had to do with a software modification that was made in 1997, and didn't pose a problem until the year 2004, you know, because there was some testing that was missed. It might have posed itself earlier but with experienced operators they would understand how to work around the problem. And when somebody would actually, in this case, you know, had the problem and kept following the procedure, that's when they got into trouble. You know, I thought that was kind of interesting. They lived with a workaround for awhile.

They unload about 12 different transportation casks, and this is why we say they have to have some wet unloading, also for some damaged fuel, because as we pointed out in the previous slide,

the fit-up collar, they don't have fit-up collars for all the transportation casks that come in. That's something that we would have to consider when they're talking at Yucca Mountain about the types of transportation casks that would come in, and we'd have to look at, you know, gee, can they accept all this fuel. Can all those casks be used at the facility.

CHAIRMAN RYAN: Tim one -- just a question while you're talking, and it's come to mind based on several of the points you've made where there's lots of variables, and lots of new stuff. How does the human reliability assessment come into all of this?

MR. KOBETZ: That's a good question. That's one we posed to them on our last technical exchange, and we need to follow up with them.

CHAIRMAN RYAN: Okay.

MR. KOBETZ: I mean, that's been specifically put into I think the pre-closure safety analysis technical exchange.

MR. WATERS: Yes, and just to add, the regulations require human induced hazards to be considered, and we did pose that question, how they considered inter -- and human interactions. And DOE has committed to get back to us on that in a future meeting. This is something we'll look at, and of

course the reliability as well.

CHAIRMAN RYAN: The second part of that of course is, you know, you're going to have some assessment of that going in, and then as experience and, you know, training and experience develops, and people begin to get, you know, real experience under their belt, is there going to be a process where you reevaluate that? I mean, how is that going to be incorporated into the institutional wisdom?

The reason I'm raising that, you might say well that's after we grant an operating license, that's going to be something down the line, but now's the time to think about that. For example, if you design and construct yourself into a corner, I can tell you several examples where there's not enough head room to do the lifts on the new casks in the new liners where there used to be in the old days, things of that sort. So how do you develop that thinking about margin, and variability, and all that? Have you thought about that? I mean, that's a step that I'd add to my list. How are systems, and processes, and components going to evolve over time perhaps as experience builds. And can you make a change? Are you locked in to designs? That's just something to think about. I'm sure you don't have an answer to all

that, but that would be kind of -- I mean, how do you make this kind of a circular process rather than a straight line.

MR. THADANI: This would tie in with the use of digital technology also. You talked about some software problems. The man-machine interface issues should probably be considered up front.

MR. KOBETZ: And I would agree with you on that, and that's something we haven't focused on a lot yet, but that's something that we have discussed to some extent.

CHAIRMAN RYAN: Yes, and thinking about your nine or so bullets, maybe these two are additional bullets to at least have on everybody's radar screens and thinking about these things.

MR. WATERS: I think that's a point very well taken. We have actually quite an expertise on our staff to deal with these issues. And we have posed a question to DOE. I think on first principle issues, DOE will have to define and design operations and categorize events based on that design operations to -- start authorization. Ours, we grant that, and that will be captured by a license conditions, but also be part of the SAR. And there is change authority where they can update the SAR to perhaps

incorporate that, either on their own, or come back in for a request. So that is a very good question, how do we carefully capture that and make sure DOE's addressed it correctly to demonstrate compliance with objectives.

CHAIRMAN RYAN: Sure. And of course the regulatory infrastructure is there to make the changes, but the real question is, is the engineered facility as it stands capable of accepting updates and change, you know, from kind of a physical engineering and systems point of view.

MR. CAMPBELL: Let me add a couple of things there. This is Andy Campbell. I'm Chief of the Performance Assessment Section. One of the areas we have identified in terms of staff capability that we needed some help with was human reliability analysis. We do have a member of the PA staff who has some background in HRA. We also have developed a user-need memo to the Office of Research to provide some assistance in this area. So we are aware of it. We are pursuing it in terms of having our own capability, and utilizing the capability within the agency to help out, especially given that we're dealing with an operational facility, and the agency has many, many decades experience with operational

facilities, and HRA is an important part of that.

CHAIRMAN RYAN: Just thinking ahead a bit, not so much for a question from this presentation, but maybe a future one, if we could draw on our colleagues at the ACRS. And of course we've got Ashok and John Flack on this staff. Maybe that's a subject for a more detailed review down the line, and as appropriate. I mean, there's no reason to aim at a particular schedule. But it seems to me that the expertise is real clear when it comes to the individual disciplines, but then when you ingrate it up, these other issues of human reliability, and systems interactions, and all that kind of comes to the top.

MR. KOBETZ: Yes, we'll take that away with us and follow up. Pool storage for between 14,000 and 16,000 NTU of spent nuclear fuel. Well, we thought that was interesting because, like I was saying, they take it out and they put it in these 9 x 9 racks, and then they stage it, and they stage it for a period of time until they need it to blend with other fuels to get the right composition when they're, you know, when they're reprocessing and they're going to send something out, which is, you know, their version of -- well, it's not an aging, but it's a

staging type place. So you know, there's some applicability out there. You know, that type of facility's, you know, been used like an aging facility.

CHAIRMAN RYAN: What's the criteria they're aiming at? Is it some blend of percent enriched uranium plus a MOX characteristic? What are they aiming at when they blend?

MR. KOBETZ: You know, basically all they told me is that they'll get an order from a customer for whatever the type of fuel and that, and that's when they pick and match. That was about as far as --

CHAIRMAN RYAN: The reason I ask, because I'm guessing that it's probably a different kind of criteria than what would be the blending for placement in the mountain.

MR. KOBETZ: Oh, absolutely. It's not thermal. Basically it's chemical. You're right.

CHAIRMAN RYAN: Okay. Yes, all right.

MR. KOBETZ: But it's an analogy that at least there is some --

CHAIRMAN RYAN: There's staging, and there's holdup, and there's residence time, and all those kinds of parameters.

MR. KOBETZ: Yes. It's not just a one

true process, I guess. It comes in, you cut it up, and out it goes.

CHAIRMAN RYAN: I'm with you.

MR. KOBETZ: Damaged fuel. All the damaged fuel that's been sent to COGEMA La Hague has been bottled and unloaded in the wet facility. They've never opened up a cask and found damaged fuel that they didn't expect. Now, one of the things I think that assists them there, and I thought was interesting, was that COGEMA has a representative at each facility that's going to be loading a cask to ship to them, to look at records, to you know, to watch the sniff tests, or however they're looking for damaged fuel. So there's always somebody there so they know what's coming to them firsthand.

Hot cell cooling systems are required to maintain SSCs within operability limits. The reason we thought this was interesting is because from the designs that we've seen with DOE, the HVAC system when it is considered important to safety was for radiological purposes, to you know, for a drop or something to make sure that you don't have a release. Now, we always wondered, you know, you have concrete temperatures, you have the resident neutron absorbers for the transportation casks. They have to be

maintained at a certain temperature. And equipment, you know. So this is just something that flags you, and you want to ask more questions maybe as we go on, is there more of an important safety feature in the HVAC system that -- a repository similar to at COGEMA.

We've got a couple of future trips coming up here in I guess the next month or two. One's going to be to Fort Calhoun to watch inspections of damaged fuel, to see how well they can detect pinholes, and hairline cracks, and does that play into the possible oxidation of spent fuel, you know, to give them a better understanding of what would be received at the facility. And also we're going to have some staff going out to INEEL. Apparently there's an inserting facility where they actually move spent fuel in an inert environment. And that's about all I know on that, but we're going to have somebody look into that in case that's a possible solution for DOE.

CHAIRMAN RYAN: Do you have any other international trips planned?

MR. KOBETZ: Not at this time.

CHAIRMAN RYAN: You know, the Japanese facility is kind of starting up, the reprocessing facility. They do have fuel that they've received now. I don't know how far along they are from just

having it, and now having it in the pool. We did in May see that activity. I think Neil Coleman can share with you what we've learned there.

MR. KOBETZ: Okay.

CHAIRMAN RYAN: And any other interest in Sweden, or anywhere else that's had a lot of fuel in pools?

MR. KOBETZ: At this time we don't have any other international trips, but I'll take that, you know, if you want to put that in a letter as a recommendation.

(Laughter)

MR. THADANI: The Hungarians have a lot of damaged fuel, but I wouldn't advise you go there. You know, the Paks problem.

CHAIRMAN RYAN: The other interesting question is, you know, it's probably easy to figure out how to handle fuel that's not damaged. That's pretty clear. When fuel is identified as damaged, that's probably easy as well. What about in the middle, when it shows up and you don't know it's damaged? I know that's an accident sequence, but you know. And the other thought that struck me as you were mentioning that is that I recall from our last briefing there's a very wide array of, you know, first

of all waste containers, second of all types and details of fuel, and hookups, and there's got to be a tremendous amount of lifting gear of one sort or another all through this. And that's, you know, that again is an engineering component, and a human factors, and training, and experience, and all that kind of stuff. So that would seem to me to be an area of real special focus. It's just the whole notion of how, and what, and you know, what are the details of all the variety of lifts that you're going to make. It's not like we've got PWR and BWR fuel and that's it, two types. It's a broad spectrum of questions.

MR. KOBETZ: And that is -- the human reliability, like I say, that's interesting, and we are going to follow up on that. Some of what you mentioned, and I don't want to just be specific on rigging and things like that, but are when we talk about the pre-operational testing, and training, and that. That's the types of things that we would look at then, too.

CHAIRMAN RYAN: But the real specific question is a lot of the fuel is beyond what NRC has licensed. Is that correct? I mean, you haven't licensed, for example, you know some fuels that are at Hanford and other things that might end up in Yucca

Mountain?

MR. KOBETZ: You're right, we haven't.

CHAIRMAN RYAN: So, I mean, and I guess I would offer the thought that, you know, anything you've licensed you obviously have real experienced folks that know a lot about it. But what about the parts that you might not be so familiar with, that might be 30 or 40 years old, and so on.

MR. KOBETZ: For DOE, and Naval fuel, and -- well, DOE and Naval fuel, they won't be handling that as far as we know right now out at Yucca Mountain. Because as I was saying, at the Idaho facility and at Hanford they will be putting these into these MCOs, and they will be putting them into their own special canisters, and they won't be taking them out. Now, but an important point is we have to understand that if they drop that cask what happens to it, because that gets to your point, you know, we're not sure, you know, what the source terms and things like that would be in there. So they're going to have to show us some reliability that those casks would not.

CHAIRMAN RYAN: Maybe the French example's a good one. Have somebody there watching it. You know, that's just an interesting dimension of what you

know and what you don't know at this point. Thanks.

MR. KOBETZ: Any other questions? Did you have something to add?

CHAIRMAN RYAN: No.

MR. KOBETZ: Are there any other questions on COGEMA La Hague? I'll take your note back about other international experience.

MR. CAMPBELL: Tim? This is Andy Campbell again. We did have, one of the members of the team that went to La Hague went on to Germany at the Karlsruhe facility there, and was interacting with the people in Germany on their fuel, and a variety of issues involving their fuel.

CHAIRMAN RYAN: I was thinking of Sellafield too. I mean, they're certainly handling a lot of fuel.

MR. KOBETZ: Yes. With that I'm going to turn over to Mike, who's going to go through just some of the independent evaluations that we're performing to get ready, and how we're working with the staff on that.

MR. WATERS: Yes, thanks Tim. We want to highlight a few examples of evaluations that we intend to perform in preparation of upcoming LA. In general, we think these activities will help us to understand

views, approach, in addressing pre-closure hazards and potential technical issues. I think to reiterate what Tim kind of alluded to earlier, what we focus on in pre-licensing and what we review during licensing will be driven greatly by the performance-based approach that DOE takes to the industry compliance with objectives, and these activities are based in part on the current approach DOE has taken as we understand it.

First, PCSA exercise, performance closure safety assessment exercise. We intend -- we've started a limited exercise looking at the fuel housing facility that DOE has described. We're using the PCSA tool to assist us in putting together that evaluation. Basically we're looking, stepping through systematically, looking through design and operations, identifying potential hazards, looking at a subset of event sequences from those hazards, examining potential consequences, and examining potential systems important to safety.

One key point to make, and it goes back to evolving design information. We're trying to base this assessment on publicly available information at DOE at this time. In some cases, we have to make assumptions on design operations continued assessment

for, but we'll illuminate, that is, on the gaps in data, or uncertainties as well. Key objective activity is obviously to further improve the assessment team understanding of DOE's approach, understanding the importance of systems. Second, flesh out the role of the PCSA tool in assisting our review for an actual LA. Third, develop any potential risk insights on fuel handling operations, and also as I said, illuminating potential gaps in design operation information, including any uncertainties.

And to answer Dr. Hinze's I guess question, we're not doing a full blown performance assessment of the entire pre-closure design. There's many reasons. I think a primary reason is as Tim said, evolving information, and the fact that design does change. And I think on first principle levels, we have looked at the basic conceptual design DOE's taken, and the hazards they've identified on a general level, and that's where our pre-closure topics have derived from, from -- to a great degree. So that's where we're at right now. And I think this limited exercise goal is on a discrete limited facility and will kind of highlight this point as well.

MEMBER HINZE: So you have no problem of an interface between your performance assessment and

the post-closure performance assessment?

MR. WATERS: I'm not sure if I understand.

MEMBER HINZE: Well, if there is a pre-closure performance assessment, we have the post-closure performance assessment. What I'm asking about is the interface between those, and the integration of them. In other words, let's take seismic. Seismic is of course very important in the post-closure, but it's very important to you too, I'm sure. And so how is that integrated? How do you thread all that together?

MR. WATERS: I think we and obviously DOE would have to inherently consider hazards that apply to both the pre-closure operations and post-closure. And part of the process is identifying all those hazards systematically, which is something we would assure DOE does. I'm not -- however, I'm not sure what more you mean between interface between pre- and post-closure. We do -- Rob, do you want to add?

MR. JOHNSON: Yes. This is Robert Johnson with the staff. Real quickly, right now there are no problems with integration between the PCSA tool and the staff's performance assessment tool. We do have staff that are involved both in performance assessment and in pre-closure. We right now are doing limited analyses using our tool, and our expertise in publicly

available design information with respect to pre-closure facilities. So there's not a problem with integration that we see, and we are working on -- I mean, there are staff members that have both hats on --

MEMBER HINZE: Across the field.

MR. JOHNSON: Correct.

MEMBER HINZE: Okay. And in that manner you can get the integration that you need.

MR. JOHNSON: Yes, sir.

MR. WATERS: Thank you, Robert. Let me go to Slide Number 1 and talk about consequent system study. That's still some broader area as well. The NRC staff intend to perform consequences to city studies related to potential conditions and release scenarios at the Yucca Mountain site. A team will use and work a public dose consequence module of the tool to determine release exposures, and perhaps use MCMP to calculate direct radiation exposures. Some objectives of this activity are to test the sensitivity of worker-induced results to key parameters in the consequence models, identify and quantify potential uncertainties in exposure estimates, and again develop consequence insights for the generic types of hazards identified by DOE thus

far.

Now more specifically spent nuclear fuel oxidation analysis which Tim's touched upon. DOE has identified the potential oxidation of damaged fuel as a higher priority technical issue that they are currently considering in their evolving pre-closure design. The pre-closure team is preparing to review any potential oxidation hazards by extensively reviewing oxidation phenomenon, and release fraction mechanics. In addition, we are looking at the Center to develop some preliminary thermal models of bare fuel in a direct transfer environment so we can better understand the thermal behavior. This is obviously important because oxidation rates are temperature-dependent to some degree. That's where we are with that.

Finally, aircraft crash analyses. The pre-closure team has spent a significant amount of time in the past years working on aircraft hazards. And we recently addressed that in the KTI letter. I think Tim mentioned, the DOE's current approach is essentially to show that the chance of release from an aircraft crash is beyond Category II, or less than 1 in 10,000 chance during pre-closure operations. They're doing this, as Tim said, in two ways. One,

looking at the overall crash frequency at the site, but also taking credit for the structural walls of the facility, and some barriers to withstand the force of impacts.

CHAIRMAN RYAN: Just a question on the probability. These are aircraft crashes from inadvertent routine air travel that intersect the facility in some way, as opposed to something intentional, is that right?

MR. KOBETZ: Correct.

CHAIRMAN RYAN: And the intentional aircraft question, that's I'm sure being dealt with separately?

MR. THADANI: It's being addressed separately.

CHAIRMAN RYAN: Okay. I guess what I'm trying to get at is those kinds of questions are typically, you know, off of the routine plate, but on somebody else's plate.

MR. WATERS: Yes, that would be in the safeguard security region, I believe.

CHAIRMAN RYAN: Okay. Thanks.

MR. THADANI: One comment I would make is that it'd be useful for you to have some understanding of the analysis and the work that they have done. You

might benefit from that in terms of what you're doing.

MR. WATERS: Yes, and actually we have an expert here --

MR. THADANI: I am familiar.

MR. WATERS: Mr. Shah. To finish up with what we're doing here, our hazard and frequency experts have been examining military and commercial flight characteristics of the Nevada test site, and are looking at applicable crash data. In addition, we are working with the Center to develop some preliminary instruction models of LS-DYNA so we do understand the structural response to severe impacts. And that's something we just started as well.

With that, I just want to reiterate, these are a few examples, as Tim mentioned earlier, with pre-closure topics, depending how the design evolves, and the approach DOE takes. Those may lead to additional analyses as well. If you don't have any questions I'll turn it back over to Tim.

CHAIRMAN RYAN: Just a quick question. Again, I'm interested in your process to stop and think about should we add new topics, or do we have the right list, are all of the sub-topics covered. And you know, what process are you going to use to self-evaluate, are we on track as this process --

particularly as it begins, and as the early phase of the review occurs. Is there a step in there to think through and do that, or no?

MR. KOBETZ: It sounds like you're looking for is there a real formal process. Not other than as we meet weekly to discuss the different technical issues, to discuss them amongst ourselves, and as we set these topics. You know, we send it around, okay, what else needs to be put on the plate here, and then we discuss it. So it's somewhat formal, somewhat informal. But I think we address your question. I think that we are asking ourselves a question what needs to come and go. Was that?

CHAIRMAN RYAN: I guess the devil's in the details. It, you know, a small group, or a subgroup saying yes, we've got it covered, is probably not good, but if it's a bigger, larger group, and has management review, or independent review, and you know you've come to that conclusion, obviously that's more like an expert elicitation have we covered it, asking somebody else. That's a broader thing. I'm just wondering where, you know, what your process kind of vision is for how you're going to do it, recognizing we're much on the front end, and it will evolve.

MR. KOBETZ: No, that's a perfect lead-in

as we're going to go into how we're going to interact with DOE, because we are preparing I think what you're going to. So if there's no other questions.

MEMBER HINZE: I really think this gets to a specific example of your question, Mike. Characterization has gone on for a number of decades at Yucca Mountain, and a great deal of data have been collected, and analyzed. Most of that data, or essentially all of it has been focused on post-closure analysis. And I'm wondering, as you look at your work here, whether you're seeing any pre-closure characterization that needs to be done, and how you are getting that information in a timely manner from DOE, and what provision is being made for communication of those kinds of needs, and can you give us examples of those.

MR. KOBETZ: Yes. Let me go into the next slide, because that pretty much comes right into the next slide.

MR. KOBETZ: Past interactions with DOE, and this is going to include some future that I think is going to address both of your questions. Pre-closure obviously is behind post-closure, and the characterization of what the work that DOE has done. Obviously they've done a lot over the last 20 years

for post-closure. So starting back, what we talked about in September of 2003 we had our first aircraft crash, but we really started getting more specific on, hey what's going to be in the LA as far as design and performance assessment and that. Can you give us a flavor, because we're looking at some documents here, and we don't see, you know, a lot that we would think that would support it. So let's talk about it. You know, it doesn't mean it's not there. It just doesn't mean that, you know, we've seen the paper trail yet.

So in February 2004 we had a technical exchange with Department of Energy. And do you understand the technical exchange, and the meanings of them? Okay. And what we're trying to accomplish? Okay. To go over the outline of the LA, you know, how is it going to be laid out, is it going to be in conformance with the Yucca Mountain Review Plan, are they going to be deviations, which they're allowed to do but we just kind of would like to understand going in so we can maybe plan you review better. And the Department of Energy, without being specific, laid out a pretty good detailed what's going to be, you know, what kind of design information will be there, and what kind of analysis. But as we would look at some documents and that, we wouldn't see the detail that

they're describing. We're wondering, you know, what's the delta here, and I think that's maybe what you're getting at. Why are we seeing this delta. So we continued to have some technical exchanges. When we were talking about -- in February we identified the items important to safety. You know, they would talk about the transporter, sometimes it would be important to safety, sometimes it wouldn't be important to safety. What does that mean? You know, well if it's transporting, you know, an empty cask just to be loaded and that, it's not important to safety. Well, there's still those system structures and components on there. If they're important to safety, they're important to safety all the time. They still have to follow the same rule all the time. You know, they have to have the same maintenance. They have to be designed to the same codes and all that kind of thing.

That's the kind of thing that we discussed during that technical exchange. You know, HVAC systems. If you're going to have -- if it's going to have to shut remotely to prevent, you know, a release, well, it's not just that damper, it's whatever that censor was to close that damper, whatever, you know, the motors, the electrical supply, anything like that. So we went through some iterative process with them on

that because we weren't seeing how that types of information was actually going to make it into an LA.

Then in September of 2004 we wanted to have, okay, you know, your design's really evolved. We're going to go through it, and let's talk about the details. Again, and that's what prompted the October 8 letter. We didn't see a lot of information on the types of casks and that that would be used at a potential aging facility. Doesn't mean it didn't exist, we just didn't see, you know, how it was tracing back to anything. We didn't understand how the electrical system, how they were taking credit for it being important to safety. Were they taking credit for it. You know, what was all the function there. We didn't see where they had made a lot of progress on the aircraft crash at that point. So we're still, we're missing that delta, and I think that's what you're getting at. That's how we're trying to interact. That's why we decided after the September technical exchange, we really need to highlight this to them, and that's how we're communicating. We sent them a letter and said, you know, these are the things that we're missing here.

Then at the June 2005 technical exchange we went back and we had more specific discussions on

aircraft crash hazard. And this time, and Mahendra's going to talk about it after this, about the types of things we would have expected to see as far as design to support a pre-closure safety analysis that we weren't seeing. Again, it doesn't mean it's not there, it's just from the documents we've looked at we don't understand how you're coming to your conclusions. And we just -- and I've got copies of it. We just sent them a letter, I guess it went out on Tuesday, basically saying here's still the things that we see a delta on that, you know, it doesn't appear that it's supporting with a pre-closure safety analysis. Doesn't mean it's there, we're just not seeing it fully yet.

Then, also in July we had one on, you know, just what is the essential information. Are we miscommunicating here somehow, the stuff that we're looking for. Maybe you've got it and we're just asking for the wrong stuff. So we went through basically the beginning of the presentation that you had today here. We went through it with Department of Energy, saying here's the regulations. You know, when it says in 63.21 they have to provide dimensions and that, well it's to support the PCSA, it's to support the analysis that shows that the system structure or

component is going to prevent or mitigate, you know, that particular event sequence. Right now we're discussing whether to write a letter on that one.

And now let's talk about the path forward, because we're trying -- you know, we're starting to get to the point that we understand, you know, I think as they've discussed it's going to be delayed until March. So we've got some time that maybe we can have more interactions. And we've talked to Department of Energy, and we discussed this at our July meeting, that hey, we've conveyed our, you know, nine, ten items to you. We've had discussions about objectives. Let's document these. Let's get this down, let's document what's the objective for each of these meetings going forward, a technical exchange on these types of topics, and then at the end of the meeting we go through the objectives, and we say hey, did we have success? If not, we send you a letter, and we're going to tell you where the delta that we still see. Maybe you've got the information but you're still not conveying it right to us.

CHAIRMAN RYAN: Tim, as you talk I think about the idea of a Level 1, Level 2, or a Level 3 in a PRA kind of way. I mean, where would you say we are? Are we starting on Level 1, are we between Level

1 and Level 2, or somewhere in between?

MR. KOBETZ: We're at Level 1.

CHAIRMAN RYAN: And the reason I ask that question, as you proceed through your process, you're going to gain more and more information, and more and more connectivity. But out of all that of course comes the second and third and fourth and fifth round of questions and details. And I guess I just see that ramping up in terms of planning, and staff, and you know hours, and all that sort of aspect of it. And have you thought through that, how that's going to ramp up over time?

MR. KOBETZ: How our resource --

CHAIRMAN RYAN: Yes.

MR. KOBETZ: -- requirements are going to ramp up?

CHAIRMAN RYAN: Yes.

MR. KOBETZ: We certainly have our resource plans in place. We certainly, you know, haven't hired all the staff I think that we need to going into it. I know they keep promising to give me a backup, and I haven't seen one yet. So we still are in the process of getting more people onboard. But I mean, you know, we've gone through and assessed what our needs are, and we've enveloped staffing plans.

CHAIRMAN RYAN: Okay.

MR. CAMPBELL: Let me add something there, Mike. This is Andy Campbell, NRC. When I started in the Performance Assessment Section about two and a half years ago when I left the staff scientist position here at the committee, I had one-half of Robert Johnson here next to me working on pre-closure. At this point in time, I have four PA staff working almost all their time on pre-closure issues, PCSA issues, including Robert, and Mike, and Chris Ryder back here, and Albert Wong who's out. I also have other people who've come onboard since then that have some responsibilities in pre-closure area, for example HRA. So we've gone from a PA section that focused substantially on post-closure. We still do have a big post-closure focus. But I have a substantial fraction of my team looking at pre-closure issues. And I think you could probably say the same thing for the engineering section. A substantial amount of the engineering effort, in fact probably more of the engineering effort is focused on pre-closure than post-closure. In addition, we have a very large staff down at the Center who are working a lot of issues in the pre-closure area. Some of them are also working post-closure area. So we have substantially ramped up

our effort in this area. We certainly have -- maintaining and continuing our base in the post-closure area, but we are anticipating a little more growth, but I think we're pretty close to being there in terms of the resources we need, we think we need, to prepare for and then conduct a review.

CHAIRMAN RYAN: Okay, thanks.

MEMBER HINZE: Andy, are you at a position where you feel comfortable with where you are so you aren't going back to DOE with asking for another rock? Asking for further information? In other words, let's take the seismic area. Have you defined those critical elements that the DOE needs to fill in?

MR. CAMPBELL: We are in that process. I would not characterize -- let me make sure I understand, but I would not characterize what we're doing and what Tim's talking about as a bringing another rock type of situation. We are looking at information on documents, and trying to understand what information that we currently see in documents, and it's an evolving process. Their design is still evolving, you know, frankly. And what we're looking at, and what Tim's talking about is are we seeing the type of information we would need to see in a license application to be able to review it. And at this

stage we continue to ask the questions, and we certainly plan on future interactions in that area.

In terms of seismic, I think John Stamatikos down at the Center is working with us in terms of seismic issues, a lot of experience with the PFS licensing process. So we're drawing on those resources to make sure we understand it. But be aware that to a certain degree, the design is evolving, and it is not a static thing that has been set at this point in time.

CHAIRMAN RYAN: Thank you.

MR. JOHNSON: Just one other point to add to that. Specifically in the areas of aircraft crash hazards and operations, some of the work that we've been doing here has informed questions that we're asking DOE. I mean, even in the July technical exchange we gave them a list of questions and expectations with respect to the regulations, and were able to ask them specific questions. Where's the technical basis for this. How are you including this. Where is this considered. So some of the things I think you're asking we are doing that. And as time goes on, and we do more of our independent analyses, we will obviously be able to incorporate those questions at the appropriate time.

MR. KOBETZ: Thank you. And I think that's going to be a good lead-in in just a minute for Mahendra's discussion on essential design requirements. But let me just in closing this portion, does that answer your question about our path forward? We want to document, we want to make public those issues, those objectives for technical exchanges, you know, at least come up with a very good schedule, understanding that things may change, but when we can hold these technical exchanges, and have it really pinned down. And right now we're discussing that with Department of Energy, you know, let's do this, let's get it out there, let's move forward, and then they understand that if there is a delta -- I mean, we're not going to say do it this way, or do it that way, because we're not consultants. We're going to say, just like Rob was saying, we don't understand this assumption, or you know, we still don't see how you're making this statement. Why is it valid. That's the kind of thing.

CHAIRMAN RYAN: Sure. No, I understand.

MR. THADANI: May I just -- Tim, if I go back to your chart on pre-closure topics. You have event sequences and aging as separately identified topic. Aging would impact fragilities of structure

systems and so on. Is that factored in when you evaluate these scenarios?

MR. KOBETZ: Actually, I think you're thinking of a different kind of aging. You're thinking like reactor licensing. Aging of a facility.

MR. THADANI: Right.

MR. KOBETZ: Okay. This is an aging facility, which is something that is proposed by Department of Energy in which they may have --

MR. THADANI: Oh.

MR. KOBETZ: -- certain thermal loads they might put them out in this facility.

MR. THADANI: I understand. But now I have raised this, do you fold in some aging considerations when you look at these scenarios, particularly from fragility point of view? Talking about post-closure. The somewhat interaction issue. Pre-closure, post-closure. Aging of equipment, if you will.

MR. KOBETZ: You're talking about the same kind of thing with license renewal, and the things that we would look at as the components there as far as their lifespan?

MR. THADANI: Yes, but -- you can use that as an example, but I'm thinking more in terms of since

you're using performance assessment type of thinking here, which is somewhat different I think, and you're trying to draw some conclusions up front, how do you account for the effects of aging in terms of potential consequences from certain scenarios that you're evaluating. You could even use seismic as an initiator.

MR. SHAH: Aging in fact has to be considered in determining the probability of failure of the equipment.

MR. THADANI: Right. And that's what I mean when I say fragility.

MR. SHAH: That will be factored into event sequence.

MR. THADANI: So you would factor it in.

MR. SHAH: Yes, as part of reliability evaluation.

MR. THADANI: Okay. Thank you.

MEMBER WEINER: I had a question for Tim. From the very beginning of your talk, you mentioned that you focus on high probability and high consequence hazards. I would think you'd focus on high risk, without disaggregating so to speak.

MR. KOBETZ: And you're right. It's just a -- I guess that was my way of saying it, that we are

looking at high risk, but there's going to be different components, where there's going to be the consequence, or there's going to be the probability.

MEMBER WEINER: Or both of them are intermediate. In other words, you're looking at a risk spectrum. I just wanted to --

MR. KOBETZ: Absolutely.

MEMBER WEINER: -- to clarify that. And the other question, it may be more detailed than you want to answer at this point, but I'd be very interested to know how you model the momentum transfer in your aircraft crashes.

MR. KOBETZ: Actually, that's going to take into his slide too.

MEMBER WEINER: Oh, okay. Okay, thank you.

MR. LEE: Tim, thanks for that. Slide 19 clarified my earlier question, as well as the follow-up from Robert Johnson. Thank you for that. Just one question. You've had five technical exchanges, and written one letter to DOE. What's their spin on all this? What's the path forward? Just more meetings? Are there any commitments? What's DOE's overall reaction? Could you characterize that for the committee?

MR. KOBETZ: I'm not sure how -- you would have to ask DOE as far as their spin, but they --

MR. LEE: Are they sensitive to the concerns that the staff has?

CHAIRMAN RYAN: I think we can get DOE to answer that, Mike.

MR. LEE: Okay.

CHAIRMAN RYAN: I don't think that's a fair question, to put Tim on the spot trying to answer.

MR. LEE: Okay, fine.

MR. KOBETZ: Let's see. Okay, so we've got our path forward. And with that we're going to kind of go into I think something that's going to address Mr. Hinze's and Ruth's questions as far as are we asking for another rock, and what about these type of technical issues. And we're going to talk about aircraft crash hazard.

MR. SHAH: Okay. What I'm going to present is based on the DOE's approach for addressing the aircraft crash hazard on pre-closure facility as we understand it from the technical exchanges we had, the last two of them. They're identified based on the aircraft -- Based on the aircraft probability studies, DOE has identified these two types of structures as

important to safety. These structures are, one, all the exterior walls of the buildings. There are four buildings involved here. And secondly is the barriers which surround the aging pads. The aging pads are basically interim storage pads, not for aging effects.

But anyway, to give you perspective on the aircraft crash probability on this building, the buildings vary from -- this is a canister handling facility, dry transport facility, transportation casks receipt and return facility, and a fuel handling facility building. They vary in size from 150 feet by 200 feet to about 500 feet by 500 feet. So these are large buildings. And the heights, for three buildings the height is about 100 feet. And the one building, this transportation receipt and return facility is about 80 feet. So you can see the probabilities and have a perspective on that.

Now, based on the fact that these are important to safety walls, what that means is that they have to be able to withstand the aircraft crash impact on those walls, whatever various aircrafts. They use F-16, F-15, A-10. Those are potential crashes could occur on the walls. Now, if it had been a deterministic type of regulation, we would have just determined what is the maximum speed, or some

probability associated with it that we would select, and then do the analysis, and show that it meets the codes and standards. But in addition to that evaluation, where you have to select the initiating events and go through the process of determining what the demands and all that would be, because this is a performance-based regulation, you also have to determine what is the probability of failure, to make sure that the event sequence starting from the initiating event which is directly impacting the building, and also that could be a fire, how that event sequence leads to compliance that it has to be a 1 in 10,000 during the pre-closure period, or -- if you assume 100 year pre-closure period, our standard is to 2^{-6} per year. So normal deterministic type analysis would stop at just going to the standard, but here you've got to go a step further and demonstrate that the event sequence has a probability of 10^{-6} per year. This allows DOE an option to select whatever initiating event probability of occurrence. However, it puts an additional burden on the DOE to demonstrate this. So that's a thing for you to keep in mind.

Now, what DOE has done now -- or DOE plans to do. We pointed out that you have to address -- in our technical exchange meeting we pointed out these

two aspects that they need to address. Now, they were thinking of just stopping at first point, that as long as they selected the aircraft crash which is likely, and then just stop at codes and standards. So that's one of the points we made it clear.

Now, what kind of information they need to provide is also we discussed in our technical exchange. First, they need to provide design as to what the wall dimension thicknesses are, what the reinforcing steel is. We do not need to know all the details of corner reinforcement, or fabrication and construction procedures, but we need to know essential elements of design, which are to be relied on for the safety. So that design has to be detailed enough so we can understand the capacities.

Second thing they need to include is what are the initiating events, like what aircraft crash could occur, what is the probability of that event, and what kind of analysis you have done to determine what the loads would be, like how the moment of transfer will take place, energy and transfer will take place, and what will be the force time history. So you could use different methods, but they have to describe what methods they used to determine these forces. And then what analysis matters they use to

determine what the demands on these different parts of these structures would be, like forces, movements, displacements. And once you have those demands, then you've got to determine what's the capacities of these structures based on codes and standards they could use, and then show the -- determine the margins of safety involved. And then that's part of the first structural integrity evaluation.

Then they'll go to performance reliability, which is what I talked just recently, is the demonstration that the probability of failure when you use these codes and standards will result in an event sequence of 10^{-6} per year. So that's where the main difference between DOE and us was when we talked about this. So I hope they'll address that issue clearly.

MEMBER HINZE: Mahendra, it wasn't clear. Your goal is 10^{-6}, so you sum up a bunch of sequences and show that the sum total is less than 10^{-6}.

MR. SHAH: 10^{-6} per year.

MEMBER HINZE: Which would then allow for a potential for an initiating event having a frequency of 10^{-6}?

MR. SHAH: Okay, that's not what I was saying. I was also going to mention that if you

choose a 10^{-6} per year as an initiating event, then you don't need to go further because once you use codes and standards you can stop there, because you have a probability of that event sequence less than 10^{-6}, so that's an option DOE has.

MEMBER HINZE: But they have to consider initiating events with a frequency that could be as low.

MR. SHAH: It depends on them. If they can show that the design, the probability of failure. Let's say they chose the probability of initiating event is 10^{-4} for the aircraft impact speed. You can determine what that speed and all that is. And if they can show that probability of failure of this structure is 10^{-2} or less, then they will still satisfy.

MEMBER HINZE: So for aircraft crash, each sequence by itself --

MR. SHAH: By itself.

MEMBER HINZE: By itself. And so if I am smart enough, I can break down to a thousand sequences.

MR. SHAH: No, there will be -- not a thousand, but there will be multiple sequences.

MEMBER HINZE: There will be many. So

they are -- but they do have to consider, from what you're saying, initiating event that may have a frequency of, say, 10^{-5} as long as the conditional probability --

MR. SHAH: Is 10^{-1} or less.

MEMBER HINZE: So they have to maintain those scenarios.

MR. SHAH: Yes, exactly.

MEMBER HINZE: Thank you.

MR. WATERS: Can I just for the record slightly clarify. The regulation is less than 1 in 10,000 chance during pre-closure operations. In that case you have to consider a pre-closure operation length of time, and actually for aircraft right now DOE's assuming that aboveground emplacement operations will be for 50 years.

MR. SHAH: Fifty years, yes.

MR. WATERS: And that event calculate 2^{-6} as our cutoff. So I just wanted to clarify that for everybody.

MEMBER HINZE: As long as we agree with that.

MR. WATERS: Right.

MR. SHAH: That ends my presentation.

MEMBER WEINER: Can I ask a couple of

questions?

MR. SHAH: Yes.

MEMBER WEINER: Are you in the position of approving -- do you approve the way they model the crash sequence? In other words, do you tell them, no, you shouldn't use this model, you should use some other, or do you just approve the --

MR. SHAH: No, we do not influence what they do. We just review.

MEMBER WEINER: You just review to what?

MR. SHAH: To see if it complies with the regulations.

MEMBER WEINER: So it is immaterial -- so the regulations don't specify how they have to be --

MR. SHAH: Exactly. It's up to them to choose what initiating events to analyze for, as long as the demonstrated event sequence is less than 1 in 10,000 during the pre-closure period or post-closure period.

MR. THADANI: But I would think you would review and approve the model they use to come to that conclusion.

MR. SHAH: Yes, we would review.

MEMBER WEINER: Yes, that was my question.

MR. SHAH: Oh yes, we will review details

of what they do.

MEMBER WEINER: I'm just curious. Do they model the mass of -- the momentum transfer from the mass of the fuel, that you'd have a loaded aircraft and that's --

MR. SHAH: As far as I know, based on our recent technical exchange they have not done that. So far.

MEMBER WEINER: So far.

MR. SHAH: They may do in future, but.

MR. THADANI: Ruth, just for your information, lots and lots of analyses have been done with fairly contemporary computer models. And in these analyses, you do include fuel. You do consider under accident conditions where the fuel would go, and how it might burn, and the potential impact.

MR. SHAH: Right.

MEMBER WEINER: Thank you.

CHAIRMAN RYAN: Any other questions? Jim, any questions?

MEMBER CLARKE: Yes, I had kind of a general question, and it admittedly reflects my limited understanding of the review process. But a couple of times today the statement was made that the design is still evolving. I guess at some point at

least portions of the design will have to stop evolving. Is that -- was that the content of the last technical exchange meeting, which elements are essential?

MR. KOBETZ: I guess -- I want to make sure I understand this right. The last technical exchange was we tried to focus in on what the regulations say to make a decision. If we get the application, whether or not to grant a construction authorization. The Department of Energy has to have sufficient design that they can demonstrate that through the PCSA that any structure, systems, and components relied on to prevent or mitigate the event sequence would do so. As far as us putting a stop on them where they finish their analysis, I mean that's up to them. How they do it. And what we try to point out is areas, as Mahendra just said, that we don't see information. They may have it, you know, it may not have been presented well, maybe we didn't understand the way they presented it, but we don't understand how they're getting through that analysis portion. Is that?

MEMBER CLARKE: Yes, I think I understand that. And then, the follow-up I guess would be if the facility is going to operate for, say, 50 years, it's

conceivable that sometime in that period a better way of doing something might come along. It may be a minor change, or it may be a major change. Do you have in your process a way to?

MR. KOBETZ: Yes. What that is I believe it's 63.24, where they have to update the LA sometime during construction but just prior to requesting a license to receive and possess, or if we were to grant, I guess a license to receive and possess. With things that may have changed during the facility, whether it's new technology, whether it's you know, design because they ran into rock we weren't expecting, or you know, whatever, if there was some sort of design. We don't expect design work to be continuing that should have supported, you know, the PCSA in the first place. Does that answer?

MEMBER CLARKE: Sure.

MR. KOBETZ: Okay.

MEMBER CLARKE: And before they could make that change they would need your approval? Or how would that work?

MR. WATERS: Let me add, DOE has -- the regulation does give them change authority, which is similar to 50.59, about the same or similar. So they follow process to make changes. If they cannot meet

the criteria for the change authority, then obviously a NMT may be what we would have to do, I believe, to make such a change.

MR. KOBETZ: Yes. There's also, in the construction authorization there's 63.32, I believe, that -- and that's what talks about what should be in a construction authorization. And one of the things that we have to look at, NRC, is what are those structures, systems and components that we feel are so important that they have to notify us. And there's different reporting requirements on there. What do they have to notify us that, hey, we had to change this. You know, some things they don't make changes to they won't have to notify us. Some things they'll have to give us and that's like, you know, 60 days or whatever.

MEMBER CLARKE: It's spelled out in the regulations.

MR. KOBETZ: So that's covered, and we have to cover that in the construction authorization if one was granted.

MEMBER CLARKE: Okay.

MR. KOBETZ: All right. Well, let me try to wrap it up then here. You know, like we were saying, Part 63, there's one license application. The

first decision that the NRC would be requested to make is whether or not to grant a construction authorization. This is really focusing on the design. Can DOE demonstrate through a pre-closure safety analysis that its design will function during event sequences as it's intended to to prevent or mitigate -- well, to prevent or mitigate the event sequences, and thus ensure that the regulatory limits, the dose limits are maintained in accordance with 63.11. The second decision if we were to grant a construction authorization somewhere down the road would be did they build a design and fabricate the waste package and that as they demonstrated in the SAR, and as we, you know, if we did approve it in the SER.

The staff in preparing for this review, we are using a structured, integrated, and risk-informed approach to prepare for the LA. And Ruth, I did want to get back to one of your comments, because we do talk -- you know, you were talking about -- where was it, whatever that slide was with the risk information.

MEMBER WEINER: High probability and --

MR. KOBETZ: Yes. That is, if you look the slide, that's the development of risk-significant technical topics. And you know, the two things that you're going to look at are going to be probability

and consequences. And that's -- we are looking at it that way. We are thinking risk.

We're performing independent evaluations. We want to make sure that when the LA comes in we're prepared to perform certain independent confirmatory calculations to show that, okay, yes we agree with the statements they made in their SAR, or no we don't. You know, and they either have to answer an RAI or it gets rejected. And then the staff, we're going to continue to interact with DOE. We hope to come up with a more formalized structured approach so that we could have the technical exchanges, understand whether those objectives were met for the technical exchanges, and if we think there's a delta write a letter and say, you know, here's a delta. Like Ruth said, it's not to say this is the way you should do it, and you're not doing it this way, it's to, you know, we don't understand why you're doing it this way and you haven't provided sufficient justification.

So that really wraps up my comments. I appreciate everybody from the NRC staff that showed up here, and provided response, and helped us prepare for this presentation.

CHAIRMAN RYAN: Thanks Tim, that's been great and we appreciate the exchange and the Q&A as we

go along. That has been real helpful too. Just a question, looking down the line a bit, when do you think we ought to hear from you again on this? You know, I don't want to just exercise you on one or two more letters, but is it before the LA comes in, or kind of whenever that date seems a little firmer, and maybe we can hear how your process and your preparations have evolved?

MR. KOBETZ: Certainly.

CHAIRMAN RYAN: I don't know if that's March, April, May, June in '06, but somewhere in that six to nine months timeframe?

MR. KOBETZ: Are you talking would you like an update for this?

CHAIRMAN RYAN: Yes, an update of where you're at, and what new insights you've gained, and how your process has maybe gone from this sort of starting vision to how it's evolved over time. The reason I suggest that is it's very helpful because you're thinking about things in detail, interacting with DOE, and you know, that's one avenue for us to get insights as well, as well as directly from them on how they're design's evolving. We did have a design briefing from DOE, I believe it was what, two months ago? Or last month? I forget. Two months ago,

thanks Mike. And we did see what you alluded to, was that they had, you know, it's evolved quite a bit from the previous briefing. So I think, you know, from both, it gives us better insight to hear from you as well.

MR. KOBETZ: Let me suggest this. Once we get our interactions established, and the objectives set, and we have a path forward, I'll share that with the staff. It'll be public anyway.

CHAIRMAN RYAN: Sure.

MR. KOBETZ: And I'll talk with the pre-closure team and see where we think an appropriate place would be to interact with you. And also, you know, we'll look for feedback from you if there's something else, or specific topics that you want to hear on.

CHAIRMAN RYAN: Okay.

MR. KOBETZ: So as soon as that gets established, which I hope you know happens in the near future, we'll pass that on to you.

CHAIRMAN RYAN: And again, I think just before the LA is coming in, and as that -- at that point before it comes in would be a time when we'd want to hear from you, at least at some -- maybe once or twice, I don't know, it just depends on the

schedule. But we'll see how it goes.

Any other questions?

MEMBER HINZE: It would be helpful if we were kept informed as to the technical exchanges in case we would like to sit in on one of the more technical aspects of it.

CHAIRMAN RYAN: Yes, that's a good point. If we can kind of keep up with your calendar, and maybe we have a staff person, or a member, to you know, just participate or observe if that's possible.

MR. KOBETZ: Certainly.

CHAIRMAN RYAN: Okay.

MR. KOBETZ: I think your staff attends most of our Yucca Mountain team meetings, and I know they're coming up, but we'll make sure that at least there's one contact point here that's added to the meeting distributions here, the meeting notice distributions.

CHAIRMAN RYAN: All right. Any other questions, Bill?

MEMBER HINZE: That's it, thank you.

CHAIRMAN RYAN: Al? Ruth?

MEMBER WEINER: I'd just like to add, I think that would be a very good idea, because a lot of the questions that have sort of arisen during this

discussion are really more technical and detailed than you want to discuss in this venue. But thank you.

CHAIRMAN RYAN: Jim, any other questions? You're sure? Anybody? Gentlemen, thanks very much for a great briefing. I'm sorry, excuse me.

MR. CAMPBELL: I just wanted to say that if the committee is thinking about something on HRA, we would certainly be interested in participating in that, whether it be a working group or whatever you guys are thinking about, we would be interested in participating in that.

CHAIRMAN RYAN: Okay.

MR. CAMPBELL: I also wanted to take the chance to thank all of the NRC staff, and all of the Center staff, both here and down in San Antonio for the tremendous amount of work that they've put into this, and a variety of activities we've had ongoing in the last few months. We've been very, very busy with interacting with DOE, and you know, what you see here today is kind of a culmination of a lot of staff activity to support that.

CHAIRMAN RYAN: Sure. No, I think the committee recognizes that. We visited the Center a few times in the past, and particularly maybe even over a year ago, and a year and a half ago, maybe saw

kind of the beginnings of the PCSA tool, and how that was evolving. So we do recognize and appreciate all the hard work of the folks in San Antonio. So thanks for bringing that up.

MR. CAMPBELL: Thank you.

CHAIRMAN RYAN: Thank you all in San Antonio, and thanks for being with us today. Anything else? Thanks very much. Appreciate it. San Antonio, you're welcome to continue to sit in, or we can end -- we're going to discuss a few business matters and other items, but I believe that is our last briefing for the day, but you're welcome to sit in. Okay, thanks very much.

Okay, we're scheduled for a short break. Why don't we come back -- it's 2:30 -- at 2:45. We'll reconvene. And I believe that will end our need for the record today. Are you sure? Because we're not taking any new information. Okay, that'll end our formal transcript for the day, and we'll reconvene at 2:45. Thank you very much.

(Whereupon, the foregoing matter was concluded at 2:30 p.m.).