UNITED STATES

NUCLEAR WASTE TECHNICAL REVIEW BOARD

FALL BOARD MEETING

Wednesday

September 24, 2008

Suncoast Casino
9090 Alta Drive
Las Vegas, Nevada 89145

NWTRB BOARD MEMBERS PRESENT

Dr. B. John Garrick, Chairman, NWTRB
Dr. David J. Duquette
Dr. Ali Mosleh
Dr. Andrew C. Kadak
Dr. Henry Petroski
Dr. William Howard Arnold
Dr. Thure E. Cerling
Dr. William M. Murphy
Dr. Mark D. Abkowitz
Dr. Ronald M. Latanision
Dr. George Hornberger

SENIOR PROFESSIONAL STAFF

Dr. Bruce E. Kirstein
Dr. David A. Diodato
Dr. Daniel S. Metlay
Dr. Gene W. Rowe
Dr. Carl Di Bella

NWTRB STAFF

Dr. William Barnard, Executive Director
Karyn D. Severson, Director External Affairs
Joyce M. Dory, Director of Administration
Linda Coultry, Meeting Planner

I N D E X

P R O C E E D I N G S

8:00 a.m.

GARRICK: Good morning. Welcome to the Nuclear Waste Technical Review Board's fall meeting.

My name is John Garrick. I'm Chairman of the Nuclear Waste Technical Review Board, and, when I am not engaged in Board matters, I'm a consultant specializing in the application of the risk sciences. I also act as the Board's technical lead on Radiation Dose Assessment.

As I introduce the other Board members, I ask that they raise their hand.

Mark Abkowitz. Mark is a Professor of Civil Engineering and Management Technology at Vanderbilt University, and Director of the Vanderbilt Center for Environmental Management Services. Mark chairs the Board's Panel on System Integration, and is the Board's technical lead on Transportation, and, quite naturally, will be leading the Board's discussion today on transportation and integrated system operations.

Howard Arnold. Howard is a consultant to the nuclear industry, having previously served in a number of senior management positions, including vice-president of the Westinghouse Hanford Company and president of Louisiana Energy Services. Howard chairs the Board's Panel on Preclosure Operations and will be leading the Board's

discussion today on surface facility design and repository site operations.

Thure Cerling. Thure is a Distinguished Professor of Geology and Biology at the University of Utah. He is a geochemist, with particular expertise in applying geochemistry to a wide range of geological, climatological, and anthropological studies. Working with Panel Co-chairman George Hornberger, Thure is our technical lead on the Natural System.

David Duquette. David is the John Tod Horton Professor of Materials Engineering at Rensselaer Polytechnic Institute. His areas of expertise include physical, chemical, and mechanical properties of metals and alloys, with special emphasis on environmental interactions. David is the Board's technical lead on Corrosion.

George M. Hornberger. George has a new position. George is a Distinguished Professor at Vanderbilt University, where he is the Director of the Vanderbilt Institute for Energy and the Environment. He has a shared appointment in the Department of Civil and Environmental Engineering and the Department of Earth and Environmental Sciences. His research is aimed at understanding how hydrological processes affect the transport of dissolved and suspended constituents through catchments and aquifers. George co-chairs the Board's Panel on Postclosure Repository Performance.

Andrew Kadak. Andy is Professor of the Practice in the Nuclear Engineering Department of the Massachusetts Institute of Technology. His research interests include the development of advanced reactors, space nuclear power systems, and improved licensing standards for advanced reactors. Andy is the Board's technical lead on Thermal Management.

Ron Latanision. Ron is an Emeritus Professor at MIT and a principal and Director of Mechanics and Materials with the engineering and scientific consulting firm, Exponent. His areas of expertise include materials processing and corrosion of metals and other materials in different aqueous environments. Ron co-chairs the Board's Panel on Postclosure Repository Performance.

Ali Mosleh. Ali is the Nicole J. Kim Professor of Engineering and Director of the Center for Risk and Reliability at the University of Maryland. Ali's fields of study and practice are risk and safety assessments, reliability analyses, and decision analyses for the nuclear, chemical and aerospace industries. Ali is the Board's technical lead on Performance Assessment.

William Murphy. Bill is a Professor in the Department of Geological and Environmental Sciences at California State University-Chico. His areas of expertise are geology, hydrogeology, and geochemistry. Bill also

serves as an administrative judge on an NRC Atomic Safety and Licensing Board Panel. Bill is the Board's technical lead on the Source Term.

Henry Petroski. Henry is the Aleksandar S. Vesic Professor of Civil Engineering and Professor of History at Duke University. His current research interests are in the areas of failure analysis and design theory. Henry is the Board's technical lead on the Design of Surface Facilities, and will be leading the Board's discussion today on the Equipment and Facility Testing Program.

I am told that the Board's most recent report to Congress is now on the website as of today, I believe. So, to those of you who are interested in pursuing that, it is available.

Well, we have already telegraphed some of today's agenda items, but I'd like to summarize what the agenda is going to be. And, the primary topic is going to be waste management system operations, and it's very appropriate and timely. It also is an important part of the Board's technical and scientific mandate.

As I indicated in testimony before the House Subcommittee on Energy and Air Quality in July, the Board takes an integrated view of the many diverse components of the DOE program. Using the expertise of the members, we evaluate the technical basis of DOE's approach to the entire

waste management system. That is, besides the Board's technical evaluations of repository postclosure performance, the Board provides an integrated technical assessment of whether the total waste management system in fact will perform its intended function. And, we do this based partly on answers to the follow question:

> Will DOE be able to effectively implement the design and fabrication of waste packages; accept spent nuclear fuel at reactor sites or high-level radioactive waste at federal facilities; transport the waste to the repository, perform necessary surface operations at the repository site, including storage; adequately perform the required underground construction activities; and emplace the waste packages in the drifts?

Gathering information to help address much of this question is the focus of today's meeting. To facilitate that process, along with DOE representatives, we have invited representatives from the State of Nevada and the nuclear industry to participate in the discussions. The hope is that this approach will enhance the discussion and understanding of issues and challenges associated with implementing an integrated waste management system and related activities, such as equipment and facilities testing undertaken by DOE.

First on our agenda will be Dr. William Boyle, Director of the Regulatory Authority Office of DOE's Office of Civilian Radioactive Waste Management. As everyone is aware, DOE achieved a major program milestone with the submission to the Nuclear Regulatory Commission of a license application for construction of the proposed repository at Yucca Mountain. We look forward to hearing about what comes next and any developments related to the license application.

We will then have a panel discussion on waste acceptance. The panel will include David Zabransky from DOE and Adam Levin from industry, or Exelon Corporation. After a short break, there will be a panel discussion on transportation. This panel will include Gary Lanthrum from DOE, Steve Edwards from Progress Energy, and Robert Halstead from the State of Nevada.

After lunch, we will get an update on the Surface Facility design from James Low and John Orchard from DOE, followed by a presentation on Repository Site Operation by David Rhodes from DOE. Following a short break, a third panel, which includes David Zabransky from DOE, Steve Frishman from the State of Nevada, Adam Levin from Exelon Corporation, and Rod McCullum from the Nuclear Energy Institute, will discuss integrated system operations. The presentation of the day will be on DOE's Equipment and Facility Testing Program by David Rhodes from DOE.

Following the meeting presentations, we have scheduled time for public comment, which is always important to the Board. If you would like to comment at that time, please enter your name on the sign-up sheet at the table near the entrance to the room. If you prefer, remarks can be submitted in writing and will be made part of the meeting record.

Now, some of you have asked about questions during the course of the presentations. Our preference is for you to write down your questions and submit them to Board staff seated in the back of the room near the entrance. And, if time permits, we may present the questions during the meeting, but certainly the questions will be addressed.

As usual, to minimize interruptions, we ask that all of you turn your cell phones to their silent mode. And, I also want to remind everyone that it is very important for you to identify yourself and speak into the microphone when you have a question or wish to make a comment.

At this time, it is my pleasure to ask Bill Boyle to come and give us a heads up on what’s going on.

BOYLE: Thank you for that introduction, and thank you for this opportunity to make this presentation. And, Ward Sproat and Chris Kouts wanted me to send their regrets and tell you why they couldn’t be here today. It’s because they will be at a hearing in the United States Senate on

transportation issues related to the repository.

So, my presentation is on a program and project status update. And, so, where I started was a presentation that Ward Sproat made at the recent High-Level Waste Conference, and I modified it, and I modified it to reflect more an emphasis on the NRC licensing process, in part because that's what I'm responsible for on the DOE side, and also because it's a very high priority for us on the project.

Next slide. This is a slide that Ward Sproat has shown many times in public over the past couple years, and he's modified it as we met our dates, or even came in ahead of schedule.

Licensing Support Network was certified ahead of schedule last October. It was subsequently challenged and our certification was upheld by the Atomic Safety and Licensing Board of the Nuclear Regulatory Commission.

The Supplemental Environmental Impact Statement was due in May 2008, and seemingly, we were late, but we actually extended the public comment period. And, so, in my eyes, taking that into account, that finished ahead of schedule.

The License Application, as Ward had committed in testimony to the Congress, was a high quality license application, was due no later than Monday, June 30, 2008. We submitted it on June 3, 2008.

The U.S. Nuclear Regulatory Commission docketed the

LA officially by letter to Ward Sproat, and subsequently in a Federal Register notice. And, that last tic, I'll talk more about. It's the docketing of the License Application is one step, but the next step that we're waiting for is a Federal Register notice from the Commission, and it would be a notice of hearings to tell the public that there will be legal proceedings and hearings related to the Yucca Mountain License Application.

Next slide. I know there's at least one NRC staff member in the room, so this is a DOE person talking about NRC processes. Any errors are mine. I would encourage anybody, if you really want to fully understand NRC's roles and processes, talk to the NRC. They're very open. They had a public meeting out in Amargosa Valley last night to talk to interested members of the public about their review, and the hearing process.

For those of you who don't know, it's actually there is two parallel processes going on. There is the Staff Safety and Environmental Reviews performed by the staff of the Office of Nuclear Material Safety and Safeguards, the technical people at the NRC, reviewing our License Application, and also our EIS, Supplemental EIS, our NEPA documentation. And, they review that according to the rules in 10 CFR Part 63, and 10 CFR Part 51.

Parallel, and independent of the NMSF's staff, is a

separate hearing process before Atomic Safety and Licensing Boards, one or more of them. And, the rules for those hearings are governed by 10 CFR Part 2. It's actually quite a long part for an NRC regulation. It deals with the rules for hearings for power plants and us. As you see down there for the last two sub-bullets, Subpart J is specific for hearings for Yucca Mountain.

And, most importantly, Appendix D provides a schedule for the hearing process, because the Nuclear Waste Policy Act mandates that this should take three years. And, so, the NRC went out, created a schedule, and showed, well, okay, it's on these dates--they don't give calendar dates because they didn't know when we would submit, and that sort of thing, so the schedule in Appendix D is expressed in terms of elapsed time, but they give a schedule for the three year review process for the hearings.

For those of you who have never been to a meeting of an Atomic Safety and Licensing Board, the boards are comprised of three judges, administrative law judges. One of the judges, the head judge, usually will have a legal background, and the other two judges, generally speaking, have more technical backgrounds.

These boards control the hearing process, including the schedules for the hearing process, where the hearings will take place, which, for many of our hearings, will be in

the NRC hearing facility down by McCarran Airport. These Atomic Safety and Licensing Boards make procedural rulings, including admissibility of parties and contentions, and party is a legal term. The Department of Energy will be a party at the hearing. The NRC staff will be a party. The State of Nevada has indicated it will be a party. Clark County has indicated it will be, the other Nevada counties have indicated they will all be parties to this legal proceeding.

The ASLBs conduct prehearing conferences, you know, to set the ground rules straight, including such things as how should we number and name the various legal documents we'll be using. The ASLB rules on discovery motions, other motions. They eventually conduct evidentiary hearings. And, I personally attended two half days at the ASLB hearings for the private fuel storage facility up in Utah, and it was quite illuminating to me. It's, to a non-attorney, it's a court of law, except that the three judges don't wear black robes. In all other respects, you know, they're judges, there's sworn testimony, there's a court reporter, and it really is a court.

As you can tell just by the words on this page, it really is a legal proceeding. And, at the end of the hearings, it's this Atomic Safety and Licensing Board that makes findings of fact and conclusions of law. And, the ASLB has the authority to authorize the NRC staff to issue a

license, or to condition or deny issuance of the license. So, they have a very important role to play.

So, this slide deals with some of the milestones in that hearing process, just the initial ones. These dates really come from either they have already happened, or they are specified for the most part in Appendix D to Part 2. We have tendered our License Application on June 3rd, and our NEPA documentation on June 16th. The NRC notified us by letter on September 5th of the docketing.

As I've already mentioned, we are now waiting for this Federal Register Notice of Hearing. And, when you go to the schedule in Appendix D, that is Day Zero. It's this Federal Register notice starts the three year clock.

If you were to go to that next bullet, as part of this process, if people believe our License Application is deficient in some way, shape or form, by omission or commission, they can petition to intervene. This is the State, the Counties, or anybody else who thinks they have a reason to want to intervene. And, if you were to go to Appendix D right now at the Federal Register's website, you would see that they have 30 days to file their petitions. Well, the Commission ruled recently within the last couple months, at the request of the State of Nevada, in part, to extend that time period during which contentions could be filed. The Commission has decided they would grant 60 days

for the filing of contentions. If you look at Appendix D today, it will say 30, but the Commission has already said it will be 60 days. As soon as those contentions are filed with the Commission, the Commission will forward those petitions to the Atomic Safety and Licensing Board.

Then, DOE gets to answer these contentions, you know, these when people say, well, you didn't do this right, or you forgot that. And the reason there's TBD there, to be determined, Appendix D does have a stated duration today, it's 25 days DOE would have to answer all of the contentions. But, when the Commission weighed in and said grant 60 days for the filing of contentions, the Commission also said, you know, we might want to double the amount of time for DOE, and anybody else, to answer these contentions, and, so, they suggested 50 and asked for input, but the Commission has not ruled finally on that yet. But, we might have as many as 50 days to answer contentions.

It's similar with petitioners' replies to DOE's answers. Appendix D today says seven days, but the Commission, in their ruling that granted 60 for the filing, suggested perhaps doubling to 14 days, but they haven't acted on that yet.

The next step would be an initial prehearing conference shortly after the receipt of petitioners' replies. And, then, the Atomic Safety and Licensing Board would grant

or deny these petitions. You know, people asking to participate, and admit or reject contentions, and we would continue on with the legal proceeding.

So, those are all the slides I have. That's where we stand on the licensing and License Application.

GARRICK: Go ahead, Ron.

LATANISION: Latanision, Board.

Bill, the filing of the Licensing Application is clearly an important milestone in the evolution of this project. Delivering it ahead of schedule is even more commendable on part of demonstration of the commitment of the staff and management of the project.

My question is the following. As we were leading up to the submission of the License Application, there were still technical questions of interest to the Board on the table, and, some responsive action being taken to address some of those concerns. I'm thinking of, in particular, of the localized corrosion issues that the Board has been concerned about for some time, and which Sandia had been moving towards addressing. Is it safe to conclude that that work will continue at Sandia and that we will hear about it?

BOYLE: I'm not that familiar with what is currently going on at Sandia, so, I just can't speak to it. I'd have to get back to you on that. But, as a general matter, I'm assuming people are aware that the, you know, it's not only

good business and good engineering and good science, but the NRC regulation, Part 63, does provide for a performance confirmation program, where, if there are technical matters that need confirmation, we can and should and will address them in performance confirmation. But, I don't know about anything particular going on at Sandia right now. Whether there is or isn't, I just don't have responsibility for that. Abe VanLuik has, though.

VAN LUIK: Abe VanLuik, DOE. Knowing that this question would come up today, I went and asked, and the things that we promised in the letter that we sent you on this topic earlier this year, those things are in the plan to be carried out this coming year. So, they will go forward.

LATANISION: And, therefore, we would be likely to hear about them; is that correct?

VAN LUIK: Correct.

LATANISION: I can see that we're much too predictable, Abe, if you--okay, thank you.

GARRICK: Mark?

ABKOWITZ: Abkowitz, Board.

Bill, I was wondering if you could speak on behalf of DOE, since you are their representative today, as to whether or not DOE sees the Board's role as having changed in any way, given that you have submitted a License Application. And, if so, in what manner?

BOYLE: No, I don't think it has at all. You know, I haven't looked at the Nuclear Waste Policy Act with respect to the Board in a while, but I do believe there is a time in the future, not today, where it actually says the Board sunsets, right, and it wasn't with the filing of the License Application. So, I think from DOE's point of view, you know, your role has not changed. You've, through the years, commented many times, made many good observations about technical matters, and we fully expect that that will continue.

Now, with respect to the recent letter that Ward sent, we're in the situation where, I hope it was clear from my slides, we are in a legal proceeding. And, you know, there's two things that play there. One is staying on schedule, that schedule in Appendix D, which is in a law, and the Commission, they have done all that they can, as far as I'm concerned, to stay within that three year schedule. They commissioned a special Atomic Safety and Licensing Board to deal with that issue solely. They asked the potential parties what can we all do to stay within three years? Please give us your input on the following things.

So, one challenge for us at DOE in interacting with you is, over the next three years, in particular, is at times, our higher priority might actually be responding to requests for additional information from the NRC staff as

part of the licensing process, or participating in the legal proceeding.

But, a second reason that our relationship is affected is as soon as the contentions become known, and those technical merits will be, you know, in a legal proceeding, we just as a matter of good business, good government, we are going to deal with those technical matters in the legal proceeding, right, rather than in correspondence with the Board or necessarily in public meetings with the Board. It happens all the time. I know when I watch television, people, you will commonly hear, well, I can't comment on that right now. It's part of an ongoing legal proceeding. And, that's where we find ourselves in a somewhat similar position. But, you're still free, you know, to make your observations. So, I don't think your role has changed. How we interact with you is somewhat influenced by the NRC proceedings.

GARRICK: Can you elaborate a little bit on how the decisions are going to be made relative to supporting Board inquiries?

BOYLE: I suppose they would depend upon the particulars at the moment. You know, in the future, like, for example, whether it's a 25 day period or a 50 day period to respond to the contentions, if you wanted to have interactions with the technical people who are responding to the bulk of those

contentions, that actually might be difficult. If the interactions during, even during the three years, but if it's at some timeframe where things aren't as hectic for any given individual, or for all of us, let's say, that's a different matter. So, I can't--I think they will just have to each individual situation would have to be judged on its own.

GARRICK: Andy?

KADAK: Kadak, Board.

I know you're not familiar with the Nuclear Waste Policy Act of 1987, Public Law 100-203, December 22, 1987, Subpart E, I'm putting this in for the record so that the public is aware about our functions.

BOYLE: Okay.

KADAK: And, I'm quoting, Section 503, "The Board shall evaluate the technical and scientific validity of activities undertaken by the Secretary after the date of enactment of the Nuclear Waste Policy Act of 1987, including site characterization activities, activities relating to the packaging or transportation of high-level radioactive waste or spent fuel." And, then, the next subpart, which says, "Investigatory powers. And production of documents," which I assume would be responses to our inquiries.

It says very clearly, "Upon request of the Chairman, or a majority of the members of the Board, and subject to existing law, the Secretary, or any contractor of

the Secretary, shall provide the Board with such records, files, papers, data, or information as may be necessary, to respond to any inquiry of the Board under this title. Subject to existing law, the information obtainable under Paragraph 1, shall not be limited to final work products of the Secretary, but shall include drafts of such products, and documentation of work in progress." It makes no stipulation about whether the License Application is filed or not.

BOYLE: And, I think, again, I don't think your role changes at all. And, I'm just repeating that. And, I think those production of documents, you know, back to my mentioning the LSN certification, as a general matter, we've made all, you know, our documents related to Yucca Mountain, relevant and non-relevant, available. And, you know, a request for our existing documents, I don't think you would be told no.

Now, if there's a request for a document that's subject to some sort of privilege, one way or another, well, I'm not the person to answer that. DOE's attorneys would.

GARRICK: Is there anything that the Board could do to facilitate an understanding of the working arrangement between DOE and the Board? Or, do you think--

BOYLE: No, I would say our relationship, DOE and the Board, or DOE's relationship with anyone just, you know, discussions, conversations, you know, meetings to see are

things going well, could we do them differently, could we do them better, more of this, less of that, so I would just encourage discussion and conversation as we move forward.

GARRICK: From the standpoint of topics, even though we may have a number of topics that overlap with the licensing process, very often, our perspectives are very different from compliance. We are not compliance experts. We are not students, necessarily, of the rules and regulations. We are trying to focus from the standpoint of the science basis, or the engineering basis, of the issue. Do you believe that that difference in perspective on issues that may be common to both licensing and the Board, because that's where it looks like we're going to have the problems, is understood by whoever makes the decisions about supporting our inquiries?

BOYLE: You know, from my point of view, the role the Board plays, and that you will continue to play, is a healthy one, right, whether your comments support us or you're pointing out where maybe we have a blind spot, or would miss something, that's helpful and we wish to know it. All that the letter communicated is is that from our part, we may not respond in writing or participate in a public meeting on that topic if it's subject to the ongoing hearing process. But, we welcome your input. We not only welcome your input, we'd welcome input from others.

GARRICK: We understand that, and we agree that you

probably do welcome our input. But, what we're really concerned about is your response. Because the Board's effectiveness is very much linked to DOE's response.

BOYLE: And, you know, again, our responses, although our present course is we've indicated our responses will come through the legal proceeding, I must point out that those are a matter of public record. It doesn't take much effort, and you'd have to contact the NRC, to be put on automatic e-mail distribution for all the filings that go on with the ASLB. You could ask, you would eventually probably get more e-mails than you want, but when there were, you know, you could have access to the depositions, you could have access to all the--you could see all the contentions, all our answers. And, so, we're just--that's the forum in which we're participating, and that's where you will see our responses. And, it will all be publicly available.

GARRICK: Yes, go ahead.

KADAK: In terms of your finding for the RAIs and contentions, in terms of staffing and resources, what are you assuming you will be getting in terms of RAI, in terms of numbers and contentions, in terms of numbers, to be sure that you're able to respond?

BOYLE: Well, that's a very good question. I've already mentioned the Commission impaneled Atomic Safety and Licensing Board to work with the potential parties to figure

out, you know, how can we stay within three years. And, one of the questions asked of the potential parties was, well, how many contentions do you plan on filing. And, I believe it totaled out at 650, which by everyone's estimation, this may be the most complicated, you know, hearing process the NRC ever has. And, even with an estimate of 650, that's helpful and useful, and there's an agreement that contentions will be single issue contentions.

But, just what does that mean to everyone? Like, for example, if the contention has to do with corrosion and temperatures involved, and the groundwater, you know, the incoming chemistry of the water, is that separate contentions? You know, like the temperature dependency is one, the groundwater chemistry is another, or is it all wrapped up into one? So, we'll have to wait and see when the contentions are filed.

But, we do have an estimate. We don't have an estimate from the NRC staff. I've never been asked on how many RAIs they might request for additional information they may have for us. But, we can look at other NRC licensing proceedings, you know, not Yucca Mountain. We could look at the reactor licensings, and that sort of thing. And, there can be quite a few of those.

Now, as to do we have sufficient resources, we haven't even gotten an appropriation yet. We will just--we

will, with the resources we have, bearing in mind that this is a very high priority, this is where our resources will go.

KADAK: What is your budget now in terms of--what are you asking for in terms of staff years to work on this?

BOYLE: You know, we just--I'm always stuck in this conundrum of trying to remember is the continuing resolution number. I believe that the President's budget asked for 480- or so million. And, that would be for the entire program. That's everything, transportation, attorneys, ongoing design, RAIs, that's everything, interactions with the Board.

GARRICK: David?

DUQUETTE: Duquette, Board.

I don't know if I heard you correctly when you said this, or if you said it, but it sounds like virtually all of your resources will be going towards the licensing. Does that mean that work at Yucca Mountain itself will come to a screeching halt?

BOYLE: No. It's a high priority for us, but as of this moment, not all the resources are going to the licensing. There is construction management and site operations office, they still have a budget. Gary Lanthrum is in the room, transportation, they still have a budget. You'll hear from Dave Zabransky of the Waste Management Office. He still has a budget. No, it's just that the licensing proceeding is a high priority.

GARRICK: Any other questions?

(No response.)

GARRICK: Any questions from the Staff?

(No response.)

GARRICK: Okay. Well, thank you. Thank you very much.

BOYLE: You're welcome.

GARRICK: We're ready to have our first panel, which is going to be on waste acceptance. I'm sorry to catch you off guard a little bit. We're a little early.

This panel is made up of David Zabransky of the Department of Energy and Adam Levin of Exelon Corporation. And, I'm going to ask each of you to introduce yourselves and tell us your position and what you're doing.

ZABRANSKY: I'm Dave Zabransky from the Waste Management Office. I've been with DOE for 14 years now. Prior to DOE, I was with Wisconsin Electric for 17 years. Primarily since I've been at DOE, I've been in the Waste Acceptance/Waste Management area. Activities, or what I normally do there is I'm the contracting officer for the standard contracts, so I've been spending a lot of my time, and Bill mentioned these new legal proceedings and the license application, I'm been involved in the legal proceedings on the waste acceptance issues since about 1996. I've been in 14 trials, and I have about 40 more to go, on many of the issues that we'll be talking about today, so that will temper some of my comments.

I've also been the technical lead on the development of the TAD specification and the deployment of the TAD contracts. That's the Transportation, Aging and Disposal canister. And, I'm also heading up the effort to develop contracts for new nuclear reactors and amendments to current contracts for the use of TADs. And, I'm a civil engineer.

LEVIN: Good morning, Mr. Chairman. And, thank you again for the invitation to the Board members. My name is Adam Levin. I'm the Director of Spent Fuel and Decommissioning for Exelon Corporation. And, in that capacity, I have oversight of all of our spent fuel storage and installation, as well as our spent fuel pools, and our activities in decommissioning. I have been with Exelon Corporation about ten years now, and I've actually been in the business of spent fuel and decommissioning for over 30.

GARRICK: Very Good. Okay, carry on.

ZABRANSKY: Okay, I've got a few slides that deal with some of the issues the Board asked about with respect to the waste acceptance area. After I go through the slides, I'll be happy to entertain any questions you have, and attempt to answer them to the best of my ability.

So, basically, what we're going to talk about today is the waste that is included in the License Application, the status of the TAD program, contractually and where we are

physically with that, the basis for the assumption in the LA of up to 90 percent of the waste may come in as TADs, the plans for packaging and shipment of DOE owned high-level waste and spent nuclear fuels. We'll cover those points, and I'll take your questions.

First slide. The License Application, as you know, is for 70,000 metric tons. So, in that 70,000 metric tons, it has been divvied up by policy within the Department to be 63,000 metric tons of commercial materials, 7,000 metric tons equivalent of DOE owned and managed materials. That equates to be, as we go down this list here, about 7,500 TAD size canisters of spent nuclear fuel in the 63,000 tons, 221,000 assemblies is the supposition there. 275 canisters of commercial high-level radioactive waste. And, that's the waste at West Valley, New York. That's not government owned waste. That's owned by the State of New York. It's included in the analysis of the License Application, although at this point in time, there's no contractual relationship for us to accept that materials.

Defense high-level waste, there's about 9,300 canisters of defense high-level waste to be produced by Savannah River, Hanford and Idaho. And, that's not all the high-level waste, but that's all that's included in the LA. There's about 3,500 canisters of DOE owned spent fuels, about 2,268 metric tons equivalent. And, there's also about 400

canisters of Navy spent nuclear fuel, or about 65 tons equivalent.

The next slide deals a little bit with the availability of TADs, and where we are with the program. As you know, the Transportation, Aging and Disposal canister concept was first brought up in late 2005. DOE worked with industry and others, and developed, I think in a very informed fashion, getting input from various parties, a spec that allowed us to--it's a performance based spec that defines the attributes we need to see in a TAD canister, but leaves a lot of the design features up to individual designers as to how they intend to meet them. That spec was issued in June of 2007, and design proposals were submitted to OCRWM at that point in time. That was done from existing contractors that we had in place for other work activities.

Based upon those proof of concept designs, we went ahead and developed a procurement and did solicitation, and as a result of that solicitation, which took the better part of a year, I believe, we awarded two contracts in May of 2008 to NAC International and AREVA Federal Services for the follow-on design activities for the design, licensing and demonstration of TAD canister systems. Those are contracts that have a base period and action periods. They run from May of 2008 to May of 2013, and at the end of the contracts, should they be implement, the intent would be that by May of

2013, there would be the physical demonstration of the TAD canister at one or more utilities by those contractors, leading to, we believe, the commercial availability of TADs in 2013.

Additionally, there is nothing that prevents in the fact that the Department has encouraged other vendors, other cask designers, that don't have contracts with us to go ahead and design TADs on their own. And, in fact, we are aware of at least one cask designer that is pursuing on his own the development of a TAD canister system.

The programmatic assumption that was made and is embodied in the LA is that up to 90 percent of the waste, commercial waste, would arrive at Yucca Mountain in a TAD canister, prepackaged at utility sites. And, that's an assumption that's made in the LA for the first 63,000 metric tons of waste. It's not all the waste that may exist. It's only a goal, an assumption for that first 63,000 tons that is covered in the License Application.

That assumption is based upon information we had obtained from our discussions with the utilities in 2005. In the 2004-2005 time frame, we went and asked utilities to provide us updated information as to their site handling capabilities. That was an update to information we obtained in the Eighties, originally in the late Eighties, the Department--mid to late Eighties, the Department had

proceeded down a path of at that time what was called the FICA, which was the Facility Interfaced Capability Assessment, and then NSTI, which was the Near-Site Transportation Interface. What we basically did in the 2004 time frame, and this was done in preparation for at that time our anticipated operation of 2010, we asked utilities to voluntarily provide updates to that information, and many utilities did. We don't have any specific authority to demand they provide that information to us, so we can merely request that they provide information to us.

Based upon that information, the assumptions that went into the development of that goal of 90 percent was that sites with rail cask handling capability, including shutdown sites and Morris, were assumed to load TAD canisters. Commercial spent fuel in non-canistered dry storage assumed to be loaded into TAD canisters for shipping. That would be the transport storage casks. And, that TADs would be available for dry storage at reactor sites by 2013.

There are also some potentials that--we go to the next slide--that for sites that couldn't handle TADs, that those could be packaged at third party sites. Now, whether that happens or not is not known, but it's a potential that a utility could contract, or we could contract, with a third party to do that packaging for us off-site. And, that with the increasing need for dry storage at reactor sites, there

has been a trend to upgrade cask handling capabilities to handle large canisters. These facilities had no capability of doing large canisters, large packages, now do. They've upgraded facilities, they've upgraded trains, so we think that trend will continue, and that more and more facilities will be capable of handling large packages.

Moving on to the next slide, these are plans for packaging and shipping DOE high-level waste. We have a memorandum agreement with the Environmental Management program that, in essence, forms the basis for our relationship. It's very similar to the contract we have in place with the nuclear utilities. It defines the roles and responsibilities of the parties. Pursuant to that agreement, EM is responsible for packaging the waste for shipment to Yucca Mountain. And, at this point in time, the only DOE wastes that will be accepted are wastes that are packaged in standard DOE SNF canisters or high-level waste canisters.

After packaging is done, OCRWM is responsible for providing transportation casks for shipping the high-level waste and canisters to the repository. And, one of the assumptions that's been made and has been discussed within the Department for years is that the repository will not accept hazardous waste, as defined by the Resource Conservation and Recovery Act. So, in essence, no RCRA wastes will be accepted from EM for Yucca Mountain.

A summary of these slides is that the License Application is based upon a capacity limit of 70,000 tons. It doesn't cover all the commercial waste. It doesn't cover all the DOE waste. It covers only the waste pursuant to that capacity limit.

The current expectation is that TAD canisters will be commercially available in 2013. The assumption programmatically has been made and is embodied in the LA is that TAD utilization can be as high as 90 percent. I think later today, you will hear from others about the modular approach to design and flexibilities that result from that modular approach. This assumption is what the LA is based upon. Changes can be made if need be if this assumption doesn't come to pass.

EM is responsible for the preparation and packaging for shipment of DOE high-level waste and SNF, and that OCRWM is responsible for providing the transportation of the materials to Yucca Mountain.

At this point, I will take your questions.

GARRICK: Thank you. Adam? I think the way we'll do it is we'll hear from both of you, and then we'll ask questions. Okay?

LEVIN: Go ahead to the first slide, please.

As a little bit of background to Exelon Generation, we operate a fleet of 17 units. We have four retired units.

The four retired units being the two units at Zion station, Dresden Unit One, which retired back in 1985, and Peach Bottom Unit One, which retired in 1975. It was a gas cooled reactor. The fuel from Peach Bottom Unit One has already been--I'm sorry, can you turn this up a little bit?

Okay, excuse me, I have a little sore throat today, so I'm a little soft. Thank you.

Peach Bottom Unit One, which was retired back in '75, that was a gas cooled reactor, and that has been, the fuel from that facility has gone up to Idaho.

We do represent about 20 percent of the nuclear industry, and looking longer term at how much spent fuel we're going to discharge, we expect about 115,000 assemblies to be discharged eventually from our facilities through license renewal. And, these are mostly BWR assemblies. So, if you're looking to try and match the numbers that David presented just a moment ago where he said he had about 225,000, recall that most of our fleet is boiling water reactors, so we're going to discharge a larger number of assemblies, and about 25,000 metric tons total.

From a used fuel management perspective, we have currently operating five dry cask storage facilities at the sites identified on the slide, with more than 100 systems on the pads at this point. We are in the process of constructing three additional facilities at Byron, Braidwood

and LaSalle, Byron in 2009, LaSalle in 2009, and Braidwood in 2011.

One of the things that David mentioned was that many of the facilities have or intend to, have already or intend to upgrade their cranes to accommodate these large dry storage systems that are currently available, and, in fact, we have done some upgrade work at Limerick, Oyster Creek and Quad Cities. And, we are actually upgrading the cranes, in the process of upgrading the cranes at Byron, Braidwood and LaSalle as I speak.

Clinton Station, we don’t expect to dry cask store there until about the 2016 time frame. We just recently rewrapped the pool and obtained a large number of cells increased the storage, and TMI, we do not anticipate, given its current license life of 2014, although we have renewed the license, but if DOE does begin repository operations in 2020, we do not anticipate that we would have to go into dry storage at the TMI site for Unit One.

Zion Station, we are in the process right now of waiting for the NRC to rule on a license transfer application that’s been submitted to the NRC to transfer the license from Exelon to Energy Solutions and their subsidiary, Zion Solutions, who is going to begin on the early decommissioning, the accelerated decommissioning at Zion Station. We expect that we will have between 80 and 85 casks

of fuel in storage at Zion Station at the end of the day, with four or five casks greater than Class C waste. So, as I mentioned, the one thing that we're waiting for is the NRC's approval of that license transfer. This will be a ten year process we hope to complete in 2019, or so.

Looking specifically at the future use of TADs, and what we're currently doing in terms of strategy with respect to managing spent fuel in our dual purpose systems, DPCs, one of the things that we're focused on is trying to be sure to load intermediate heat spent fuel into the canisters, along with lower heat spent fuel on the periphery. It actually turns out that from a fuel management perspective, this works well for us because one of the things we're focused on is keeping radiation doses, occupational doses as well as reasonable. And, the way to do that is to keep your cold fuel, your older colder fuel for the periphery of the cask where you have to do the sealing and welding of the cask.

So, in essence, in the long run, we will actually be able to focus on maintaining older colder fuel, a large population of it, for TADs when they do become utilized.

We currently have 10,000 tons of used fuel in our pools, with about 1,000 tons out in dry storage at this point in time. By 2013, by the time TADs are ready to be utilized by Exelon, we will have about 2,400 metric tons in dry storage, and that's 2,500 of the 25,000 we anticipate, and

that was one of the things that Dave alluded to earlier, that up to 90 percent, and in our case, it could be as much as 90 percent of our spent fuel, can go in TADs if we, indeed, we successful in beginning a TAD program in 2013.

We also will have 5,000 metric tons of fuel in our pools, and I anticipate that as the TAD program ramps up, that what we would be doing is loading the TAD systems from our pools. So, we would have about 5,000 tons ready to go in TAD systems by that point in time.

Next slide. Exelon had the opportunity to participate in the technical dialogue of the TAD design. And, I think we're quite comfortable that the TAD system will work at all of our sites. The one site that it would not work at at this point in time would be Clinton Station. We have a 60 ton non-single phase crane there. I do expect we would upgrade that crane in the 2016 time frame when we do need to go into dry storage. Other sites, I would anticipate nominally that they would just require the specific, TAD specific ancillaries that interface with the crane in order to be able to move TADs around the site.

We have entered into discussions with a couple of vendors at this point for TAD demonstration systems. We would like to exercise that opportunity at one PWR and one BWR, probably a BWR out in the East, and a PWR at either Byron or Braidwood.

In summary, we don't see any technical obstacle to using the TAD systems. I think for us the focus has to be on two points, the first point being that we have to be able to implement the system without interruption of site operations. And, I'm going to actually talk about that a little bit more this afternoon. And, the second piece is although the TAD systems are smaller, if we can stay focused on reduced processing time, which is the big driver in terms of actually getting a system loaded and out on the pad, if we stay focused on that, we think we can be successful loading TAD systems.

So, we do see the benefits to using TAD systems. But, again, ultimately, it's going to have to be a business decision, the business drivers being the two that I just mentioned.

That's all I have.

GARRICK: Okay, thank you. Okay, we'll open it up for discussion. Mark?

ABKOWITZ: Abkowitz, Board.

I'm going to ask a couple questions, and then ask to have the opportunity later on to ask some more.

GARRICK: We'll decide on that later on.

ABKOWITZ: Okay. I'd like to start with, Dave, I have a couple questions about your presentation. One is that there is a recent EPRI report that came out that suggested that the

90 percent assumption was off base, and that 75 percent was a more realistic assumption. So, I'd like your reaction to that.

ZABRANSKY: Okay. My understanding is that we will address those issues during the license proceedings, should they become contentions. Right now, that's an EPRI report, that we have no further comment on.

ABKOWITZ: Okay, thank you for that comprehensive response.

The other question I had is my understanding is that some of the DOE high-level waste and spent nuclear fuel, from a waste acceptance standpoint, is dealing with some problematic issues. I was wondering if you could elaborate on those, and comment to the extent of how that might affect the kind of loading that you had anticipated being able to make out of there, and what kind of implications that has on the number of canisters you might need to use.

ZABRANSKY: Could you be more specific?

ABKOWITZ: Sure, I can be more specific.

ZABRANSKY: Okay.

ABKOWITZ: My understanding is that there are some issues with regard to the MCO waste packages. There's also some issues with regard to some of the high-level waste that may or may not satisfy RCRA requirements, and there's also the lack of facility at INL right now, the packaged spent

nuclear fuel, all of which means that you may have to put less into each canister because you're not able to make the combinations of five high-level waste canisters and one spent nuclear fuel canister per shipment, as you had anticipated.

ZABRANSKY: Okay. And, I guess I'll address that to the best of my ability. You know, as we talked about, the LA presumes, it's a licensing basis for what we think will occur, and it's our analysis of that. Some of the materials you talked about, the MCOs, for instance, it's my understanding they are included in the LA from the standpoint of the long-term waste isolation perspective, postclosure perspective. Further work needs to be done on the preclosure perspective, and those analyses are ongoing, and we believe that those analyses will show that there's probably be no issue with the acceptance of those materials.

Until those analyses are done, and any amendments that may be required are made, the materials won't be accepted until we can demonstrate compliance with the LA.

With respect to EM's future plans, as I said earlier, we've got a relationship with them through the memorandum agreement that's very similar to the relationship we had with the utilities. Under our contracts with Mr. Levin and others, the process that's set up is they tell us 63 months prior to operations what they really intend to send to us. EM also has to send us a listing of here's what we

are intending to send to you 63 months prior to operations.

The basis for the LA is our understanding of what EM's plans are. EM has to move forward and implement those plans so they can provide those wastes to us. If other wastes are, or those wastes don't exist because they haven't been successful, or haven't had the resources, we'll have to adjust later on to that situation.

ABKOWITZ: Can you answer if, I'm going to pose a hypothetical for you, perhaps you can answer this question. If it turns out that the DOE is not able to optimize the loading of high-level waste and spent nuclear fuel canisters collectively into the same waste package, do you agree that that means--I understand waste acceptance can still take place--but, do you agree that that would mean that there would be more shipments that would need to be handled at the surface facility, and the possibility that the drifts might need to be longer to accommodate the number of waste packages that would have to be put in there?

ZABRANSKY: And, again, I'll give you an answer that I'm sure you're not going to find satisfying. But, I can't speak to hypotheticals without knowing all the circumstances at the time. So, I don't know. I don't know what the ramifications might be without knowing exactly what the parameters might be. All I can say is that whatever happens will be consistent with the license that exists.

GARRICK: Let me raise a question with Adam, and try to get out of this licensing constipation we're in with respect to responses to questions.

Adam, can you comment, you said something to the effect that you thought that Exelon could meet the 90 percent assumption. Can you, I'm a risk guy, how confident are you with that thought? And, how low might it be? What is the practical situation in your own operation, relative to TADs, because TADs, the success of TADs is very much dependent upon how much it reduces the fuel handling requirement. If you have an offsetting issue, like thermal management and the need to do blending, and what-have-you, that completely offsets that advantage, then, of course, the TAD concept becomes somewhat suspect from a cost benefit--cost risk benefit standpoint.

Speaking from your own inventory of fuel, does TADs, in your judgment, offer a real advantage? And, what is that advantage in whatever terms you'd like to give, a radiation dose, cost, fuel handling, whatever?

LEVIN: Okay. I suppose I can answer this a little bit more freely.

GARRICK: I want to get a real operational--

LEVIN: I'll go ahead and do that. I think the first thing is that I view our opportunity to put up to 90 percent of our fuel into TADs based upon a very successful immediate

deployment of TAD systems. Clearly, if it's delayed, or if it's ramped up, or whatever, we're not going to get 90 percent in.

GARRICK: You're not going to get 90?

LEVIN: No. But, will we get more than 75 percent? I think that opportunity exists. Nobody from EPRI came to talk to me about that document, so honestly, I'm not sure how they got their 75 percent. But, the fact of the matter is that we do have, and I can focus on currently, because I, number one, have a lot of BWR plants, which is helpful, and, number two, because I relatively have not loaded a lot of fuel into dry storage at this point, I can focus on keeping, maintaining some older, colder fuel in my pools for that day when TAD systems do come along.

They will cost us more to load. They will increase our radiation dose. I think what I'm focused on is if I can load four dual purpose systems, let's say, in four weeks today, I need to be able to load six TADs in that same four weeks. I'm time constraint more than anything else at the site. So, my focus really is on processing these things quickly. And, that's really where the business case becomes an issue. And, that, I honestly don't know until we see TADs deployed and see how they work out in the field.

However, having said all that, I will have fuel that I can load into TADs that will be older, colder fuel

that will give me the opportunity to learn how TADs work, and hopefully get rid of a lot of TADs off-site initially.

GARRICK: But, it doesn't sound like TADs offers your particular complex of plants a particular advantage.

LEVIN: It does not offer a particular advantage in cost, dose or time savings.

GARRICK: Yes.

LEVIN: What it does offer are all those soft issues, which is we can have an opportunity, get our fuel off-site, number one, and, number two, we have the opportunity to look forward to being able to dispose of this fuel directly in a geologic repository without having to repackage it. So, that's where I think they offer the biggest benefit.

GARRICK: Yes. Andy?

KADAK: Kadak, Board.

Adam, perhaps you can help us understand the accumulation of dual purpose containers, or single storage only containers in the nuclear industry right now. And, how many of those containers do you think will be in existence by 2013?

LEVIN: I'm not sure that I could.

KADAK: Okay.

LEVIN: To be honest with you. I don't have that kind of information.

KADAK: Okay. Perhaps Rod McCullum can help us later on

this afternoon.

LEVIN: Sure.

KADAK: Now, the question I have is let's assume that's a big number, because I'm quite sure it will be a big number. You've already got, based on what you've said, is 185 by 2013, because you had 100 in storage, 85, if you think that's going to work out. I know Mainiak (phonetic) has got 63. Roe has got 17 or 18. We can add it to a fairly like number. According to DOE, they expect the utilities to open all those dual purpose containers that have been hermetically sealed, and repackage them, likely at the site, the site meaning the utility site. What is your reaction to that prospect?

LEVIN: I would hope that at some future date, that we can come to an agreement that the dual purpose systems can be taken off our site as they are. That's our goal, and that's the reason why we focus on loading dual purpose systems as opposed to single purpose systems, to have that opportunity available.

KADAK: But, your planning basis, though, is if you have to load a cask, it will be in a dual purpose or multi-purpose canister with perhaps, you know, 50 percent more fuel in it, spent fuel in it?

LEVIN: We will load dual purpose canisters until we are comfortable that we can load TADs regularly, in which case then we'll be loading TADs.

KADAK: Thank you.

GARRICK: George and then Mark.

HORNBERGER: I had a question. It may fall to be the same question that Andy asked, but I'm not technically competent in this area, but I'm reasonable facile with arithmetic. If I take Exelon as having 20 percent of the industry, and I multiply 20 percent times 63,000 metric tons of heavy metal, I get something over 12. And, on one of your slides, your 2008 inventory was something over 12,000. How does that flow affect how the kind of fuel you would envision packaging in TADs?

LEVIN: I'm not sure that it does at all. Again, my goal principally is to look at loading our current DPCs with intermediate to hotter fuel in the center, cooler fuel on the periphery, and maintaining an inventory of cooler fuel, knowing that to be able to ship fuel off-site, if my intention is to load fuel directly from the pool into a system that is transported, I have to keep lower heat, older, colder fuel to be able to put on the periphery of any transportation system that I intend to ship off-site immediately. So, that's what I'm focused on.

GARRICK: Okay, David and then Mark.

DUQUETTE: Duquette, Board.

A couple of fairly low level questions. David, you indicated, and I know why 70,000 metric tons is going to be

the number that's in the License Application, but you opened your statements by saying there's going to be more than 70,000 metric tons available for storage eventually. I'm probably asking a personal opinion, it doesn't have to do with the license constipation that John talked about, but what do you think is going to happen to the rest of the nuclear fuel? Where is it going to go? Is there going to have to be a second License Application to expand the repository? I mean, obviously, if there's more than 70,000 metric tons, you're only asking to bury 70,000, somebody has got to do something with the remainder.

ZABRANSKY: I think I can respond to that. Ward Sproat has talked about a number of times the Nuclear Waste Policy Act contains a provision requiring the Secretary of Energy to advise Congress as to the need for a second repository between, I believe, January 1, 2007 and January 1, 2010. Ward has indicated his desire to have that report to Congress done soon. I believe that that report should be done in the next couple months, and that report will offer the Secretary's opinion to Congress as to what he thinks should be done with the balance of the spent fuel from the current fleet of reactors. So, I would tell you that hopefully in the next couple months, the Department will put forth what it believes is the right thing to do with that excess inventory.

DUQUETTE: And, perhaps you don't want to answer the

next question, but it's tied to this one. And, that is, do you think it will be an expansion of the current repository, or actually a second repository?

ZABRANSKY: And, given the fact that I've been working on that report and that it's still in internal review, I think I need to tell you that that will wait until--I can't answer that until the Secretary weighs in with his opinion as to what should be in that report.

DUQUETTE: I think that flies in the face of what Andy said earlier, but I'm not going to discuss right at the moment as to what we're privy to as the Board.

The second part of the question is, and I'm probably going to be bringing this up a couple times today after Bill Boyle's presentation, given that resources are being, I wouldn't say redirected, but there will be considerable resources directed towards the License Application, do you see that as a delay in the development of the TAD program?

ZABRANSKY: No. I mean, Bill said that, you know, money is getting put where it needs to get put to make sure we meet the high priority items. The TAD program development has been a high priority item. So, while other activities that are not seen as being mandatory in the near term are being delayed, or funded at a lower level, the TAD activities are being fully funded.

DUQUETTE: But, you think it will be fully funded?

ZABRANSKY: At this point in time, I have no indication that it won't be. I mean, so far, it has been fully funded, and my belief is that it will be in the future.

DUQUETTE: Okay. A question now for Adam. And, like George, I haven't looked at arithmetic in a long time, but your slide indicated that you were going to provide 20 percent of the commercial nuclear industry's waste. And, then, I looked at your numbers, and it looks like 115,000 out of 221,000 doesn't compute at 20 percent. And, 25 metric tons out of 70,000 metric tons also doesn't compute at 20 percent. Would you help me with the math?

LEVIN: I'd be delighted. First of all, the 25,000 metric tons is based upon all of the plants receiving license renewal. And, I think the Department has already taken a look at that with respect to repository, a potential repository at Yucca Mountain, and identified that there could be up to 130,000 tons generated by industry. So, that 20 percent sort of fits into that number.

With respect to the number of fuel assemblies, as I mentioned earlier, we are a BWR fleet, predominantly a BWR fleet. So, we generate many more assemblies, which is why we'll represent roughly half of the number of assemblies, yet only 20 percent of the total MTU.

DUQUETTE: Okay. So, basically, the 20 percent is based

on the total possibility for nuclear fuel, not 20 percent of the 70,000?

LEVIN: That's correct.

DUQUETTE: It has to do with either expansion of the repository, or the designation of a second repository in New York City?

LEVIN: That's correct.

GARRICK: All right. Mark, Ron, and Howard.

ABKOWITZ: Abkowitz, Board.

Adam, I'd like to explore some of the business case issues with you in a little bit more detail. The first one has to do with the assumption that Dave made that the 90 percent included taking the existing spent nuclear fuel that's in dry storage and having it repackaged into TADs before it leaves. I would think that would probably be the technique of last resort from the standpoint of the utility, taking something that's already been taken out and putting it back in and redoing it. So, is it safe to assume, at least from Exelon's perspective, that the only way that that assumption is going to work is if a third party gets involved and moves it off of your site and does something else with it?

LEVIN: No, I think the answer to that is no. It's certainly what we're focused on is trying to be able to, once DOE performs, ship directly from our pools. And, we'll ship

directly from our pools for a long, long time. I'm not concerned about that. And, I would hope by that time, we figure out some opportunity for the repository to develop a facility that should be able to handle DPCs. That's the way I look at it.

ABKOWITZ: So, in some respects, playing off of the discussion you had with David, and your answer to that question, in some respects, everything has to work perfectly to get this first 70,000 in place, and then the remaining 65,000, or whatever it's going to be, a little of this, and a little of that, no one really knows how we're going to solve that problem, because all the sacrifices are going to be made to try to make the 70,000 work.

LEVIN: Well, at 3,000 metric tons a year, that's 20 years out, so I think there's some opportunity there for us to work some of those problems through.

KADAK: Mark, with your permission, could I just ask a follow-up question?

ABKOWITZ: Absolutely.

KADAK: Kadak, Board.

What do you do with sites that have no plants there, like decommission facilities, where spent fuel is currently stored? David, perhaps you can answer that question? What is your intention there, because repackaging at sites where there is no spent fuel pool is a little bit of

a challenge.

ZABRANSKY: Dr. Kadak, you know that I'm going to have to--my answer to that question, I'll have to deal with it within the constraints of my ongoing 12 year litigation, which is, and I'm following up with what Adam was saying, is the Department's position, the government's position has been clear that those canisters are not acceptable. So, that, until remediated, they won't be accepted into the system.

Now, having said that, as Adam alluded to earlier, we're always willing to talk with individual utilities about a combination that we might be able to make contractually to address those concerns.

KADAK: So, this is sort of DOE blackmail?

ZABRANSKY: It's dealing with the fact that we have a contractual relationship and a legal situation.

KADAK: And, logic be damned?

ZABRANSKY: We have a contractual relationship and a legal situation.

ABKOWITZ: If I may continue?

KADAK: Yes.

ABKOWITZ: We needed a constipation break.

Adam, I'm sure you've probably done some back of the envelope calculations, and maybe you can kind of help me work through this. What is the difference in the capacity of a DPC that you would typically be using now or anticipate

using in the next five years versus the anticipated capacity of the TAD?

LEVIN: The TADs will require about 50 percent more systems to load. So, where we may be loading four systems during an outage, or during the campaign, we'd be loading six instead.

ABKOWITZ: So, 1.5 TADs equal 1 DPC in terms of capacity?

LEVIN: Approximately.

ABKOWITZ: Okay. Now, what about cost?

LEVIN: I don't know the answer to that.

ABKOWITZ: Oh, come on.

LEVIN: I know the TADs are--no, I don't--I know the TADs are going to be more expensive. We're probably looking at something that's going to be twice as expensive overall when you include that 1.5 factor.

ABKOWITZ: Okay. So, basically, at the end of the day, if I'm doing some quick math here, it's per unit of waste handled, it's going to cost you three times as much if you use a TAD as opposed to a DPC?

LEVIN: No, twice to two and a half times as much, is my best estimate.

ABKOWITZ: Okay, So, you have done some back of the envelope?

LEVIN: No, just going by the one and a half.

ABKOWITZ: Okay. And, that, on a per package basis, or something, are we talking a difference in cost of millions of dollars?

LEVIN: Our current cost for loading systems are probably in the range of one and a quarter to one and a half million per system.

ABKOWITZ: Okay.

LEVIN: And, so, you're talking upwards of 3 million a system.

ABKOWITZ: 3 million a system. And, how many of these are we talking about over the waste that you have out there now, or that you will be dealing with? Are we talking about a $30 million differential, a $60 million differential, or $120 million differential?

LEVIN: Well, at a given site during a campaign, it would be about--well, it would be about $6 million per campaign at each site. So, if we had all unit sites that were all loading casks every year, at six sites or seven sites, it would be somewhere between $30 and $40 million with TAD systems.

ABKOWITZ: Per year?

LEVIN: No, no, no. It would be, let's say, roughly four systems a year per site, so 24 systems, so instead of being--it would be upwards of $70 million per year for us.

ABKOWITZ: For how long?

LEVIN: Versus 35.

ABKOWITZ: Okay, so $35 million differential per year?

LEVIN: Over the life of the plants, over the balance.

ABKOWITZ: Times 20? So, $700 million for one-fifth of the industry, and, so, that would then become $3.5 billion for the industry? Out of the generosity of the utility industry, are you going to take one for the team?

LEVIN: It is something that we feel we need to include as the cost of operation. If it's something we need to do, we will. And, we see the benefit on the back side of it being that we can go and tell the folks where we'd like to site a nuclear facility that, yes, we have closure to the nuclear fuel cycle.

ABKOWITZ: Okay, thank you.

GARRICK: Ron?

LATANISION: Latanision, Board.

David, I'm interested in the development contracts that have been awarded to AREVA and NAC.

ZABRANSKY: Okay.

LATANISION: I have the feeling that we've seen the 2007 system specifications for the canister, but we haven't heard a lot of conversation about the assembly and fabrication, and I don't remember the details. So, I'm going to ask you firstly, are they performance specifications, or are they process specifications, or both?

ZABRANSKY: Well, the specification we have is a performance spec.

LATANISION: A performance spec.

ZABRANSKY: It talks about what the TAD has to do, and what the criteria are for the TAD.

LATANISION: Okay. So, is it then at the--are the two contractors then at liberty to choose their approach to joining and fabrication and assembly, for example, or is this something that's specified at the stage for them?

ZABRANSKY: To the extent it's not important to the performance of Yucca Mountain, and it's not included in the spec, the answer is yes, they are at liberty to use different approaches for how they may manufacture items.

LATANISION: Okay. Well, my concern, from a materials point of view and from a corrosion engineering point of view, is two-fold. It would seem to me to be important to consider residual stress control, either by thermal treatment or other means. Is that part of the specification, first of all? Secondly, from a corrosion engineering point of view, we spent a lot of time in Board conversations over the years, and public meetings talking about crevices, some of which may be created by, even by dust accumulation. But, crevices can be created by fabrication as well, and I'm wondering what sort of let's say design verification is included in the development process with these two contractors?

ZABRANSKY: Okay. I think the way I would answer that is that the TAD itself is an inner container that goes inside a waste package overpack. It's my understanding that the TAD canister itself isn't credited for waste isolation. So, to the extent that there's an interface between the canister and the waste package, those specific performance requirements have been specified.

LATANISION: They have not been specified?

ZABRANSKY: They have been specified because there's an interface.

LATANISION: Okay.

ZABRANSKY: But, the waste package itself is the primary containment, and it will be done by DOE. So, the TAD vendors are creating an inner canister that is not being credited for isolation.

LATANISION: So, there's an interface then between DOE and the canister vendors?

ZABRANSKY: From the standpoint if there is an interface that affects the long-term isolation, that's been put in the specification. But, if it's not required for that, that's been left up to the vendors.

LATANISION: That's left to the vendors. Okay, thank you.

GARRICK: Howard?

ARNOLD: Arnold, Board.

This will be somewhat repetitive, but back on the canisters, the TAD canisters, we're assuming they will be commercially available in 2013, and that you will have worked out with all the utilities any commercial or other issues involved in their accepting them with gratitude at that point in time. It sounds to me as though you've got 20 percent of the industry on board. What are you doing to make sure the other 80 percent, some of whom don't plan new reactors, and wouldn't be motivated by issues involved in siting them, are you working hard to make sure they're accepted when they're available?

ZABRANSKY: I think, yes, the answer is the Department, following up on what Adam said in response to the questions, yes, we understand that part of the business case is to make the acceptance of TADs an overall positive thing for the utilities. We're working to that end. Obviously, we haven't worked with everybody yet. We have my resources and in the near-term, it will be focused on new reactors. But, we've had dialogue with Adam and other utilities about what type of amendments we could enter into for the contract in place that would be good for both parties, and would facilitate the early implementation of TADs, addressing the uncertainties of the time frame and when they may get implemented, and making sure that we don't do anything that--you know, our desire is as we go down that path, to address and implement TADs as

early as possible, is to not jeopardize their ongoing operations. So, it's more than likely going to be an individual discussion with each utility as to when it's appropriate to move to TADs as quickly as possible, and what we can do in return for them doing it.

GARRICK: Let me get a question--oh, go ahead, Ali.

MOSLEH: Mosleh, Board.

On this issue, to what extent are these factored into 2030, what are the controlling assumptions behind that date?

ZABRANSKY: The controlling assumptions behind that date are, again, we put together a procurement that has certain milestones, certain deliverable dates, certain expectations that the contractors must meet in order to be successful and get paid. And, the dates that were established, were established by the Department after discussions with many parties, industry, the cask vendors themselves as to what would be reasonable dates for things to occur. So, we think it's an aggressive schedule, but it's not an unreasonable schedule. We factored in cask vendor, as to it's going to take me this long to do this, and then we developed a schedule that we thought met our needs to the best possible, and was something they could deal with. And, quite frankly, it was something we put into the procurement, and when they bid on the process, recognizing that this is, in essence, a

fixed price contract, that if they didn't meet those dates, they wouldn't be successful and wouldn't receive compensation. So, I think it's a good schedule. It's one that they bid on. It's one they recognize the aggressiveness, but they can also manage it in a way that they think they can be successful.

MOSLEH: But, that depends on you not changing the requirements.

ZABRANSKY: Yes, it depends on the specification we have in place, being the specification we have in place, yes.

MOSLEH: And, given the uncertainties that you just alluded to, are they likely to change those requirements in the specifications?

ZABRANSKY: Now, which uncertainties are those?

MOSLEH: You were talking about, you know, the discussions with the other 80 percent.

ZABRANSKY: Well, again, those, I don't think those uncertainties, no, those kind of discussions won't change the spec. I mean, the inherent risk has always been that the spec represents our best belief as to what it takes to make these containers disposable. And, to the extent that that is a problem at some point, that will have to be addressed, but we believe that these containers, the spec represents the Department's best thinking as to what it needs to have. I don't think the discussions we're talking about with

commercial utilities will have any impact on the spec.

GARRICK: Andy, did you have a comment? And, then, David, and then I have a couple.

KADAK: Again, for David, will you be selling the TADs to the utilities, or giving the TADs to the utilities?

ZABRANSKY: It's a hard question. I never thought about it before. I have to answer that in context of the Department has received a lot of guidance in court as to what it can and can't do. And, one of the things we received guidance on is what we can use the Nuclear Waste Fund for. And, as you're aware, I believe, we did some--we had a settlement early on with PICO Energy back in the good old days of 2000, and after that settlement, we were sued by a number of utilities. It became known as Alabama Power. And, the courts told us we can't use Waste Fund dollars for on-site storage.

So, we are crafting a way of dealing with this consistent with the Alabama Power decision that doesn't have us using Waste Fund dollars for on-site storage.

Having said that, I think the approach we're going to take is, and we're not finalized yet, is that the utilities will have to purchase TADs. And, to the extent, once we agree to take them, we'll reimburse them at some point in the future when they're accepted.

KADAK: Okay. Now, what's the production rate of the

TADs per year, starting in 2013?

ZABRANSKY: I don't have any information on that either.

KADAK: All right, that obviously affects Adam's plans for use of TADs. The last question is I just want a clarification on the current situation with plants that are in--that DOE is paying the utilities for because of the failure to accept spent fuel in 1998. As I understand it, and correct me if I'm wrong, DOE is paying to these utilities a certain sum of money for costs incurred for storage at their sites, and these costs will continue until DOE will take the spent fuel from the utilities at their sites.

Getting back to my earlier, perhaps a little flip comment about sort of blackmail, aren't you paying right now for storage at existing sites, and wouldn't it be in the best interest of DOE to take that spent fuel from these sites, especially those that are decommissions, to avoid those kinds of costs?

ZABRANSKY: I have to clarify before I can answer, let me clarify. First of all, just to be precise, DOE is not paying any utility for storage. It's being paid by the Treasury Department pursuant to settlements entered into between the utilities and the Department of Justice.

KADAK: All right.

ZABRANSKY: DOE is merely acting as a technical advisor to the Department of Justice as to whether or not the costs

submitted by utilities are reasonable and allowable. So, that's technical, a legal analysis out of the way. And, the answer is yes, I mean, the Department, and Ward has said this a number of times, that the best thing we can do to limit that liability is get Yucca Mountain done and start accepting spent fuel in meaningful quantities.

KADAK: But, we're back to the question of if a facility doesn't have any capability to repackage, doesn't that really impress that you should probably take it--

ZABRANSKY: To that end, I'm not aware of any utility in that situation that we've paid a dollar to.

KADAK: How about Yankee Rowe?

ZABRANSKY: They have not received a dollar, to my knowledge.

KADAK: Maine Yankee?

ZABRANSKY: They have not received any money from the government.

KADAK: Boy, I thought I got a settlement award for $143 million.

ZABRANSKY: I believe those are all under appeal.

KADAK: Okay. Thank you for returning my token of memento.

GARRICK: Okay, David?

DUQUETTE: Duquette, Board.

After following the tangent that Andy just went on,

and since we seem to be running early and we can't let you guys off the hot seat yet, let me ask a hypothetical question to both of you. The concept of reprocessing comes up periodically. It's often shot down in budgets, and so on and so forth, but we're going to be looking at a new administration, which may or may not have some different philosophies on what to do with nuclear waste and nuclear power in general. Have either your office or the utilities factored into contingencies for things like TADs, and so on and so forth, the possibility of reprocessing waste in the future?

ZABRANSKY: I'll start that one. I think to that end, yes, the Department has obviously, the Global Nuclear Energy partnership as part of the Department of Energy, there have been discussions within the Department as to how the pieces fit together. And, I think that there's been testimony by Ward and others in different forum that, you know, reprocessing, longer term situation, that will get looked at and implemented, or not implemented in the future. We're going to have to deal with it as soon as possible, you know, the materials that will go to Yucca as direct disposal options. In the future, if things change, we'll have to address that and look at different opportunities, different ways of doing things, different waste forms. But, those are not near term waste forms, near term problems. As Dr. Kadak

said, it behooves us to do something as soon as possible, and as soon as possible is to begin development and deployment of materials at Yucca Mountain.

LEVIN: And, from our perspective as a utility, I don't believe that it has any impact with respect to our management of used fuel at this juncture.

DUQUETTE: Thank you.

GARRICK: I guess this goes to David. Earlier, we talked about a number of challenges facing the DOE waste stream, and depending on which scenario you look at, the DOE spent nuclear fuel contributes a disproportionate amount of the dose as well. So, there are some real issues, it seems, with respect to the DOE waste stream, and I'm wondering is there an analysis of these issues and documentation that the Board would benefit a great deal from understanding what it says and what the basis is, and what DOE is actually doing about being prepared to have its spent nuclear fuel and high-level waste accepted in the repository? It would be kind of embarrassing if their own waste was not accepted in their own repository.

ZABRANSKY: Just to clarify the question I'm hearing you ask, it's that when you say DOE, I've got to think of it you're talking about not RW per se, but what the owners of the waste, EM, Environmental Management, is doing?

GARRICK: Yes.

ZABRANSKY: And, I don't know that there's such a thing. I think that's a question that we could pose and find out. I know that there's always ongoing discussion between the programs as to what is happening and what's going on, but I think those issues as to how they're allocating resources, how they're prioritizing their programs, need to be answered by the senior management of the Environmental Management program, which is Spalling, Enez Terrez, Jim Mullendoff (phonetic), and perhaps those should be posed to them as to whether or not such analyses, or how their plans exist.

GARRICK: Well, it would seem that it would be very amenable to analysis because there are lots of issues, including the actual loading of the canisters and especially with respect to the co-disposal canister. And, it just occurred to me that there must be somebody that has really analyzed the different scenarios that we're talking about. And, a lot of our questions would probably be answered if there was such an analysis, and if we had access to it.

ZABRANSKY: I guess all I can say is that we will look into that and see what is available, and get back to you.

GARRICK: Yes. Okay, any other comments? Okay, go ahead, Henry.

PETROSKI: This is Petroski.

This question of the dual purpose canisters, and in conjunction with the recommendation for a second repository,

is the recommendation for a second repository limited to being of the same design as what is now defined by the License Application?

ZABRANSKY: I think, and, again, not getting ahead of the Secretary, because that's not a good thing to do, is that the requirement, pursuant to the Act, is to advise the Congress as to the need for a second repository. So, at this point in time, the Act actually prohibits the Department from doing any specific work as to the technical attributes of the second repository, or its site. So, the first step is to identify whether or not such a thing is required, and that's what would be in this report, is the Secretary's determination as to whether or not there is the need for a second repository.

PETROSKI: But, at the same time, it doesn't rule out accepting dual purpose canisters?

ZABRANSKY: Again, let me just clarify, that's not a technical issue. That is a commercial issue. It doesn't change the commercial issue at all.

PETROSKI: Could you spell out that distinction for me?

ZABRANSKY: Well, technically, you know, Yucca Mountain is being designed to have facilities that would be capable of accepting some number of dual purpose canisters and repackaging materials into TADs. That's a technical requirement. Whether or not the Department does that is a

commercial discussion.

PETROSKI: Okay, I see. Thank you.

GARRICK: Yes, Mark?

ABKOWITZ: Abkowitz, Board.

Dave, let me just follow up on Henry's question. If the Secretary comes up with a recommendation that rather than having a second repository site, it's more desirable to expand the capacity of the existing Yucca Mountain proposed site, does that mean that the design that's in place right now would be the same design for the waste in excess of 70,000 metric tons?

ZABRANSKY: I can't speak to that point. I don't know.

ABKOWITZ: Because you're dealing with somewhat the same surface facility and the like, so, does that mean then you need 90 percent TADs out of the second part of that operation as well?

ZABRANSKY: And, again, I can't speak to what might happen as to what the recommendation might be and how it's implemented. Congress first would have to agree with the recommendation--

ABKOWITZ: So, it's conceivable then if the repository were expanded, that after 70,000 tons, we'd have a long pause and we'd take down a bunch of facilities and build new ones, and open up a second, you know, an annex that would look very different?

ZABRANSKY: Well, again, the reason that this process is taking place today, and that Ward wanted to do it sooner rather than later, is to ensure that whatever the decision is, is that there be continuity. 70,000 tons is going to take us until 2050. Based upon the recommendations made in 2008, 2009, the hope would be that we'd be ready to move to the next phase without interruption.

GARRICK: Adam, I have a question for you. What do you consider, what have the utilities considered to be the greatest challenge in implementing the TADs concept, or challenges?

LEVIN: Probably, to me, the single most challenging aspect of it will be integrating it into plant operations. I can tell you that even taking four to five weeks, or six weeks, out of plant operations schedules to load dry casks is a challenge. We certainly don't want to extend that time frame too much, if we go to loading 50 percent more systems in TADs. So, we're going to be very focused on ensuring that given the use of TADs, that we can accommodate that in plant operations.

GARRICK: So, it's a matter of getting rid of the fuel in a timely manner?

LEVIN: Right.

GARRICK: Howard?

ARNOLD: Arnold, Board.

I gather from that that you have to shut down your reactor to do that?

LEVIN: No, we do not. It's just for--the reason it becomes an issue is competing resources, particularly for the large cranes at the plants.

GARRICK: Okay. Any questions from the Staff? Yes, David?

DIODATO: Diodato, Staff.

I wanted to follow David Zabransky to make sure I understood the comment you made about whether to go with TADs or dual purpose canisters. Did I hear you correctly in saying that's a commercial decision not a technical decision?

ZABRANSKY: Again, I think the context was the decision at a utility site?

DIODATO: Well, you said disposal of--did I hear you correctly disposal of these canisters was a commercial not technical decision?

ZABRANSKY: Of dual purpose canisters.

DIODATO: Yes.

ZABRANSKY: What I was responding to was the acceptance of those is a commercial decision that needs to be made by the Department in agreement with the utilities.

DIODATO: Yes. So, not the disposal?

ZABRANSKY: It doesn't speak to the disposal.

DIODATO: Okay, thank you very much.

GARRICK: Any other questions? Gene?

ROWE: Rowe, Staff.

I've just got a quick question. First of all, Adam, when you load the dual purpose canisters or TADs, do you do that during plant operations? And, it's only a manpower issue?

LEVIN: Yes, we do.

ROWE: A quick one for Dave. I realize the License Application has a 63/7 split between DOE and commercial. Is that a decision that if DOE decided for some reason, you could change that split? Forget the fact that you're going to have to do a whole bunch of analysis, but if it turned out that you needed to change that split, is that under DOE's power to do that?

ZABRANSKY: Again, I think that decision goes back to an intra-departmental agreement between the Office of Civilian Radioactive Waste Management, Environmental Management back in the mid Nineties, that that's how we'd implement the co-disposal approach, commercial waste and defense waste.

ROWE: But, it's a DOE decision?

ZABRANSKY: I believe it is, yes.

ROWE: Okay, thank you.

GARRICK: Okay, any other questions from anybody?

(No response.)

GARRICK: All right. Well, thank you. Thank you very

much. It's a good session.

Okay, we're scheduled to have a break. I think we'll break from now until about 10 after.

(Whereupon, a brief recess was taken.)

GARRICK: We're now ready to move to the Transportation Panel. And, Board member Mark Abkowitz will be leading the discussion on this particular session.

ABKOWITZ: Abkowitz, Board.

Thank you, John. The way that we're structuring the program today, as you probably can see, is we're looking at the entire preclosure operation as an integrated waste management system. Obviously, the first step is to figure out how to package and get prepared for shipment the wastes that are residing at various locations around the country, both at DOE facilities and commercial facilities.

We're now moving on to the transportation component, and we view that component as essentially having shipments ready to egress the shipment origin, and we are exploring how they make it to the fence line at the surface facility at Yucca Mountain.

We are fortunate today to have three representatives on our Panel, who will be able to speak to us from their perspectives on the transportation component, Gary Lanthrum representing the Department of Energy, Steve Edwards representing Progress Energy, one of the primary shippers in

this particular case, and Bob Halstead representing the State of Nevada.

Similar to the Panel that we had prior to the break, we're going to ask each of the panelists to give a formal presentation in sequence without any questions from the Board, and then we'll open it up for a more general discussion and question and answer period.

I'd like to ask each of the panelists to give a brief introduction in terms of their background, and then they can correspondingly launch into their presentation. We'll do this in the order that's listed on the agenda, so, we'll start with Gary, and then Steve, and then finally, Bob.

Gary?

LANTHRUM: My name is Gary Lanthrum. I'm the Director of the Office of Logistics Management in the Office of Civilian Radioactive Waste Management. My job is to develop the transportation system that will ultimately be used to ship spent nuclear fuel and high-level waste to Yucca Mountain both nationally and in the State of Nevada.

My background has been nuclear engineering, working in Naval shipyards, and I actually started my career at the power plant, Trojan in Oregon on the Columbia River. It's kind of sad, I was there for licensing and start-up of that plant. It's now shut down, the core has been unloaded, and the reactor vessel is disposed of, and I'm still working. It

doesn’t seem fair somehow. From there, I spent a number of years working with weapons and special equipment material transportation activities for DOE out of the Albuquerque Operations Office, and then transitioned in 2003 to come to work for the Office of Civilian Radioactive Waste Management in the Transportation Group.

EDWARDS: Steve Edwards. I’m supervisor of Spent Fuel Management for Progress Energy in Raleigh, North Carolina. My responsibilities include all of the on-site spent fuel storage and transportation of our five nuclear units. I’ve been with Progress Energy and its predecessor Carolina Power and Light for 26 years. For about the last ten, or so, working exclusively on spent fuel activities. I’m responsible for all the on-site dry storage, wet storage projects, transportation, as well as our strategic planning for shipments to the permanent repository.

HALSTEAD: I’m Bob Halstead. I’m transportation advisor for the Nevada Agency for Nuclear Projects. My responsibilities are primarily transportation impact assessment for the Yucca Mountain Project, although I have worked on some other issues for Nevada. I’ve worked on these issues for Nevada, both as a consultant, as a resident contract employee in Carson City, and then again as a consultant since 1989. Prior to that, I worked for the State of Wisconsin Energy Office, Great Lakes Coastal Management

Program and the radioactive waste review board for ten years. I was deeply involved in utility systems planning, particular 20 year advanced plans, worked on power plant siting, carried cases before the Public Service Commission of Wisconsin, as interest may appear. My academic background is as an environmental historian, and I have particularly worked in the area of the history of origins of the United States' dependence on imported oil.

ABKOWITZ: And, with that, I guess we can go into the presentations.

LANTHRUM: Go to my first slide. One of the things we were asked to talk about was the degree of understanding of the interface between the transportation system and the utilities, particularly the number of utilities that had capabilities for dealing with TADs was one of the questions. One of our challenges is that that interface is constantly changing. And, we are far enough away from our first shipment that we are not building the transportation system explicitly around the existing capability that the utilities have.

A prime example is back in 1998, only ten utilities had dry storage capability for storing casks on site. In 2008, the number is 40, and as many sites change their capability to include dry storage as part of their portfolio of capabilities, many things get upgraded on the site to

support that, and many of those capabilities and many of those upgrades contribute to the transportation interface. And, we would expect that between now and the 2020 date, that additional upgrades and changes will be made. And, so, we haven't paid and haven't designed the transportation system around what exists now. We designed it around what the national system is capable of dealing with and making sure we can work with that, and we have looked at how we can accommodate any outliers at the actual transportation interface sites with the utilities.

The last comprehensive review of what was available at utilities, and of the near-site transportation infrastructure was done about 12 years ago, and at that time, we had a pretty good feel for what those capabilities were. That survey was done back when we were still looking at 2010 as the starting date for repository operations, and, clearly, that date isn't going to be made.

What we did do in 2005, one of the things we used to keep track of utility capability, including things like crane capacities, lay down space, rail access, there's a whole range of things that we track, there is a document we call the Facility Interface Data Sheet. It's basically a large spread sheet. Those were updated on a voluntary basis back in 2005, and Dave Zabransky alluded to that in his presentation. Because it was a voluntary update, we had

fairly low participation, it was somewhere between 60 and 70 percent of the utilities asked to update, actually provided information, and, so, it's incomplete.

Our plan is to do a formal update in the five years before the repository operations start, which right now would be around 2015. And, that would be coincident with the delivery commitment schedule updates that Dave Zabransky talked about, which are done 63 months prior to the start of shipments.

We do have plans in place on the transportation baseline to do updates of both the site capabilities and the near-site transportation infrastructure capability. We did a dry run of that with one of the shortline railroads that serves the Salem and Oak Creek plants. We did that last year in conjunction with the Federal Railroad Administration, and community people from the area, from the northeast.

Again, it was a very good review of the capabilities of the shortline railroad, the Winchester and Western Railroad, and as the model that we would use to look at updating the transportation capabilities to get from sites to the national infrastructure, and that will be part of what we'll be doing starting in about five years before shipments begin.

Next slide. Dave talked about the fact that under the current contracts and court decisions, the Department of

Energy has no plans, and actually I should probably say more accurately, the Department is barred from providing funding for upgrading infrastructure at sites. That's not going to be happening. It was one of the questions that was asked.

Although, two weeks ago, I was at the Monticello generating station doing a benchmarking visit, looking at how they do a number of their operations, and they were in the process of loading their first dry spent fuel storage cask. And, they had done the upgrades fairly recently to both crane capacities to lay down areas, additional trackage on the site, and on-site heavy haul capability to move very large casks from their reactor fuel storage building out to the dry storage area. And, that's the kind of thing that we're expecting to happen more frequently as additional sites add dry storage capability.

Under the proposed action in our Environment Impact Statement, we're looking at transporting just under 10,000 rail casks and roughly just under 3,000 rail shipments by train. We made the policy decision back in 2005 to use dedicated trains for the usual mode of transport. And, probably the most important take out in this question, I think you all are exploring lots of issues around TADs and other systems that might be shipped, the transportation system is being designed to support large rail casks. Whether those are TADs or something else, the system is going

to be relatively impervious to, it's going to be able to support any of the large rail capabilities that might be needed.

The Navy's cask systems, for example, are going to be roughly 290 tons when loaded for their transportation configuration. That's far heavier than the casks for either DPCs or TADs. The rail system is being designed around supporting that level of car loading. And, the rail cars themselves are being designed. And, so, what winds up actually getting shipped is really not as big a concern because the design of the transportation system will accommodate a wide range of weights and rail cask capabilities.

We did analyze for sites that do not have rail access currently, but do have crane capacities to deal with large rail sized casks, the ability to do intermodal operations from those sites to a rail head. There are portable crane capabilities for lifting casks that are the size of a loaded TAD in a transport configuration, and the technical specification that Dave Zabransky talked about limits that weight to 180 tons. That's a very doable transport weight for both portable crane capacities and for heavy haul trailers for getting those casks from sites that do not have rail access to a rail head, so we can still support the mostly rail mode of transport that we chose

nationally back in 2004.

And, again, the updates to both the site infrastructure capabilities and near-site infrastructure will be done about five years in advance.

Next slide. We did select the preferred alternative of mostly rail, both nationally and in Nevada, as our primary mode of transport. There are no technical design and construction challenges with the development of the Nevada Rail Line along the analyzed corridors in our EIS. In fact, there was a, I think the most recent copy of Trains Magazine did a look at this construction project, and they compared it basically to the Great Northern and Western Pacific Lines that were constructed 80 years ago in terms of complexity. And, certainly, we've got a lot more industrial capability these days than we had 80 years ago for rail construction.

We have expanded the discussion in the EIS between the draft and the final on ability to mitigate the impacts associated with both construction and operation. I know we have been challenged a number of times over the what appears to be a slow rollout of dealing with impact mitigation, but largely, that's because we have not made a decision to act yet. We are still not completed with the NEPA process. There's a record of decision that is still required, and the no action alternative is still a possibility on the rail

alignment Environmental Impact Statement that was done on the Caliente corridor. Until we issue a ROD selecting one of the action alternatives, that would be the trigger to start detailed discussions with local land users and landowners about how we would mitigate the impacts associated with both construction and operation of a railroad.

Cost and schedule are always a challenge for us. We are constantly aware of the challenge associated with this Department and our ability to get the President's request for funding. And, our schedule right now for construction calls for about a five year construction period, but, again, that's going to be highly dependent on getting the budget authority that we've got in our long-ranged integrated baseline.

And, the last slide. We believe that the utility/transportation interface will continue to evolve as the transportation system is developed. We are trying to come up with ways that the transportation system, as it's being designed, can be flexible to deal with those changes without having to reinvent the wheel, and we believe that most of the changes that are happening are adding capability to our shipping plans rather than removing capability.

The Nevada Rail Line does remain a priority for the Department. Even though there's a no action alternative, it's still on the plate for the current EIS. We already have made the decision that rail will be the mode of transport in

Nevada. The no action alternative would only apply to implementing rail along the Caliente or Mina corridors, which are currently being studied.

And, the rail industry itself is well prepared to both design, construct and also operate a rail line across the terrain that we're talking about to get shipments from the main line track to our repository at Yucca Mountain.

Steve, I think you're up.

EDWARDS: I want to take just a few minutes to discuss the shipment experience that exists within Progress Energy, and talk a little bit about our experience that we have had with transportation of spent nuclear fuel.

Progress Energy is a regulated utility in the Southeastern United States. We have service territory in North Carolina, South Carolina and Florida, and we have five nuclear units at four different locations, and we have done transportation for a number of years between our North Carolina and South Carolina plants. We have not done any transportation with the Florida plant.

Next slide. Okay, we are, just for a bit of background, we have done a total of 210 shipments for 375 casks, a little over 5,200 spent fuel assemblies, and that's a combination of PWR and BWR, about 1,200 metric tons of uranium, to put that in perspective with what Adam and Dave were talking about this morning in terms of volume. And, in

those shipments, we have not had any incidents which involved any radioactive spills or releases, and we have had no measured radiation exposure to any train personnel or any of the general public.

To break that down, we shipped initially from Robinson to Brunswick beginning in 1977 through 1981 to make space at the Robinson plant for re-racking. We then began shipping from Robinson to Harris in 1990, shipped through there through 2004, at which point we ran out of shipable inventory and moved into on-site dry storage. And, then, we shipped from Brunswick both United 1 and 2, to the Harris plant beginning in 1989 after the Harris plant went into operation. The pool was replaced and serviced, and we shipped from both of those units through this year.

We do own, maintain and operate our own shipping equipment. We own four shipping casks, the Hyatt 300 General Electric original manufactured casks, their capacity of 7 PWR or 17 BWR assemblies per casks. But, we do own eight railcars. We use those--four of those are cask cars and four of them are spacer cars, but we do own two cabooses, which we use for escorts, both the mechanical, radiological and security escorts. We have those set up so we could ship simultaneously from one of the Brunswick units or the Robinson unit. As well as all support equipment for loading and unloading at the sites. So, doing this would appear to

be--we use our existing staff procedures, so we have dedicated staff which we use for our loading and unloading, as well as the transportation activities.

All of the loading and unloading, we do internally. We do utilize existing mainline track to get between the plants. CSX services our territory, so although we provide all of the rail cars, cask cars, cabooses, et cetera, we do use CSX to provide the engine and the track. So, we have experience working with them in that respect. And, of course, we do have to coordinate all of our shipping activities with the various local, county, state or federal organizations, such as Nuclear Regulatory Commission, et cetera.

And, finally, in conclusion, I guess the main point I want to get across is that there is spent fuel transportation experience in the U.S. already. We've been transporting since 1977. It is being done routinely, and safely and effectively, and I think the experience that exists, not just at Progress Energy, but elsewhere in the U.S. as well as around the world, can be brought to bear to provide lessons learned and support DOE in their planning and transportation activities as well.

HALSTEAD: Thank you. Let me first acknowledge Dr. Fred Dilger, our GIS expert's input into my presentation on the graphics. I'd like to give you an overview on some of

the State of Nevada concerns about the proposed rail construction project.

Next slide, please. An overview. The current forums that those issues are being addressed in, overview some of our past recommendations, look at the Caliente rail project itself, and then specifically look at the concerns that Nevada and other parties have raised in the Surface Transportation Board proceeding, and, we'll finally talk about what maybe the next steps are.

Next slide, please. Right now, there are three forums where these rail issues have been considered. First, before the U.S. Surface Transportation Board pursuant to DOE's application for a Certificate of Public Convenience and Necessity. Secondly, they will be considered in the Nuclear Regulatory Commission's licensing docket. And, thirdly, there is an ongoing review that we've started of the Department of Energy's final EISs, and, of course, we're waiting for a record of decision that would implement the rail alignment EIS. And, that might quite likely lead to some at least consideration of litigation.

Next slide, please. I'm not going to talk in detail about any of these issues. I've discussed them with the Board before, and I'll be happy to answer any questions about them. The State of Nevada has, over the last 15 years, put forward a group of ten recommendations for enhancement of

transportation, security and safety, and also to address the specific issues of constructing a rail line in Nevada. And, as I said, I'll be happy to discuss any of those if the Board members have questions.

Next slide, please. This is the final alignment for the Caliente Rail Line based on the final EIS. Yes, it's the preferred corridor, and because there is no record of decision, we should not consider it final yet, and it just gives you some sense both of its relationship to Las Vegas where the Union Pacific mainline from Salt Lake City to Los Angeles runs through, and also gives you some sense of the terrain that's covered.

Next slide, please. These are the potential truck and rail routes, important to remember that even under the preferred rail scenario, DOE is talking about 10 percent truck shipments. Based on the routing studies that we have done, these seem like reasonable routes to us. We believe these are the most likely cross-country routes that would be used to Caliente with the--these are the directional flow on some of those routes--may or may not be what DOE has laid out in its assumptions in the final EIS. And, remember, these are representative routes that DOE has put forward, and are not considered final by DOE.

Next slide, please. Well, I'm certainly not going to read all these criteria, but I want you to see the

criteria that Nevada presented to the Department of Energy during EIS scoping in 1995. We said consistently we will not pick the rail route or assist you in picking the rail route, but will give you all of our best advice on how we think you should select it. And, really, what all these criteria mean, taken together, is that we expected DOE to identify three feasible, acceptable, potentially advantageous routes for construction of a new rail spur. That would avoid any shipments through downtown Las Vegas on the existing Union Pacific mainline.

And, what DOE has put forward as their preferred choices are, at least for consideration in the EISs, are a Caliente route that involves shipments through Las Vegas, and is technically challenging. A second corridor, the Mina corridor, which is, I think, fair to say less technically challenging, but has some serious institutional problems because it goes across the Walker River Indian Reservation.

Looking specifically at the Caliente corridor, next slide, a few views from the corridor to illustrate some of our concerns. The terrain leads to feasibility safety costs and environmental impact issues. There are also some issues of concern to other parties about the limited economic development impacts of the Caliente approach.

Next slide, please. A primary concern for the State of Nevada, for Clark County and the City of Las Vegas

is the potential for rail shipments through downtown Las Vegas on the existing Union Pacific mainline. DOE says this would be 8 percent of the rail casks. Studies that we have done in 1998 show a maximum of almost 80 percent of the shipments conceivably being routed through Las Vegas if the railroads are allowed to route traffic without any restrictions. And, our own most recent assessment, looking at DOE's strategy for what they call a suite of routes, or multiple cross-country shipment routes, suggests that possibly 40 percent of the rail casks would go through downtown Las Vegas.

This is a particularly sensitive issue because within 800 meters of the centerline of the track, we have, as we have summarized here, a large resident population, about 95,000, 34 hotels with 49,000 hotel rooms, and possibly 40,000 visitors and workers at any hour of the day. Additionally, the sensitive of these issues in Las Vegas would be elevated because DOE's current plan for truck shipment, which depending on whether or not there's a second repository, would be one or two truck shipments per week every week. Those shipments are also currently slated to use I-15, the I-15 beltway, and U.S. 95.

Next slide, please. I will be happy to answer any of these issues in detail in response to questions Board members have, but I wanted to summarize for you some, but not

all, of the issues that we have raised before the U.S. Surface Transportation Board in response to DOE's CPCN application. In particular, while DOE has chosen the shared use option as their preferred option, our understanding is that they have not made a final decision, or if they have, they haven't announced it, that their record of decision may commit them to this. And, this raises a number of jurisdictional, procedural, and impact assessment issues.

In particular, this raises issues about the evaluation of shared use impacts and economic development opportunities. The straightforward NEPA issues yet to be considered would include the radiological, non-radiological impacts, impacts of current users of land, special attention to terrorism and sabotage issues, and the evaluation of the National Rail System impacts.

And, there also is an issue, very much parallel to the issue being considered by the Nuclear Regulatory Commission in the licensing docket, as to the extent to which the STB has an independent responsibility to begin its NEPA process from scratch, or whether they would adopt in toto the final EIS developed by the Department of Energy, or whether there will be something in between, where portions of DOE's EIS are used, and other portions of the NEPA analysis are done under their responsibility.

Next slide, please. It's important for me to tell

you that there are other parties of record who plan to actively participate in the Surface Transportation Board proceeding. They include local governments, the affected counties, the one affected Indian tribe, the Timbisha Shoshone Nation, the individual stakeholders who are property owners and property users along the line. And these issues range from very general issues like the impact of building a railroad through this area on access, to very specific impacts, for example, the impacts on the Heizer Sculpture installation in Garden Valley.

There are a range of impact issues related to either the selection of a continuous rail line, or a north/south rail line, which are related issues, but not exactly the same. There are a number of procedural issues about whether there will be a hearing and public participation. And, then, there are a whole range of issues about how impact mitigation will be handled. And, I think an important aspect of the impact litigation issue is not only how mitigation will be directed and ordered, but who will pay for mitigation.

Next slide, please. Next steps, actually there could be another preliminary step under the STB finance docket. Typically, the STB breaks this question into first, a determination of public convenience and necessity, and then if they make that finding, they proceed to a NEPA review.

There is one party that has challenged the public convenience and necessity finding, and the State of Nevada may well do that. I expect most of the action at the STB to involve the NEPA process, and potential litigation over some of the procedural issues involving the STB's acceptance of the application.

In the NRC licensing docket, it's early to say exactly what will emerge in the way of licensing contentions. There was a very fine information meeting carried out by a half a dozen different NRC licensing experts last night in Amargosa Valley, a briefing for the affected public in Nye County and the Town of Amargosa Valley. And, we were pleased that the NRC presentations on the specific issue of the rail line followed the same way that we have analyzed this, which is to look at the specific portions of the rail alignment EIS that are adopted by reference into the supplemental EIS for the repository. So, a number of these rail line issues will now be germane to the licensing docket, but they may be there more as NEPA issues than as issues related to the safety analysis report.

Finally, depending on what happens with the record of decision, I think there is certainly a potential for some litigation over the final EIS.

I thank you. I'm sorry I have gone over my time limit, and I will be happy to answer any questions.

ABKOWITZ: Thank you, Gary, Steve and Bob. We'll open it up for Board questions. And, I'd also like to invite Bob Fronczak from the AAR to position himself fairly close to the public microphone here, because I'm sure there will be some railroad questions that he may want to weigh in on.

I guess I will start out, and then we can have some other members here join me. The first question I have is for Gary, and it comes down to this issue of the record of decision. Is there an anticipated date for issuance of that ROD?

LANTHRUM: I believe the ROD is imminent. One of the things that we were waiting for was we had not received the biological opinion from the Fish and Wildlife Service yet, and that was a piece of information we needed to close all of our external agency reviews. We received that the end of last week, and, so, the ROD should be coming out very shortly.

ABKOWITZ: Okay, thank you. The second question, also for you, Gary, is, and I know that I've asked this question and you've answered it before, but I feel compelled to ask it again.

LANTHRUM: You didn't like my last answer?

ABKOWITZ: No, I just want to make sure it's still the same answer. We've talked before about the TAD design and the weight of the TAD being such that you need to basically

ship it by rail to get to the Yucca Mountain site. So, I think I've asked you in the past is basically the repository system contingent on having rail service in Nevada, and if there's any other contingency planning going on should that rail line be severely delayed in its construction, or never exist?

LANTHRUM: Well, as the EIS, the repository Supplemental Environmental Impact Statement indicates, even under the mostly rail scenario, there will be truck shipments. And, the repository will be handling both rail casks and truck casks. Absent rail in Nevada, TADs will not be shipped in Nevada. There is no backup plan for getting rail sized casks from a rail head in Nevada to the repository. We are focusing on rail as a key element in the ability to get the repository to operate as designed.

ABKOWITZ: So, if I follow that logic, if for some reason the repository opened and the rail line didn't exist, or it just ended up being taken off the table, then all spent fuel shipments coming into the repository would be in some containers other than TADs, and, so, consequently, that would have ramifications on modal share, number of shipments, and even processing at the surface facility; is that a reasonable conclusion?

LANTHRUM: In the past, you have indicated a desire for doing systems analysis, and transportation is part of the

repository system. And, if it looks like one portion of that system is lagging, the funding for the system as a whole will be adjusted so that the system is ready to operate as a system on day one. I do not see a scenario where the repository would be nearing completion and we would be way behind in rail. We will build an operating repository system, which includes rail.

ABKOWITZ: Okay. I'm going to suspend my other questions for the moment, and give other Board members a chance to participate. We'll have Ron, and then Andy.

LATANISION: Latanision, Board.

Steve, I'd like to hear from you in terms of some of the lessons learned, given the experience that you folks have had. And, in particular, have you had interactions with the public? Have there been regulatory issues that were troublesome that were overcome? Have there been litigations that were filed that had to be dealt with? What's been the history in terms of lessons learned with your firm?

EDWARDS: We have generally involved the elected officials primarily in our communication. So, we had a lot of meetings with city, county, local officials along the route. We have had some which involved public, particularly news outlets in some. But, we have focused primarily on the elected officials in the past in those kind of communications.

In terms of lessons learned, I would say that definitely making the public aware of what's going on is something that I think is important. Spent fuel shipping is a safeguards activity, so the date and time of shipments occurring is something that by NRC regulation you're not allowed to share with the public. So, that's kind of where we draw the line. We feel that people need to be aware of the situation, but in terms of any specific activities, we do keep that very, very closely held information.

In terms of litigation, we have not been involved in any specific litigation on the shipping activities. We have had other litigation within our nuclear fleet that has at least involved peripherally some of the shipping activities. But, nothing that directly involved the shipping program itself.

LATANISION: Was the communication with the public one that you would describe as being smooth? Were there hiccups in the conversation? What was the nature of that?

EDWARDS: I would say it's kind of a combination of both. We have definitely run across groups of individuals that did not favor transportation. And, in particular, we had, some that we had perhaps not anticipated initially coming in, was some of the community versus community, basically the shipping community versus the receiving community. The Harris plant has at least since 1989 been the

receiving plant for all our shipments. So, obviously, the people, when you meet with the citizens, the people near the Robinson and Brunswick plants are much more in favor of it than you would get at the Harris plant.

But, I would say by and large, we've had favorable response, even from around the Harris community, but there have been definitely groups that have been both opposed to the operation of the Harris plant, and those same people typically are opposed to the transportation as well.

LATANISION: Thank you.

ABKOWITZ: Andy?

KADAK: Again, Steve, just to follow up on that. How many miles is it that you're shipping this stuff by train?

EDWARDS: Our routes are typically around 200 miles per shipment.

KADAK: So, this is not an insignificant shipment?

EDWARDS: It's not an insignificant shipment, and it does involve, just because of the nature of the track, it does involve crew changes. We go through some U.S. Army track coming out of Brunswick, as well as the way, we go through Hamlet, North Carolina for Robinson and Brunswick, and both of those, because of the way CSX is set up, do require crew changes at both of those. Going from Robinson to Harris does involve going from South Carolina to North Carolina, so we do have to get involved in transfer of

ownership from the escort perspective from South Carolina to North Carolina. So, we had, I believe, some of the issues that you would face on the shipments to the permanent repository on a smaller scale, and we've had to deal with those.

KADAK: But, practically speaking, you know, you don't see a major challenge in doing this as a mode of transportation to, say, Yucca Mountain, with the possible exception of the State of Nevada, where there is some controversy?

EDWARDS: I mean, any time you're moving over rail over several thousand miles, you're changing states, you're changing railroads, it's a complicated movement, but it's not one that--it can definitely be done. It's going to require a lot of coordinated effort. But, it has been done and can be done.

KADAK: Let me ask Bob a quick question. In terms of the Mina route, you seem to suggest that it's in your mind has less challenges, I think was the word you used, and it may in fact be preferred in your eyes. What do you think can be done to overcome the obstacles that might lead to approval of that route from the stakeholders?

HALSTEAD: Well, first of all, Andy, the State doesn't have a preference for any route, and, so, I can't say there's a preference for Mina. But, DOE's studies I think generally

have come to the conclusion that we have come to, that if you look at the terrain, you look at the construction impacts, and particularly look at the impacts on the current users of land, DOE's own analysis looking at those issues all found that from those perspectives, Mina would be the preferred corridor. The sticking point, of course, is--and I would say there are two sticking points. One sticking point is the institutional issue of Indian nation sovereignty and dealing with the Walker River Piute Tribe.

I think there is also a related issue, which has to do with the specific proposal for the Mina route that has emerged in DOE's environmental documents, which is in short, relocation of a large portion of the existing rail line on the Walker River Reservation. And, that involves some significant challenges, a large bridge across the Walker River, crossing a river that has endangered fish in it, building bridges in areas where the soil conditions will be challenging for bridge supports. And, even on an Indian reservation, with the support of the tribal governments, I think there are likely to be some challenges with archeological and religious sites in the route.

So, I think one issue is the Indian nation sovereignty issue itself. And, then, related to that is the issue of how you come across. And, all the previous analyses of the Mina route either assumed that the existing track bed

would be used and upgraded, or that the reservation would be avoided. And, in DOE's analysis, they have chosen neither of those options. They have chosen to go across the reservation in a very challenging way.

So, while I'm not trying to dodge the question, because I don't want to take a position of telling you how I think the State would proceed with this, because that's not our policy, I think the past studies that DOE did in the late Eighties and early Nineties culminating in their 1990 identification of preliminary routes, still suggests a number of the options that ought to be considered. And, they go back to the scoping advice we gave them in 1995. Pick a route that's feasible from an engineering standpoint, minimizes adverse construction and operation impacts. To the extent that there are economic benefits, and some of the economic benefits, by the way, are a two-edged sword. If you build a line as a common carrier and a utility company comes in with a proposal to run dedicated trains to haul coal to 2000 megawatts of new installed coal fired capacity, that's part of your impact issue.

But, I think all of those things have not been evaluated properly, and there are parties, and some of them may wish to speak to you during the comment part, particularly the northern counties, who believe that a north/south corridor--let me correct that. There are really,

I think, three points of view out there. One is that there should be a northern railway. There's, secondly, an opinion there should be a northern railway combined with a southern railway. And, then, there's also an opinion that if the Caliente route is built, it should be a continuous route that would have a connection through the southwest portion of the state. And, I think the people who are advocating those are the appropriate parties to tell you about that.

KADAK: Could I follow up with Gary on why that DOE chose neither of the recommendations, namely, why not use the existing rail bed?

LANTHRUM: Actually, Lanthrum, Panel. Actually, we looked very closely at the range of options we had, and, in fact, Mina was not on the table because in 19, I believe it was 89, the tribe wrote a letter to the Department that said basically, don't even think about making shipments across our reservation, because we're never going to approve them. There's a lengthy history. The track that's going across the reservation was built by Southern Pacific, but it was built without a right-of-way from the tribe. And, unique as far as I know in the railroad industry, everywhere else where railroad runs, the railroad owns the land under the track. The tribe sued and they wound up winning their case, and, so, it turned out that they, in fact, did own the land under the track, and based on that, Union Pacific pulled up the track

from Hawthorne on down to Gold Field, and abandoned it.

The court required the tribe to work in collaboration and grandfather the Hawthorne Army Depot and let the track continue to be used for shipments to the Hawthorne depot until I believe it's 2030, when that right-of-way agreement will expire.

Prior to publishing what was going to be a draft EIS back in the 2006 time frame, late '05, early '06 time frame, I made one last visit to the reservation myself, and talked to the tribal counsel and said you told us to stay away, we've stayed away. We are about ready to publish a draft EIS that only looks at the Caliente corridor. Are there any conditions under which you would reconsider? And, you have to understand that the right-of-way that they have with the Army for shipments to the Hawthorne Depot, specifically exclude shipments of spent nuclear fuel, and they also specifically exclude any common carried shipments. That means no shipments of anything going anywhere other than the depot for depot work is allowed across the reservation.

And, in that conversation, they said no, we really don't want shipments going across our reservation. And, I said are you concerned, because right now, the rail line goes right through the small town that they inhabit. It's a very small town, and the rail line actually divides the school and the old folks home and the community center from the fire

station. And, they have about 15 trains a year run through there right now. They are about 110 car trains, but it's not a lot of traffic. And, one of their issues was they didn't want more stuff coming through the heart of their downtown, and bisecting the town again. They've got a very, very slow speed restriction. I believe it's 15 miles an hour through the center of the reservation. And, I said if we were willing to move the track, if that was one of the things that we would consider, would you change your minds. And, they said you'd do that? I said we'll study it. No promises, but we would study the possibility of moving the track so both the Army shipments and the DOE shipments would avoid going right through the center of your town and dividing the community, and the little town of Schurz. And, they said okay, we will join you as a cooperating agency in your EIS and we'll study it.

That went will until we had completed the technical data collection. About that time, the tribe was going through elections again and changing tribal council, and they changed their views again and said you know, we don't really care, even if you do move the track, we're still not interested in any shipments across the reservation. And, they withdrew as a cooperating agency from the EIS. And, at that point, it became clear that we had no path forward, and, so, we withdrew detailed work. We did publish the technical

information that we had collected to date, and it's in the EIS. We saved all the information that was produced as part of that effort because it's good for the public record. I think overall, there's lots of good information that was developed. But, the tribe is in absolute control in this position, and whether we use existing track or move the track didn't seem to make any difference in terms of their level of support for shipments across reservation lands.

The environmental advantage or benefit of the rail line was largely, it would 100 miles shorter than the Caliente corridor if you use the existing track. If we made a detour around the community of Schurz, you lose some of that benefit because you're adding additional track rather than just starting at the Hawthorne Depot and building from that point down. If you avoid the reservation altogether and go through the very challenging terrain that surrounds the reservation, it's--the reservation is in a lovely river valley between a bunch of mountain ranges, and the mountain ranges on either side are very complex terrain. And if you get into looking at avoiding the reservation altogether and trying to construct a north/south route, you've essentially gone back to the same length of distance that you had with Caliente, and in many cases, much more challenging terrain, particularly in the northern area.

KADAK: Thank you.

ABKOWITZ: Okay, we've got Thure and then John and then David.

CERLING: Cerling, Board.

Bob, I was just wondering how the State of Nevada was using the experience that industry has in shipping regard to waste, Progress Energy, and so on, is there a lot of dialogue and information flow between the groups that have shipped nuclear waste, and in your group, or I'd just like to know the status of that. And then, how you use that information in your analysis?

HALSTEAD: Can we put up Slide Number 4, please? I believe it's 4, the listing of recommendations.

I have to say the obvious, because the State of Nevada opposing the repository project, and we'll take that position in licensing. On the transportation side, with the proviso that we will not pick the rail route, our response to the Department of Energy, the other federal agencies, the industry advisory groups, and so forth, has been quite different. We have participated in all the forums that are available for a coordinated and shared approach to issues. You know, I think it's no small matter that we have been on record, for example, recommending mostly rail as the best, or least bad way, to plan the transportation system. And, we have participated in a number of very specific tasks, like developing the emergency response and accident prevention

programs that the Department of Energy has worked on, and we're in communication with all of the correct parties.

I think there are some new issues I think that are emerging, particularly regarding the TAD canister system. The TAD canister system seems to us to close off the mostly truck option, and we're not sure that either as a matter of logic or compliance with the NEPA expectations for development of alternative plans, and no action alternative is relative to the rail road, that DOE ought not to be thinking about some of those other issues. But, you know, basically, we've put forward the ten issues that we think address our safety and security concerns.

One that doesn't appear on this slide. We have added greater attention to human factors management, an issue that we raised 20 years ago, that the Department of Energy responded to in the early Nineties. Then, when their budget was cut, their human factors program was terminated. Many people remember this was a big issue with Professor Price from Virginia Tech when he was a member of the Board, and, now in looking at the way the Federal Railroad Administration has highlighted human factors as a safety issue.

So, I would say I think that we're in close communication with the relevant federal agencies, and certainly with the Association of American Railroads collectively. We don't deal with either specific utilities

or specific rail carriers.

There are three probably critical issues there for us. Shipping the oldest fuel first to reduce radiological hazards, using dedicated trains, and full scale cask testing. There are some technical complications with oldest fuel first, because of the TAD proposal. There is some uncertainty about what DOE means by its commitment to dedicated trains. If you look at the recent filings, you know, DOE's lawyers are not always comfortable with the things that the Department has put forward in its planning. And, on the issue of full scale cask testing, there's some real division yet between Nevada's expectations and the way the Nuclear Regulatory Commission is moving with the package performance study. But, as I read the vote sheets that the Commissioners fill out to explain how they voted, I see in fact a potential for significant agreement between Nevada and the NRC, where the NRC picks that issue up.

So, I would argue that in fact there's been enormous success in defining the issues, and some limited success in resolving some of those issues. Right now, the rail access issue, and some of the routing issues that external parties, particularly the Department of Homeland Security and the pipeline and hazardous materials transportation authorities at DOT have some new routing guidelines that deal with shipments through highly populated

areas, and what are called iconet areas, for example, the Las Vegas strip, or certain areas in Chicago. So, I don't at all mean to say that there aren't some significant issues to be resolved, but our approach has been to try to identify those issues and in every area where we have a concern, we've put forward what we believe is a reasonable resolution.

Obviously, the recommendations we've made will enhance costs. And, I notice today, no one yet has raised the issue of the new lifecycle cost estimates. And, in the past, we've estimated the cost of the transportation program somewhere in the range of about $8 to $10 billion for a $60 billion repository, and we recently reexamined those costs and we think they're probably in the $16 billion plus or minus a couple billion dollars. There was a time when a billion dollars meant a lot in Washington. I'm not sure it's the case anymore.

But, the things that we're recommending, for example, the kind of cask testing program we want, I think even if a Cadillac approach to cask testing is done, it adds maybe $70 million to the transportation lifecycle cost, and that seems like a very reasonable expenditure to us, given both the safety issues, but also given the public perception of risk.

I'm sorry for the long answer, but this summarizes really a lot of interaction, and I have to say the Department

of Energy through the transportation external coordination group has provided a forum to address these issues, not just with Nevada, but with all the other stakeholders, and the utilities and the railroads participate in that.

ABKOWITZ: Okay, John?

GARRICK: Garrick, Board.

Gary, you indicated, I think, that the construction period for the Nevada Rail Line was around five years that you estimated. Is that just construction only?

LANTHRUM: Five to ten years. That's construction only, yes. And, the five to ten year range was analyzed in our EIS, and the range was dependent on what the annual funding flow was.

GARRICK: Okay. So, if you add to that the planning and the permitting and the designing, is it still in the five to ten year range?

LANTHRUM: For actual construction, yes, because we're not anticipating to start construction until 2013 at this point. So, the planning and designing work can go on between now and that point. We can start construction in 2013, complete construction in late 2018, and we would have some period of time to do dry runs and other exercises before starting actual operations for repository shipments.

GARRICK: Okay. Robert, I think you've almost answered the one question that I had. But, from your perspective, and

given that the State is against the project, what do you consider to be the two or three most serious issues or obstacles to the Nevada Rail Line?

HALSTEAD: Well, let me start by highlighting those three general issues, oldest fuel first, dedicated trains, and full scale cask testing, which are more likely to be resolved either between the Department and the stakeholders, or with the NRC. And, then, obviously, there is the actual selection and construction of the rail lines.

I think if I were to try and share with you a national perspective, we had an interesting discussion of this at the ANS, the American Nuclear Society summit meeting this year. Jim Hardeman, who many people know as the radiation control officer for the State of Georgia, has a background in the industry, was on a panel with Alex Throer (phonetic) representing Gary, and Marvin Resnikov and myself, and after our presentations, Jim Hardeman got up and said well, I don’t want to shock you, but, you know, I agree with about 90 percent of the things that the State of Nevada has said. And, those were mostly things related to things like the Section 180(c) rulemaking to provide emergency response training, to do route specific and location specific response planning, that pay more attention to accident prevention than human factors.

So, I think if we look nationally at the issue,

obviously, shipments through urban areas are going to--have always really been a major issue because of the location of the interchange yards, and now in the post-911 environment and the greater consideration of terrorism and security issues, that's certainly taken to another level.

So, I guess I'd have to say route is still a very important issue nationally, but the accident prevention and emergency response preparation, and specifically the funding and the mechanisms for funding to the states, the extent to which the states will be required to pass through funding to local governments. We haven't talked much about the critical role of local governments, and certainly in emergency response, that's an issue that hasn't been worked out. And, I think that's where, if I were looking at the national issues, I would look at the emergency response planning and the routing.

GARRICK: Steve, has your experience included both regular and dedicated trains?

EDWARDS: We ship exclusively by dedicated train.

GARRICK: Did you consider the other--

EDWARDS: Not very much. From our, we would strongly agree with what Bob said. I think dedicated train is the right way to go for a shipment like this, just because you've got, you're going from one point to another, you're going directly, you don't have to worry about other cars going to

other locations, et cetera. And, so, from our perspective, from the planning, because we do provide a number of escorts both on the train as well as accompanying the train, getting there from Point A to Point B as directly and quickly as possible is very important. So, from our perspective, a dedicated train is the right way to go.

GARRICK: Now, are the dedicated train requirements pretty much the same that they've always been in terms of speed and passing rules, and what have you?

EDWARDS: For us, in the past, there have been certain speed restrictions, such as 35 miles per hour, 45 miles per hour. In recent years, it has basically been dictated by the track and the track conditions. So, there's no set speed limit. For every shipment we look at every portion of the track, and work with CSX in terms of what speed is allowed during that, or on that piece of track for that specific shipment.

GARRICK: How about passing?

EDWARDS: Generally, our view is that the dedicated train, particularly one carrying spent nuclear fuel, should have priority, and we would ask CSX in our case to hold other trains where possible. There are conditions where we do side rail, if there's a large train coming through, or they may do the same, or we may wait at a particular exchange yard for another train to come through. So, it really depends on

track and conditions, and looking ahead a number of blocks, but we do try to coordinate the timing of the shipments to minimize any other traffic that may be on the rail. And, if we need to, stop at a particular, there are a lot of restrictions in terms of where you should stop from a security perspective, so we try to arrange those. So, like I said, if we do have to stop for traffic to let other trains through, we do that at a rail yard, or some exchange yard, something like that.

GARRICK: And, you don't let your train operators do text messaging?

EDWARDS: That's correct.

GARRICK: Okay.

ABKOWITZ: David?

DUQUETTE: I'd like to encourage, by the way, when someone asks a question of the Panel, if you have some other information you'd like to add, please do that as we go along.

LANTHRUM: Can I jump in there then very quickly?

DUQUETTE: Yes.

LANTHRUM: There are speed restrictions for spent nuclear fuel trains, even on the best of track. About 50 miles an hour is going to be the speed restriction overall, no matter if it's Class 6 track, which is the best there is. There's another restriction that was put in place by the FRA dealing with the tunnel fire concerns after the Baltimore

tunnel fire and others. There is a passing restriction so that trains carrying other hazardous commodities cannot pass a spent fuel train in tunnels.

GARRICK: But, there doesn't seem to be a national specification for a dedicated train. It seems that it depends on the track. It depends on the rail.

LANTHRUM: Well, dedicated train is not a--it's not unique in the way that you operate a dedicated train. It's just a train with only one commodity on it. That's what distinguishes it. You're not carrying multiple commodities on the train and multiple cars. The speed restrictions are based on what the content is that you're carrying, and even if we were not in a dedicated train, even if we were in common carriage, those same speed restrictions would apply because spent fuel would be on that train. And, so, the operating standards are not for dedicated train versus non-dedicated. The operating standards are for what is being transported.

The dedicated train, mostly what that buys you is operational flexibility because when the cars come into a classification yard, you don't break all those cars up and shuffle them and move them onto different trains. They stay connected, and there's a huge advantage in that, and it speeds the time to get through the classification yards because you're not doing that car sorting. I think the

average turnaround time in a classification yard now for a regular train is about 72 hours. It's much, much shorter, all you do is come in and change crews and refuel, and you can be on your way with a dedicated train. So, it's a lot of operational flexibility that provides you, not so much that there are different requirements for what your operating conditions are going to be for dedicated versus not dedicated trains.

HALSTEAD: If I could add to that? It's certainly, I think, a general agreement between the people in Gary's shop and the railroads and the utilities, State of Nevada and the other stakeholders, and particularly the really experienced ones, for example, in the State of Illinois, where they've actually got a very rigorous inspection program, that dedicated trains are the only way this material should be shipped.

An interesting part of the proceeding before the Service Transportation Board has occurred, however, because the CSX Railroad filed a motion that the STB should require the use of dedicated trains. And, in DOE's response, they, of course, said well, no, we don't think that they should be required. And, then the CSX Railroad has taken the somewhat unusual action of filing a reply to a reply, which is not normally accepted at the STB, and we're not sure if their filing will be accepted, but they have then raised the issue

that in fact if DOE plans to use dedicated trains, they shouldn't have a concern about the request to have them required.

Hopefully, that's going to be resolved in favor of dedicated trains, because that's probably been the highest single visibility issue in spent fuel transport by rail for the last 30 years. And, Mr. Fronczak may have something to say about that.

ABKOWITZ: Please do. A point of clarification needs to be made. Just introduce yourself, if you would, Bob, for the record.

FRONCZAK: Yeah, Bob Fronczak with the Association of American Railroads. And, it's not something you said, Bob, it was something Gary said earlier about the tunnel. AAR, you know, incorporated a no passing rule in tunnels in our OP-55, which is our operating practices, recommended operating practices for hazardous material transportation, it was an FRA. But, otherwise, you did get it right, Gary, it is AAR's 50 mile an hour speed restriction.

ABKOWITZ: Bob, while you're up there, David, I know you have the floor here, but, so do I. I'd like to explore a little bit more the contract services that you'd be providing as the carrier of spent nuclear fuel shipments. Does the railroad reserve the right to pick the route, even if there's an agreement up front that it would be desirable to use a

certain route, such as going through Caliente, doesn't the railroad reserve the right to reroute under unusual circumstances, in which case you cannot guarantee that there would never be a shipment through Las Vegas, for example?

FRONCZAK: Well, I said this in the past, and the railroads will do anything for a price, and if, you know, the shipper wants us to move it halfway around the world and back, you know, we'll do it for the right price. I think what we will normally do is work with the shipper and try to work out the most reasonable route, and generally speaking, the most reasonable route is the most direct route. Our best track tends to be through major metropolitan areas. We generally do not have bypasses around metropolitan areas. But, again, we are flexible. We will work with the shipper and do what makes the most sense.

LANTHRUM: There is a new deal, a T-rule, though, that places a different role for the railroads in terms of routing. They have to do an annual safety and security review of track, and then within the track that meets the requirements for safety and security, there could be discussions about routing options for the stuff that falls out of that process.

EDWARDS: And, this is Steve Edwards. I would add to that as well. At least for the shipments we have, we have NRC approved routes, and, so, we are not allowed to deviate

from an NRC approved route. So, if for some reason weather, track blockage, or whatever, we could not gather the approved route, we would have to get prior approval from the NRC to deviate from that route.

ABKOWITZ: Okay, thank you. David, did you have a question? If you remember the question--

DUQUETTE: I don't remember my name at this point. I'm going to start with Steve. Steve at a previous set of Board hearings, Board meetings, we heard some pretty elaborate security type things on some of these shipments. There were going to be dedicated cabooses with machine guns, and a whole bunch of other stuff. Do you require security on your-- either security or armed security on your shipments?

EDWARDS: We do require security. We do require armed security, and there are certain regulations that depending on the transportation area you're traveling through, the NRC regulations do require certain armed security and a certain number of escorts. But, we do use armed escorts, and we generally work with the states, in our case North Carolina and South Carolina, for local law enforcement support.

DUQUETTE: So, it's local law enforcement. It's not your employees who provide the security?

EDWARDS: That's correct. What we found in looking at that, you do get into certain deadly force issues that's best dealt with by local law enforcement and not by regulated

utilities.

DUQUETTE: And, a very quick question. Have you had any push-back at all from CSX employees about moving this stuff?

EDWARDS: No, we have not. Generally, the only push-back we've gotten from them were when the NRC regulations related to fingerprinting, background searches with the FBI, that sort of thing, we have gotten push-backs. So, that was not directly to us about moving it, but to the NRC about background searches. But, from our perspective, they have certain rules for how they assign crews to certain routes, and we've never had any issues with that.

DUQUETTE: Okay. Bob, a couple of questions for you, one of which is trivial, but I'll ask it anyway. But, at a hearing we had up near Caliente, in fact, I think it was in Caliente, there was a lot of push-back from some of the ranchers who are affected by the train coming through. One of those is whether or not cows would cross tracks or not. I still don't have an answer to that question, as to whether they will or not. But, are you getting much in the way of communication from the ranchers who would be on the Caliente route? And, that really goes to both Gary and to you. You know, we're going out of our way to avoid Indian reservations because of national issues with the Indian nations. But, how about our own citizens?

HALSTEAD: Well, let me say in general, everybody whose

grazing allotment is affected, is traversed by the land, feels they will be somewhat adversely impacted. The degree to which the individual permittees feel that their operations will be affected ranges from minor inconvenience to people who fear that their entire operation will have to be radically changed, or that perhaps it can't operate the way it has. So, there's a considerable range in these impacts.

If we were to talk about a couple of specific operations that are owned by people who have spoken to the Board, for example, the sheep and cattle operation that the Uhalde family operates, primarily in Garden and somewhat in Coal Valley, they both herd cattle and sheep, and they also move them in trucks at different times of the year. And, there simply is no way to build a railroad across the grazing areas that won't significant impact their operations.

Maybe the most extreme example of an adverse impact is in Reville Valley where the Fallini (phonetic) family operates the Twin Springs Ranch. And, there you have, frankly, a quite unusual operation. It's probably the largest single family operated ranching operation left in the country. The grazing area is about the size of the State of Rhode Island, about 1000 square miles, and primarily, they have a north/south running valley, Reveille Valley, where it's a run of the valley operation. They move cattle all the way around it, and there really is not a very practical way,

I think, although we have looked at alternatives, and DOE looked at alternatives to avoid Reveille Valley. So, if you laterally bisect that grazing allotment, and you further separate the water resources on the western side of the valley from grazing areas on the eastern side. And, we just got the detail engineering plans and vertical profiles, so we haven't really looked at the top of rail elevation relative to the surrounding line, but that's an important issue in looking at impacts on specific areas.

You know, if the rail bed is 18 inches, well, maybe you'll be able to herd cattle against it, and maybe you won't. But, certainly, if it's four, five or six feet, which it may be in many parts of Reveille Valley, then you're talking about underpasses and severe complications. So, the short answer is some ranching operations are going to be very severely impacted, and the impacts may in fact be so great that they really can't be mitigated. You may actually have compensation or a buy-out of certain operations. But, on the other hand, there may be some areas where relatively easy straightforward mitigation measures will suffice.

LANTHRUM: The same question. I'm fortunate that Ned Larson is the federal project director for the Nevada Rail Line. He grew up on a ranch, and they had cattle that crossed railroad tracks all the time. I did not grow up on a ranch, but I do have a motorcycle and I've ridden my

motorcycle a lot of open range country in Wyoming and Arizona, and I almost had an accident in Wyoming with cattle running across a railroad crossing in open range country, and out onto the road. And, fortunately, I had anti-lock brakes on my bike, and, so, I didn't hit the cow, because when a train hits the cow, the train usually survives. If a motorcycle hits a cow, it's a bad deal for the motorcyclist.

We believe that cattle will cross railroads, but in addition to that, we're willing to do a number of mitigating activities that will be part of the mitigation action plan that we will enter into if in fact we make a decision to move forward with one of our alignment options, and it would include things like underpasses for cattle if in fact the elevation of the rail line above the surrounding terrain became more complicated. There are a number of other things that we would be willing to do, and there are things that we believe that we can do during the construction process to get the cattle more comfortable with the fact that there's activity out there, and to encourage them to move back and forth. And, so, there's a whole range of activities that we're willing to undertake, in addition to the fact that cattle will cross railroad crossings.

DUQUETTE: Bob gave us a number for what he thought this was going to cost. Why don't you give me your number?

LANTHRUM: Well, we have an analysis in the EIS, and our

integrated baseline was submitted to Congress in the spring of 2007. Depending on what year dollars you use, the original analysis that was done back in the early Nineties had a number of around $880 million, but that was with early Nineties dollars. Obviously, things have gotten more expensive over time. We have a number out there that's in the $2.4 billion range, and that has escalated up to 2008 dollars. And, then, there's a number that talks about $3.2 billion, and that number is looking at year of execution costs, where the construction doesn't start until 2013 and possibly ends in 2018.

And, so, depending on what year dollars you're talking about, with inflation, the numbers are going to change. It's about $2.4 billion in 2008 dollars, and it goes up more if you look at year of execution costs.

DUQUETTE: But, it's not the 16 billion that Bob quoted?

LANTHRUM: Well, he was talking about the lifetime, the whole program, transportation to buy the casks, buy the railcars, to operate the system, and right now, since we have not come anywhere near doing operating contracts, I couldn't begin to tell you what the total lifecycle costs are going to be. There is a number that's in the total lifecycle cost analysis that's submitted to Congress, and off the top of my head, I couldn't tell you what that is. But, that makes a number of guesstimates about what operating costs and other

things are going to be.

DUQUETTE: Thank you.

ABKOWITZ: Okay, Andy and then Thure and then Ali, and I guess we're just not going to have lunch today.

KADAK: It's just a question for maybe Gary and the gentleman from the Railroad Association.

At one of our last meetings, we had a lot of discussion about the interstate agreements when a rail shipment crosses a state line, and how much inspection has to be done, recertification of the same package from the previous certification over the previous state, what counties or cities. Are you guys making any progress on resolving that, and maybe just have a national inspection?

LANTHRUM: We are constantly looking at the possibility of implementing what they call point of origin inspections, and inviting people from various states that would be involved in the trans-shipment to come and participate in the point of origin inspection. And, we believe based on the certification of the casks and the work that will be done by the utilities to prepare these casks for shipment, that that should be sufficient. Railroads typically don't investigate or inspect other hazardous cargos as they transition from state to state. You get a go-ahead with the point of origin, and you're good for the duration.

Unlike truck shipments, where, as you cross state

lines, there are frequently inspection and truck scales, and places to pull over just after crossing the state line, there typically is not a place to pull over after crossing state lines for railroads. You have to wait until you get to a siding or a classification yard, or other facility, and typically, those are not built at state lines just arbitrarily, and, so, it would be very complicated to do state by state inspections. We're a long way from having the actual operations and commitments on inspections finalized, but there are state individuals involved with the FRA that are cleared inspectors, and, Bob, you might want to talk more about that.

FRONCZAK: Bob Fronczak with AAR again. I agree with what you said, Gary, we don't have inspection stations, and in a recent shipment that we have for the West Valley shipments, State of Illinois requires inspections, and we ended up having to send them to Peru, Indiana, which is about 50 miles inside the Indiana border, you know, away from Illinois, to actually do those inspections. We are very much in favor of having a really good first inspection at the plant, which FRA is pretty well committed to do in their safety compliance oversight plan, and we would hope that the states would accept that, as well as the normal routine inspections that happen along the track, as well as, you know, the fact that DOE is committed to build their system in

compliance with S-2043, which has onboard monitoring of the shipments as they're in progress. So, there's a lot of inspection that's going to happen real time as the train progresses.

HALSTEAD: Might I add, Andy, that a number of states are impressed by the assurance, the safety assurance that the Illinois program seems to have provided, both in terms of the general public and elected officials, and, so, a number of states have or are considering adopting inspection requirements that would be based on the Illinois program. So, for rail, that is obviously an issue because of the difficulty of finding a safe place to do the inspection.

And, this is also an issue with the DOE decision to ship legal weight truck casks in overweight truck service. There are pros and cons about that that I don't really want to go into, but I think the bottom line is that use of overweight trucks will really highlight that inspection and permit issue, and they're something that really need to be explored.

LANTHRUM: I would add that DOE has not made a decision to ship legal weight or overweight trucks by rail. We did an analysis of our EIS and determined that that EIS bounded that condition if we at some point did choose to operate that way.

KADAK: Just a comment on Bob's comment. My hope was that instead of having individual states do individual

inspections, that the individual states would rally around a standardized inspection at point of origin, which I think would be more common sensical.

But, a quick question for Bob. What is your recommendation on dual purpose casks?

HALSTEAD: This is an old recommendation that predates the MPC proposal, and our recommendation was that DOE and the utilities coordinate to plan a system based on dual purpose casks precisely so that utilities would not be putting large inventories of spent fuel into single purpose storage systems at the reactors. At that time, we also were looking at some of the storage issues at the surface facilities of the repository, but basically, without getting into the disposal container aspect of the TAD proposal, we have always thought that there was a great deal of wisdom to either individually licensed dual purpose systems, or something more system-wide, like the MPC proposal.

ABKOWITZ: Okay, very quickly, Thure, and then Ali.

CERLING: Cerling, Board.

I direct my question to Steve, and I'm interested in the issue of public perception, and your group has had experience of on the order of 20 plus years of dealing with the public and transportation. So, I was wondering if, quickly, you could summarize how public perception has changed by the communities affected over time, and what

lessons you have learned, and how you might have done it differently?

EDWARDS: I will say from our experience over time, the communities tend to forget that it's even going on, unless there is an incident that might call it into question, cause it to get into the news. So, I would say that the lesson learned there would be not have any incidents that cause it to get into the news, and things go much smoother.

CERLING: How would you do thing differently for a new, you know, going back 20 years ago when the public issues were larger, when the program initiated. So, if a program were to begin, how would you deal with the public differently than you did?

EDWARDS: I think the point Bob was bringing up earlier, ensuring that you address the first responders, emergency response, and you have a good plan and good training for those people, and then you make sure that the general citizens are aware of the participation of the emergency response organizations and the training and their preparedness that works there, and that they recognize that it is not just the shipper that is involved, but you do have the support of the infrastructure along the entire route. I'd say that is very important, so they understand everybody that's involved, and everybody is called into the process.

ABKOWITZ: Ali?

MOSLEH: Mosleh, Board.

This is for Gary. Looking at this list, to what extent DOE agrees or concurs with the concerns embodied in these recommendations?

LANTHRUM: Well, as Bob indicated, we have this organization called the Transportation and External Coordination Working Group where we deal with a wide range of issues that our stakeholders have. They shared these issues with us. A number of them are things that we don't have direct control over. The oldest fuel first? Transportation will transport what we are given under the contracts, and as Dave indicated, the contracts control what will be shipped.

What we will be doing is shipping everything in compliance with the NRC regulations. And, so, it doesn't matter whether it's old fuel or new fuel, we'll meet the RAD limits and other limits that the NRC has established for transport. So, all shipments will be legal under the regulations.

Mostly rail? We made that as our record of decision. We did that back in 2004, both nationally and in Nevada. The dual purpose casks? That's not an NRC issue. That's a utility issue. Dedicated trains? We made the policy decision back in 2005 to use dedicated trains.

Full scale cask testing? That's largely an NRC issue. They're the ones that control the cask regulations

and the degree of testing that's going to go on. In fact, the National Academy of Sciences looked at that issue as part of their study of the safety of spent fuel shipments that was completed in 2005, and they indicated that they support full scale cask testing, but they believe that the program that the NRC was currently implementing was both necessary and sufficient, and we will buy casks certified by the NRC.

The NEPA process for selection of the rail spur? We believe we have complied with all the requirements of NEPA and we think we have done a very thorough job. We went, again, out of our way to look at a potential additional corridor and we delayed issuance of the ROD by a couple of years by doing an analysis of the Mina. So, I think we've been very aggressive in trying to make sure that we've met both the intent and the spirit of the NEPA regulations in our analysis that we've conducted.

The straw man routing process? We have a number of things going on in looking at potential ways to derive routes. We have asked the various regions of the country, we deal with states through state regional groups, where we get collective knowledge about issues of a region, and we have asked them to participate with us in a way of looking at what the criteria and methodology that they would like us to incorporate for routing would be.

One of the things we're looking at now is a sample

problem, which basically is a straw man process. Western states have, by and large, not wanted to participate. The Midwest actually came up with a set of proposals on their own. They have been very actively involved. The Northeast has been less active, but they've been engaged. The Southeast is kind of just watching what we're doing. But, I believe all the regions will be involved in what we've proposed in terms of a sample problem, which is a good way to go, in making sure that, in practice, what you come up with in theory looks like it's going to be workable.

We would not anticipate that this would be driven down to final routing solutions for quite a long time, because we're still 12 years away from the first shipment, at the earliest. And, so, there's a lot of time to deal with the routing issues.

The YVC program? We worked very closely with states and tribes and other stakeholders about how to capture the way we would implement our requirements under Section YVC of the Nuclear Waste Policy Act. We worked diligently to come up with a revision to the draft policy for allocating YVC funds for training of emergency responders and for technical assistance. The draft revision came out about a year and a half ago. We received comments on that. Part of what that last revision did was finalize or propose a changed approach for funding states for emergency response, but it

was absent or quiet on how we would deal with tribes, because tribal issues are in many cases very different than state issues. Over the past year, we worked through a series of recommendations with tribes. There is a revised draft policy about to come out that will include the tribal revisions, and we're hoping that will be out by the end of the calendar year. So, we're very actively engaged on that front.

State regulatory enhancements? I can't speak to what states are going to do, but certainly we will respond when they come up with their proposals. And, then, terrorism and sabotage concerns? There is a hearing going on in the Senate today with the Senate Commerce and Transportation Committee on transportation safety and security. And, I believe in the NRC's testimony, they're going to talk about the revision of their security status that was done. They did a revised review that was concluded in 2007. It's a classified review. I've been briefed on that. They believe, based on that review, that their current regulatory regime is both necessary and sufficient to deal with issues of security, in addition to issues of safety.

We are working in collaboration with the NRC, and with a number of international partners at finding ways to better assess what the actual consequences of a sabotage event would be. Unfortunately, funding for that effort has been cut back as part of the overall funding cuts the program

has faced, but recently, we've got tentatively good news on some money that's been directed to that testing program that would, again, look at what the actual consequences of a high energy, high density device, impacting a spent fuel shipment would be in terms of release fractions, and particle size, which has a very big impact on the consequence of a terrorist attack.

And, having that information, if that is, in fact, if we're able to do what we call the Phase 4 test, actually testing actual pieces of spent fuel in a very controlled situation with these HDD devices, if what comes out of that would recommend changes to the security environment, the NRC, since they are a partner in the test, would certainly be on board in trying to change their regulation.

So, I think we have looked at all these things. We take them all seriously, and a number of them, we've already taken action on. Others, we've got processes in place to make sure that we address them before we start shipping.

ABKOWITZ: Okay, we need to wrap this up. There's two issues I need to get on the record here, so I will ask questions and ask the best abbreviated answer you can give us.

The first one has to do with water, you need water to build a railroad in Nevada. Could you explain the process you're going to need to go through in order to get water?

LANTHRUM: Certainly. Water is controlled by the State Engineer. We have a challenge with the State of Nevada, because they actually did a--passed a law that said that the Yucca Mountain project is not in the public interest, and one of the first things the State Engineer has to do when he is considering an application for a water permit is determine whether or not the request is in the public interest. And, since the law says it's not, the process or the permit cannot be processed. And, so, we had that issue generically for Yucca Mountain, and then it will affect the railroad as well.

The railroad will take about 2 billion gallons of water for dust control and for compaction of the cuts and fills that we're going to be working on. 2 billion gallons of water spread over a five year construction period, and that's about the amount of water that Las Vegas consumes in three days. So, the overall impact is not great, but we do have some hurdles in terms of getting the permits to acquire that water.

ABKOWITZ: Okay, thank you. And, the other issue, and this is something directed at you, Gary, and also at Bob Fronczak. My understanding from the previous tech meetings, and so forth, and the work you've done so far, is the egress issue from commercial nuclear sites to a mainline railroad requires using shortline railroads in 20 or so places. And, I understand that there is a certain minimum operating

standard that you expect those shortlines to have in the way of track quality, and so forth, in order to be considered in a condition usable by DOE for these types of shipments.

Could you comment on how extensive the problem is going to be to upgrade these shortlines to that level, and perhaps, Bob, you can help us with that question, and also just give us a sense of the financial condition that shortline railroads are in, and what their ability to pay might be?

LANTHRUM: The review that we did of the Winchester and Western Railroad with the Federal Railroad Administration and with local officials last year was along those lines, trying to get a handle on what the current condition of the shortline track is. It was one shot. We ran out of money to pursue it any further. It's not a strong process driver for us at this point with where we are in terms of beginning overall shipments. It is something we will do before shipments start, and, again, I said about five years in advance.

The number of shipments that we will be making is relatively small. The number of shipments coming across Nevada with the Nevada Rail Line will be two to three shipments a week by rail of spent fuel. The commercial activity that represents is not, in and of itself, does not warrant upgrading track. And, so, the extent of the small

shortline railroad's ability to do track upgrades will depend more on other commercial activity that requires the use of the track than our shipment workload. We are just not a big shipper, volume-wise.

And, so, for those tracks that don't have a commercial basis for doing those track upgrades, we will wind up not using the track if it's not at a grade that allows us to get our escort cars and our cargos on there. For ones that have the commercial rationale for doing their upgrades, they've got a business mile, they're run as little businesses.

ABKOWITZ: So, what you're saying then is that there may be sort of a number of facilities that have rail, direct rail access that you may not ending up using rail for, you'd have to use heavy haul truck, or something, to get it to the nearest mainline rail head in those circumstances?

LANTHRUM: That is a possibility. But, it's going to be driven by other market conditions than by our level of work.

ABKOWITZ: Bob, did you want to comment?

FRONCZAK: Fronczak, AAR, again. I agree with what Gary is saying. Basically, the shortlines, this business is not going to generate enough revenue to justify major investments in track. So, somebody is going to have to pay for those investments, and, frankly, I think it's a commercial issue. You know, you have to do a cost benefit analysis and figure

out what the most effective use of taxpayer funds is, or ratepayer funds.

ABKOWITZ: Okay, thank you. I want to thank the panelists, and particularly wanted to thank David Duquette for his long line of questioning that made us late.

GARRICK: Thank you. I think we'll reconvene at 1:15.

(Whereupon, the lunch recess was taken.)

AFTERNOON SESSION

GARRICK: We're now going to move to the Surface Facility Design, and Board member Howard Arnold will be leading the discussions.

ARNOLD: Thank you, Judge. We have two presenters, James Low of DOE and John Orchard of DOE. And, I'll ask them to introduce themselves at the beginning of their talk.

I just wanted to add a word at the beginning. The Surface Facility Design, of course, is driven by what has to go through it. And, from this morning's discussion, I think there's going to be a lot of emphasis on the wet handling facility in the sense that if a fair amount of the fuel doesn't come in in the form of TADs and it has to be repackaged, then there will be a lot of attention on that facility. But, I'm hoping that will come out in the discussion.

First, is James Low from DOE. Oh, excuse me. I had you in the other order.

ORCHARD: My name is John Orchard. I am a project engineer for the Department of Energy on the Yucca Mountain project, and I'm responsible for some of the surface facilities. I'll be discussing some of those at the first part of the talk. Then, Jim Low is a project engineer also for some of the other facilities, and he will be talking about some of his facilities in the second part of the talk.

Next slide. We talk in acronyms, and there is a list of acronyms in case you need them.

This is a rendering of the site. The north portal to the subsurface emplacement facility is located here, to put it in perspective. We have the initial handling facility, the wet handling facility, the canister receipt and storage facility, and the receipt facility. These are the main process facilities at the site.

And, on the next slide, we have a plan view of mostly the same thing. To put you in perspective, here's the north portal. We have the IHF, WHF, CRCF-1, RF-2, and then we have future provisions for a CRCF-2 and 3 as the through-put builds up, and as we need them, and this is also to show you the relationship of the aging facilities, which is also going to be discussed later.

Next slide. The discussions on the design of the facilities and the status of the design is that to support the Preclosure Safety Analysis and the License Application, the design is complete, in accordance with the 10 CFR 63, but the design is continuing in order to support procurements and construction of the facility.

Next slide, please. The primary part of the intention of the presentation is to discuss the throughput of the waste forms, and the mechanical handling equipment that's used in that throughput is listed here. We've got cask

handling cranes, spent fuel transfer machine, canister transfer machines, site transporters, TAD closure equipment, DPC cutting equipment, but all this stuff is in use in commercial nuclear plants, and facilities in the country and around the world, and it will be designed to consensus codes and standards for the type of equipment it is. We've got an example, the cask handling cranes, spent fuel transfer machine, canister transfer machines will mostly be designed to ASME NOG-1, which is Rules for Construction of Overhead and Gantry Cranes.

KADAK: Are those single failure cranes?

ORCHARD: NOG-1 is single failure, yes. We can get into a discussion of that later, if you like.

The cask transfer trolley and the waste package transfer trolley are unique in their application at our facility here, but the components are in common use throughout the industry. And, the applicable portions of those pieces of equipment will be designed to ASME NOG-1 again. And, the same with the transportation and emplacement vehicle. It's got some unique components and the entire vehicle will be designed--the applicable portions of the entire vehicle will be designed to the applicable portions of ASME NOG-1.

The facilities we're going to talk to you about are, that you asked to be briefed on, is the aging facility,

canister, CRCF, WHF, RF and we're not going to specifically address the IHF, but it's one of the main facilities there. And, we've got a table here to show you the waste forms that are handled in each of the facilities, and what the purpose of the facility is.

The high-level waste, the DOE high-level waste is in canister form, and it's primarily handled in the CRCF, but it can also be handled in the IHF. The Naval SNF is canisterized in its entirety, and only uniquely handled in the IHF. DOE SNF is again handled in the CRCF where it's co-disposed with the HLW. The commercial SNF, the uncanistered commercial SNF, which at this time includes DPCs, is entirely processed through the waste handling facility, where it's put in TADs. Wet handling facility. And, the commercial SNF that comes in in TADs can be handled in any of these facilities, except the IHF, primarily in the CRCF, but it can be handled for various reasons in the other facilities through the RF and the aging facility.

Next slide, please. The mechanical handling equipment that handles these waste forms is listed here, and to show the commonality and application of these various pieces of handling equipment, we've got this table here that shows the cask handling crane, is used in all facilities, all the waste forms come in in transportation casks that are off-loaded with the cask handling crane.

We've got transfer trolleys in all facilities, CTMs in all facilities. The waste package closure facility is used in those facilities that actually load and close the waste packages. The TEV handles the waste packages out of those facilities. The site transporter is used in these three facilities, CRCF, WHF, RF. The spent fuel transfer machine is only used in the WHF, which is what it's there for, and the TAD closure and DPC cutting machines are also used in the WHF. And, we'll get into more detail later, Jim will.

Next slide, please. In the CRCF, the requirements, the throughput requirements that we designed the facility for are the following, and this is per CFCF. We've got 450 metric tons of heavy metal per year that's going to come in TADs, and we're going to place it in waste packages for direct disposal. And, this works out to approximately 55 TADs. The TADs have varying weights, and so it averages about 55 TADs.

We've got 200 metric tons of heavy metal in TADs that we're going to put in aging overpacks and place in the aging pads. We've got 50 metric tons of heavy metal DPCs which we can also place in aging overpacks in the CRCF for the aging pads. We have 63 canisters per year of the DOE SNF and 315 canisters per year of the DOE HLW which we place in the waste packages for disposal.

One of the design approaches that we've taken on the CRCF in order to facilitate throughput to meet these requirements is that we've got parallel lines for loading and closure of the waste package. The waste forms are received in a single line, but then we can transfer them, load them in the waste package, and close them in two parallel lines.

Next slide, please. And, here's a plan view of the CRCF and showing some of the waste flow paths through CRCF. They are color coded. The primary waste path is the pad, we bring the--

GARRICK: You're going to have to go to the microphone.

ORCHARD: We bring the TADs in here through the receipt facility on a, primarily on rail cars. We off load them from the rail cars, place them into the cask transfer trolley. The cask transfer trolley is moved into the canister unloading area here, where the canister transfer machine, the floor above, lifts it out of the transportation cask, moves it over and places it into the waste package that's on the waste package transfer trolley. The waste package transfer trolley then moves to this location here, where it's welded closed, and then the waste package transfer trolley moves it out into the loading bay here, where it's tilted down and placed into the TEV, which is this machine here, and the TEV moves the waste package out into the repository.

KADAK: How long does that process take from receipt to

out the door?

ORCHARD: It's in the order of two days. I'll have to get back to you for an exact number. Am I right? I can get you the exact number, but it's in that order. I used to know it to the minute, but I don't.

Another capability that we have in the CRCF that I mentioned is that this orange line here represents bringing in a TAD or a DPC that we want to load into an aging overpack, and move out to the aging pads. And, a third capability that we have in this facility is that we can bring TADs either from the aging pads, or from the wet handling facility out there, the uncanistered fuel has been put into a TAD, we can bring them in on a site transporter into the-- directly into the cask unloading area here, and again with the CTM move it out of the aging overpack into the waste package, waste package closure, and TEV into the repository.

Next slide, please. Here's a section view through the same facility. This shows the rail car with the transportation cask on it. This structure here is the cask prep platform where when we off load the transportation cask, we put it in the cask transfer trolley. This is the cask transfer trolley moved under, well, into the cask unloading room. The CTM here above reaches down into the cask, withdraws the canister up into the bell, the shielded bell, and the canister transfer machine, the bell moves over to the

loading position for the waste package, it lowers the canister into the waste package that's sitting on the waste package transfer machine. The WPTT moves it over to the waste package closure system here, which is a welding system primarily that welds the lid on the waste package. The waste package transfer machine moves it into the loading room here, where it's down-ended, tilted down into a funnel position, and moved into the TEV, and then the TEV takes it through the vestibule and out to the repository. And, that's how the CRCF works in a nutshell.

Next slide, please. The receipt facility does a slightly different function. The requirements for that are 1000 metric tons of heavy metal in TADs that we can put into the aging overpacks, for movement out to the aging pads. And, we can also load 140 metric tons of heavy metal coming in on DPCs that we can put into aging overpacks to move out to the aging pads.

Those are the throughput design requirements for the RF. Some of our design approach to meet those requirements--well, some of the function of the receipt facility is that it reduces demand on the CRCF and the WHF in this transloading capability of putting these waste forms into aging overpacks. The CRCF is capable of doing it, but having the RF takes some of the demand off the CRCF. And, the DPCs, we can put out in the aging overpacks and bring

them back into the WHF when we're able to transfer them into TADs.

So, the RF also decouples the receipt of the waste form from loading the waste packages in the CRCF, is a second approach that the RF provides us. And, one of the things about the receipt facility is that the equipment that we use in the receipt facility is the same equipment that we use, at least at the front end of the CRCF for their receiving and transferring of the waste form. So, that's our design approach.

Next. Here, again, is a plan view of the receipt facility, showing the flow path through the facility. The red line here is a TAD, or DPC, coming in on a rail car, and just like in the CRCF, it's off loaded off the rail car, placed, up ended and placed on the cask transfer trolley and moved into the cask unloading room. And, in an area above here, we have the canister transfer machine that lifts the TAD, or DPC, out of the transfer cask, and places it into an aging overpack, and, the aging, rather than a waste package as in the CRCF. So, we put in the waste package, or we put it in an aging overpack that's sitting on the site transporter, and the site transporter then moves out into the aging overpack closure area, and then through the vestibule and on out to the aging pads.

The green line here represents--we have the

capability of receiving horizontal DPCs. There's a certain number of horizontal DPCs in the industry, and they have to be maintained in a horizontal configuration. So, we don't upend them here, we bring them in on the rail car again. We lift them off and put them onto a stand. Then, we can move the rail car out and bring a specially designed site trailer in here, where we can put the DPC in its transportation cask on the trailer, the site trailer. And, the site trailer moves the horizontal DPC out to the aging overpacks, where we have specially designed horizontal aging modules to receive the DPC and store them and stage them, hold them. And, that will be discussed in the aging pads.

KADAK: Just a clarification question. What are all those other rooms? It looks like storage areas.

ORCHARD: Well, for instance we have A-track systems here, and some of these are A-track systems. We have electrical systems, and some of these are electrical rooms. Right off-hand, I don't know exactly what these rooms are. We can find out. We didn't label them.

On the next slide, I've got a section cut through there, and it shows it's a section cut through there, but it might show us some of that equipment a little bit better. We have equipment location drawings that show in detail what that equipment is.

Can I have the next slide, please? This is a

section through the receipt facility, down the process line like I indicated on the last slides, and, again, this is the rail car with the transportation cask on it. This is the cask prep platform, and you can see dotted in here the transportation cask sitting in the cask transfer trolley. And, here's the transfer trolley after it's moved over into the unloading room. There's the canister transfer machine and the shielded bell. It lifts the TAD, or the DPC, into the bell, moves the bell over here, lowers the TAD, or DPC, into the aging overpack that's sitting on this machine here that's the site transporter. And, then, it moves perpendicular into the page, out through the aging overpack closure and vestibule.

For instance, this shows a low level waste sampling tank here, all the floor drains and stuff run into a low level waste tank and we collect it here and sample it before we take it to our low level waste facility, if required. And, we see it's taken most of the other equipment out of there, but a lot of the other, most of the other big equipment is HVAC stuff and a lot of it is also electrical stuff. Switch gear.

Next slide, please. Okay, this is Jim Low is going to talk to you about the WHF and the aging packs.

LOW: Thanks John.

ARNOLD: Okay, we'll hold the questions until after Jim

is finished. Thanks.

LOW: The WHF, as John indicated during his introductions, I'm the project engineer for--

GARRICK: You're going to have to get closer to the microphone.

LOW: I'm the project engineer for the wet handling facility as well as the initial handling facility, Department of Energy, Office of the Chief Engineer.

The WHF requirements for receipt and processing is that it's capable of receiving 230 metric tons of bare commercial spent fuel, and there's a seven day minimum turnaround for the transportation cask that's associated with the commercial spent fuel.

ARNOLD: A slip of the tongue. You said minimum, but you mean maximum?

LOW: I mean maximum, sorry, maximum seven day turnaround for the transportation cask to be returned back to service. And, it's capable of receiving 77 metric tons per year of commercial spent fuel in DPCs.

KADAK: Can I just clarify? What do you mean by bare?

LOW: Bare is uncanistered.

KADAK: Uncanistered. And, how are you going to ship those?

LOW: Those will be in either truck or rail transportation casks.

KADAK: So, not in TADs?

LOW: Not in TADs. The whole purpose of WHF is to take the commercial spent fuel that's not in TADs, and package it into TADs.

KADAK: Do you have a cask that can do that now?

LOW: Do we have a cask?

KADAK: Transport cask.

LOW: Well, we have the truck transportation cask, such as the GA-4 and GA-9 that the facility has been designed to accept.

KADAK: And, they take how many assemblies?

LOW: Well, the 4 and a 9 are 4 and 9. But, the facilities also, is being designed to also take large rail transportation casks, too.

ARNOLD: They have to be put into TADs?

LOW: That's right.

ARNOLD: That's the whole purpose of the facility?

LOW: That's right. The whole purpose of the facility is to take transportation casks containing bare fuel, or transportation casks containing a dual purpose canister, or receive aging overpacks from the aging facility that are containing dual purpose canisters, and package it all into TADs. That's the output of the WHF.

In order to meet these receipt and processing requirements, we have a facility design approach, which for

the work stations that are sited inside the facility, is a full utilization for all stations, which means that more than one transportation cask, dual purpose canister, or TAD can be processed simultaneously. It's not a sequential operation in order to meet these type of throughputs.

The wet handling facility process flows circularly from the transportation conveyance on the east side of the facility to the preparation operations for the canister or for the bare fuel on the north side of the facility to pool handling operations, which is located in the west, to transportation casks and TAD export and welding operations, which is located on the south side of the facility.

Next slide, please. This is a material flow path diagram. These are the main station locations that are located within the WHF. The primary ones are the overpack--I mean--the cask preparation work station, which is commonly called prep station Number 1, a DPC cutting station, which is located here. This is prep station Number 1. We also have a TAD closure station located here. And, we also have a prep station Number 2, primarily for the purposes of preparing empty transportation casks for export out of the facility using the cask handling crane.

What's depicted here are four primary flow paths. The first three are into the pool, as depicted, and the last flow path is the TAD loading and export, which is the blue

line here. The most simple operation is the transportation cask, bare fuel, which is the red, enters the facility via the transportation vestibule. It's off loaded, up ended, then taken to prep station Number 1, where it's purged, off gas cooled, filled with borated water, and then transferred to the pool for either unloading into the staging racks or loading into a TAD that's already been prestaged in the pool.

The green line details the operational steps that's involved with unloading a dual purpose canister in a transportation cask. In order to do that, we, like the bare fuel transportation cask, it enters the same pathway, the transportation cask is prepped in prep station Number 1, and then it's moved into the unloading room to remove the DPC. The DPC is then subsequently loaded into a shielded transfer cask, which is used exclusively within the WHF, and then it's taken out, taken to the DPC cutting station, where the DPC lid is cut, and moved to the pool, DPC unloading bay for unloading into a TAD.

A capability within this facility is to accept the DPCs and aging overpacks from the aging facility. And, in order to accomplish that, we come in through this aging overpack vestibule, which is, when we're exporting TADs is used to export it, but here, we're importing the DPC aging overpack. Then, this comes on using the site transporter. This moves into an unloading room. The unloading room, the

DPC is unloaded from the aging overpack, and then loaded into a shielded transfer cask, and the shielded transfer cask takes the same operational steps as we described before for the DPC in a transportation cask.

Relative to previous questions, these are electrical rooms. These are HEPA trains, HEPA exhaust plenum. These are the pool clean-up systems, three trains worth, and there's a maintenance room, and utility rooms here.

Next slide, please. This is a section view through a partial depiction of the WHF. We have a pool here. It's about 74 feet by 61 feet by 52 feet deep. As indicated in our plan view, we have a transportation cask come in. It's prepped by our mobile access crane where impact limiters are removed. We use the cask handling crane to upend the transportation cask. Then, it's taken to the prep station Number 1, and depending on whether it contains a DPC or not, it's either exchanged for shielded transfer casks or not. Assuming that it is, the prep station Number 1 is the front end for the unloading room that's behind this wall here. After it's been exchanged for a shielded transfer cask, we then take it to the DPC cutting station, where the lid is removed, and then--

KADAK: Underwater cutting or an air cutting?

LOW: It's an air cutting, but it's under water from the

standpoint that the DPC is--the STC is actually filled and cooled with borated water first before we make the cut.

KADAK: So, it's underwater cutting?

LOW: It's under water cutting, but it's not in the pool.

The DPC STC is then taken by the cask handling crane, and then placed into the DPC bay. There's another staging shelf behind this wall here. And, then, the fuel is removed using the spent fuel transfer machine, and then placed into a TAD canister, which will be in this transfer station. This is one of five transfer stations located inside the pool here. We have a staging rack that's capable of 209 assemblies and four damaged fuel cans. And, we also have a decom pit for abnormal situations where we may have to deal with an STC or a cask where these prep stations may not be able to.

Next slide, please. I'm switching gears to the aging facility. We don't have a material flow diagram for the aging facility as we do for the three other facilities that you've seen here. The primary block flow for the aging facility is TADs and the DPCs from the receipt facility, loaded in aging overpacks, from the wet handling facility. If we happen to have the rare situation where we export a TAD that needs aging, that's also fed into the aging facility. And, from the canister receipt and closure facility, we have

TADs in their aging overpacks. These all are moved out there using the site transporter, and moved into one of 2400 positions relative to the vertical aging overpacks.

They're aged, they're monitored, temperatures, exhaust temperature from each aging overpack is constantly monitored. And, at the end of aging, they either go to the wet handling facility to process the DPC into a TAD, or they go to the CRCF because they already have a TAD, and be processed into a waste package.

The top flow diagram reflects, as John indicated, those fairly rare situations where we have horizontal transportation casks with DPCs. These horizontal transportation casks are received from the receipt facility. It's subsequently moved in the transportation cask to the aging pad. It's removed from the horizontal transportation cask into a what is called a horizontal aging module, or a HAM, and at the end of the aging process, the HAM is then moved to the wet handling facility using a special horizontal shield transfer cask.

Next slide, please. This is a plan view of the aging pad. There are about 25 total slots available. There's 2400 for vertical overpacks, and 100 HAMs. Each one of these have a capability of about 1250. They're four by four. You can see that they're either--I mean, each square is a four by four aging overpack.

And, that's my last slide.

ARNOLD: Okay, thank you, Jim. John, perhaps you could come up and both of you together answer our questions.

Let me kick off, take my prerogative as the Board lead on this. Kind of a general question of the status of the design. You've turned in a License Application in which, I know this isn't--it's not at a high stage of completion in terms of construction drawings, and you will get a bunch of RAIs. The question I have is what flexibility is there to adapt this design as you find out things through either the RAIs, or through industry experience, or through your own further work as you proceed?

ORCHARD: I believe that to--a certain amount of the design has been done to support the safety case, which is what's gone into the license. So, if we want to change part of the design that impacts the license, we'd have to go through some type of license amendment. So, that would be our constriction on--

ARNOLD: Let me give you an example.

ORCHARD: There's a lot of design that isn't--

ARNOLD: Yeah, let me give you an example of the kind of thing that I might be interested in. Several places in there, there's a welding station, where you're going to close something. Now, those tend to be choke points. Sooner or later, something goes wrong in the welding station, and

everything else starts to back up. Can you, for example, decide you're going to put an extra welding station at each spot, or do you feel that that would require a license change?

ORCHARD: Well, I think we'd have to talk to our licensing people to find that out. It depends on the level of detail of the design that we've got in the License Application.

ARNOLD: Yeah, that's what I'm asking you.

ORCHARD: If we wanted to add another--

ARNOLD: Just as an example, another might be the pool itself. To what extent does that pool mirror existing commercial practice in spent fuel pools, or in fuel handling pools in the commercial reactors?

LOW: Well, the pool was designed with industry consultants.

GARRICK: I'm having trouble hearing you.

LOW: The pool was designed with industry consultants, and based on our contractor's extensive experience in building spent fuel pools for power reactors across the country.

KADAK: Who was the contractor?

LOW: It's Bechtel.

KADAK: Who?

LOW: Bechtel.

LACHMAN: My name is Kirk Lachman. I'm DOE, and I just wanted to address your first question on the adding of additional closure cell. It would require a substantial change to our licensing basis and the safety case, and that would be significant, because it would change the envelope of the facility. It's not all that flexible in that case. Years of work.

ARNOLD: Okay. All right, other questions? Andy?

KADAK: Have you guys had a working group meeting with the facility design people yet?

ARNOLD: No.

KADAK: I think we probably should. Have you done a throughput analysis identifying single mode failures in any of these facilities?

LOW: Yes, there are preliminary throughput analyses, and David Rhodes will be presenting a lot of information relative to that in his next presentation.

ARNOLD: Yeah, that's the next portion.

RHODES: Actually, I'm David Rhodes, DOE. I'll be doing that in the next one. Why don't you hold that question for me.

KADAK: Okay. In terms of the seismic design, the last time we checked, it was like a huge burden to design these facilities that may only be operated for, say, 50 years, much like a spent fuel storage for a nuclear power plant, 60

years. Have you made any progress in establishing a reasonable design basis for facilities like this?

LOW: Relative to seismic design?

KADAK: Yes.

LOW: We believe that seismic design is--well, perhaps I should defer that answer to Deb Nevergold, who is our lead seismic structural manager from Bechtel here.

KADAK: Is he here?

LOW: Yes, she's--

NEVERGOLD: Yes, Deb Nevergold. I'm the project engineer, and I'm shorter than everybody else. Project engineer for BSC, and we're designing the structures for the 2000 year occurrence earthquake. The PGA for those values, the horizontal is .45 and the vertical is .32. So, I don't know that I would call those excesses, but we have completed the design based on those requirements.

So, basically, what we have is four foot thick walls, with enough margin in it to meet the probabilistic requirements required by 10 CFR 63. So, we have code requirements and then the probabilistic requirements, and the four foot walls adequately meet all those requirements.

KADAK: I guess that's what we're questioning, the need for four foot walls.

NEVERGOLD: As I said, we have probabilistic requirements that, by the code, there is margin in the

design, if we had the code requirements only, there would be something less than four feet, but even nuclear power plants have margins built into it. And, so, based on the amount of margin we need to meet 10 CFR 63, four foot walls are reasonable.

KADAK: Okay.

ARNOLD: Henry?

PETROSKI: Petroski. The four foot walls brings up this question to me. I don't see any dimensions on any of these drawings. Is that deliberate or--

LOW: These are general arrangements. These are actually figures.

PETROSKI: Are they to scale?

LOW: Yes. Yes, they are to scale.

PETROSKI: On some of your flow path diagrams, a question arises, and maybe this is anticipating a later presentation also, but what plans do you have for, let's say, dry runs going through those procedures? There seem to be a lot of very sharp turns involved in some cases. Are there plans to take prototypes through the process, through the flow process?

LOW: David Rhodes will address that during start-up and testing, but David is there to provide you--

RHODES: Actually, that is the last presentation of the day. I will address that.

PETROSKI: All right. Okay, thank you.

ARNOLD: Mark?

ABKOWITZ: Abkowitz, Board.

Could you tell us what percent design complete the surface facility design is in terms of what's been submitted as part of the safety case? Is it 30 percent complete, 5 percent?

ORCHARD: I think we tried to express that in our first slide, or to support the safety case, we're 100 percent complete. But, there's a lot of ongoing design to support procurements and construction, and calculation of percent complete is a function of your enumerator and your denominator.

ABKOWITZ: Okay. But, for all intents and purposes, we're looking at cartoons, in a lot of respects.

ORCHARD: All we're showing you here is cartoons, yes.

ABKOWITZ: Correct.

ORCHARD: In the LA submittal, we have detailed drawings.

ABKOWITZ: So, there are much more detailed drawings that are supporting the LA, with some of the dimensionality that got this--

ORCHARD: This structure is all dimension, yes.

ABKOWITZ: Okay. And, if I understand a response that was made a short while ago, there's really very little

latitude in that design without requiring some kind of licensing amendment. Anything that would require adding a cell, building another WHF, any of those types of things would be of the nature that would require an amendment.

ORCHARD: Absolutely.

LACHMAN: Kirk Lachman, DOE. Yes, if we change the structure of the facility, the site of the structure, the dimensions of the structure, we're going to have to go through all the work that Debbie did before with a structural analysis, fragility analyses, et cetera. So, yes, there's not much flexibility, unless I do it inside the envelope I have right now.

ABKOWITZ: So, let's take for example then, this issue with the 90 percent TAD assumption. If that assumption were 80 or 70, or something of that nature, which would imply a larger number of wet handlings, that would be the type of operational--change in operational assumption that would require a change in the surface facility design, and that would require an extensive amount of additional work?

LACHMAN: Well, that one is somewhat easier, in that we have, as you saw from Slide 3, I think it was, the overall site plan view, where we had three canister receipt and closure facilities--actually, it's Slide 4. Should the waste come in a different percentage than we anticipate, we would go through, and such that it would exceed the capacity of the

current WHF throughput, we would go through a licensing proceeding amendment, and go through all that work, and we could replace CRCF-3 with a WHF-2.

ARNOLD: Yeah, I think they talked before about the ability to replicate those buildings. That's different than changing the design.

ABKOWITZ: So, what you're saying is it's easier to build another facility than it is to add another welding cell to an existing facility?

LACHMAN: Well, you asked a different question. Or, I understood you to ask a different question about the 90/10 split, and if more was coming uncanistered, which would require a wet handling facility addition. As far as adding another facility versus changing, there's a number of years between the build-out of CRCF-1 and CRCF-3, in which at that time, should we determine through our operating experience that the throughput rates just aren't working, there's a hangup someplace, we could then do a design change going through the proper licensing proceedings, and amendments, et cetera, and do whatever, wherever the choke point was, whether it's the closure cells, whether it's the front end of the building in the transportation casks. So, that could be done. There's a number of years between CRCF-1 and CRCF-3, or even CRCF-2. So, there are opportunity for those analyses for be done.

ABKOWITZ: Thank you.

GARRICK: Do I understand correctly that you have design drawings in the License Application?

LACHMAN: They are not specifically drawings. There are figures.

GARRICK: Can you characterize this in architectural engineering terms, like are they Title 1, Title 2, Title 3, or a percentage, or where are we on this design anyhow?

LACHMAN: I'm going to go back to one of their slides where we are 100 percent complete with the design to support the License Application.

GARRICK: Well, that doesn't mean much.

LACHMAN: When you look at Part 63 and the requirements of Part 63--

GARRICK: I don't care about the regulation. I'm talking as an engineer. Where are you from the point of view of engineering design? If you didn't have the NRC, where would you be in the conventional design engineering?

LACHMAN: I'm not able to answer that for you right now. Title 2 is about right where we're at.

GARRICK: Are you at 30 percent, 20 percent, because we don't get a sense at all of where you are on the design from these cartoons.

LACHMAN: The cartoons are cut from the model. I'd like to correct that statement. Those aren't cartoons, those are

cut from our 3-D design model. So, the drawings are cut from these 3-D models, the HVAC, electrical, the piping.

GARRICK: Okay. Well, then you do have--have these been designed by an engineering construction firm?

RUSINKO: I'm shorter than Debbie, so I'll be it. My name is Barbara Rusinko. I'm the engineering manager for BSC. So, yes, these designs are done by an architect engineering company. The figures you're seeing here, and the figures that are in the SAR, are based on real live design drawings that an AE would see. So, in the case of a mechanical system, there are official PNIDs issued, like you would see in any plant for piping systems. There are ventilation instrumentation diagrams for the ventilation systems. There are single line drawings for the electrical systems, and there are structural drawings for the structural design. The figures that are in the License Application that are public are extractions from those drawings.

GARRICK: Okay. So, when you say single line drawings, that's very different from design drawings?

RUSINKO: That's correct. So, a single line drawing is a higher level electrical drawing. At the end of the day when we're actually constructing this, the constructors will need all the connection diagrams. That level of detail is not done. That is something you will need for the constructor later.

GARRICK: Okay, thank you.

ARNOLD: Thank you. Gene, do you have a question?

ROWE: Rowe of Staff. I've got a couple questions on the wet handling facility. You said that it's--is it based on an--the pool and the pool cooling and cleanup system, is it based on an existing pool design anywhere? What's the basis for that design? In the past, DOE has told the Board that they've tried to utilize utility experience to the maximum extent possible. So, I'm wondering if they did that with the pool, because I've seen dozens and dozens of pools, and none of them look like that.

LOW: Well, BSC made numerous trips to utilities as the design was being developed, and this is the--

ROWE: Excuse me, we're running short here, but let me give you a specific question. The reset pumps for the pool are located eight feet, based on your LA, are located eight feet above the surface of the water. I would assume that those are probably on the order of 500 gpm centrifugal pumps. I'm not aware of a 500 gpm centrifugal pump that can lift eight feet of water with zero NPSH. Have you identified a pump that will do that?

LOW: That is left for further detailed design.

ROWE: Do you think it's possible to get a centrifugal pump that can lift water eight feet with zero NPSH?

ARNOLD: That was the thrust of my first question, was

to what extent will this design evolve and improve as time goes on? Adam, did you have a number?

LEVIN: Yeah, if I may. Adam Levin Exelon Generation.

Just to hopefully put this in a little bit of perspective. The Zion station, which has been shut down now for about ten years, our time to boil at that plant is 168 hours plus. So, for cooling, we really have very few cooling requirements with respect to the station, and if we need to, we can bring in auxiliary cooling as needed. But, the fact of the matter is at least for Zion station, I don't know where the design of this facility will be, but I can tell you with ten year old fuel, the cooling requirements are rather minimal.

ROWE: Yes, but it's more than just cooling. It's also purification. And, my concern is, and Howard's question initially was if you have to change that configuration because you can't find the equipment that can operate at those conditions, then that could have a major impact on the layout of the facility, which will impact the structural analysis. And, so, my question is have you looked at whether that system will actually work or not?

LOW: We have completed sizing calculations that suggest that these major pieces of equipment will function as required.

ROWE: Do you have pump curves?

LOW: I don't recall.

ROWE: I could not find anything in the LA or the DOE databases that have any information on those pumps.

RUSINKO: Barbara Rusinko, BSC engineering manager.

The system that you're describing, from the standpoint of the level of design detail that's in the License Application, this happens to not be an important to safety system, so the level of detail for that particular system is not something you would find in the license application for that reason. These are lots of the design details that may or may not change as we go through detailed design. In the case of the wet handling facility, there are parts of the building, especially where the pool cleanup and filtration is, that we have allocated extra space in the layout in case we have design changes that have to be made to that system. I'm not in the position today to talk to you exactly about what's in that current calculation. We do take into consideration pumps that are available in industry, not trying to invent or buy something that doesn't exist in industry before. But, when you talk about the level of detail, we do keep in mind what's important to safety and what's not.

ARNOLD: Let me just cap it off, because we've got to move. The issue, in my mind, isn't, you know, whether this particular design is perfect, because my experience with a

lot of nuclear plants is that at this stage, you're not looking at a final design at all. It's going to evolve a lot, and the question is are you prepared to make those changes, and have you left yourself--or the flexibility to make those changes, or are you painted in a corner? That's the question.

KADAK: Kadak. I'm just wondering what is the design basis accident for any of these facilities that has driven you to go to these designs? You said you made a safety case; right? What is the design basis accident? What are you trying to address with concrete walls? Let me ask another one. Are you looking to blend the fuel into TADs after you open up a perfectly fine DPC? Is there any strategy for measuring the fuel assemblies as they come out, so you can blend them and reload? Are any of these details contained anywhere?

LOW: We have the capability, but I don't believe that we have that thermal blending strategy that you refer to.

KADAK: Mr. Subchairman, I think we desperately need a more detailed discussion of this.

GARRICK: I think there's another issue here, too. We keep talking about the safety case. And, as we indicated this morning in my opening remarks, the Board is interested not only in the safety case, but in the performance, in the throughput, and in the ability of this thing to perform its

intended function.

So, a lot of the questions we're asking are with respect to its performance capability, not with respect to a licensing requirement, or an NRC regulation. And, we seem to have a disconnect between the discussion having to do with the effectiveness of the system from a throughput standpoint, and the effectiveness of the system from a safety standpoint. And, we're trying to get an understanding of both, and we keep kind of coming back to well, we've done this with respect to licensing, we've done it with respect to safety.

The NRC is not as engaged into the throughput issue as the Board is, and the Board is very interested in that. They want to know, they want to be convinced that this system is going to be able to perform in a reasonable way, and that's a very different question and I don't get the sense that the questions are being responded to in the context of operations and throughput. They're being responded to in the context of licensing. As we said, we're not licensing this. We're trying to understand how it works.

KADAK: And, John, even in the case of the design basis, which is a safety question, we're not hearing any answers.

GARRICK: Right. Yes. Yes.

ARNOLD: Well, let's leave it that we're unsatisfied at this point.

RHODES: Excuse me. If I may go and respond to what you

just asked about? David Rhodes, DOE.

The first thing is the design description that we prepared for you today was in relation to the subject of the throughput, which is where all of the waste acceptance, the transportation, the panels that we've talked about today, was intended to convey. This was not intended to be a discussion of the design for you, which probably would duly be done under a separate meeting, which we'd be more than happy to support at the appropriate time.

When we talk about the thickness of the walls, the design of the pool, that doesn't relate to the ability of the facility to perform its intended function. It's a mission behind the facilities. I can get to that this afternoon when we talk about the throughput presentations. But, right now, I think the design discussions are going beyond what we had intended to convey for you in terms of the throughput capabilities.

In terms of us being able to achieve the mission which we were established, the facilities collectively meet the throughput requirements. I can talk about the specific things that we have changed in the design that allowed us to proceed with more detailed development, so that we can achieve what we had intended to do, and it may not be the right forum here in this discussion to go and talk about that.

The reference to the design basis accidents for the facilities, for example, I can address briefly in the last presentation today when we talk about those interruptions of service, if you would. So, if you could defer that question for me, that would probably be more appropriate.

ARNOLD: Let me just cap it off. I was not trying to say that the design won't do it. I know it will eventually as you evolve it, in response to all the questions you get. It's just that you aren't going to build what we're looking at now. You're going to build something that has several more years worth of your wisdom in it.

So, let's proceed to the next one. David Rhodes, you're the next speaker.

RHODES: David Rhodes. I'm the engineering support supervisor for the Department of Energy. In previous life prior to joining the Department, I was the systems engineering manager for Bechtel SAIC, so I was responsible for the throughput analysis of the different facilities that we have, and I was involved with the program analysis for the total system model, which was done back on the East Coast, to go and assess the programmatic impacts of some of the subjects you're talking about.

So, if we can go to the next slide, just what I'll talk about is an overview of the repository design as relative to what went into the throughput modeling

activities, and the integrated surface facility throughput, and the last subject was the potential upset conditions and how they relate to what was modeled in our facilities.

This next figure represents just the general concept of operations for the nuclear facilities. Along the left-hand side, you actually see four boxes down the side and one down the bottom, which actually represent the waste forms going in. The arrows that you see represent from the generators to the transportation systems, either by truck or rail, so, the next two figures.

The next series of lines actually shows the transportation network, including the balance of plant, rail and truck buffer areas, where we actually shuttle the material. We receive the material on site, we shuttle it to the various nuclear facilities with which they will be handled. The lines coming out the right side of the four central nuclear facility figures represent the interactions that we have when we shuttle it from the building to building, from the buildings to the aging facility, and from the buildings to the subsurface, the subsurface being the one that’s on the bottom right.

Next, if you would. What we have in terms of incorporating the level of design into the throughput modeling that we have done. We have taken the design that is represented in the License Application, and it was modeled in

what we would call a discrete element model. So, each of the components of that design that affected throughput were actually put into a very detailed model. It includes the layout of the facilities, and the layout of the facilities themselves affect the ability to perform the mission. The facility configuration in terms of where equipment was located, the mechanical equipment envelopes, how the equipment operated so that it wouldn't interfere with each other. Time-motion studies that we had performed for various components of the equipment, both for the nuclear dose assessment, plus just studying the equipment in terms of speeds of the equipment, you know, the operability, and things like that, for how long it takes to operate.

We had operations input on the number of staff that are required, the operations personnel plus the operations support staff that were required in order to support those types of operations, whether it was a health physicist, whether it was an operator, someone performing radiological inspections, that was all incorporated into the modeling based on the operations organization input.

We also took a look and fed into the model the industry equipment speeds that we obtained from plant visits to commercial nuclear facilities. We actually had numerous visits to various owners of the fuel, got to see their operations. We actually saw them processing fuel. We were

able to go and record times. We were able to take videos, brought those videos back and took a look and compared what they do to what we do, and input those times into the models. We visited other facilities that use similar types of equipment. We made visits to the Naval handling and packaging facility in Idaho. They use some of the same equipment that we're using, including air pallet systems, and the same types of crane equipment that we use. So, we had very good information for what we fed into the model for what we expected this equipment to operate like.

We also took a look from commercial vendor equipment where we were not able to go and see them. This industry information is available, and we used that to as large a degree as we could.

What we end up with is we have throughput rates, and these are the requirements that we talked about for each of the individual facilities that John and Jim talked about. It's a design-to-performance. This is the minimum design that we have to accomplish with the facilities. This is not a you must maintain level. This is a design-to. It's the minimum threshold that we consider the facilities acceptable in terms of their performance.

Next slide, if you would. Some of the assumptions that we used in these models, and all of the modeling that we have does require assumptions, and some of them are fairly

significant. The first one we have is that the equipment necessary is available on demand. And, this is primarily the things that feed the facility and remove things from the facility. If I have a locomotive from the rail buffer area that receives a cask on site, that locomotive has to be available to move a cask into the building when that building first has an availability.

On the back side of it, there's some equipment that's being moved in. There's a crawler for moving aging overpacks around. That crawler is available the moment that aging overpack is ready to go out. The same thing with the transportation and emplacement vehicle. The throughput modeling assumes that it is available when it's demanded. So, it's an on-demand model.

The availability of these pieces of equipment is based on programmatic funding. If the repository is funded at a certain level, so that we can get all the numbers of equipment that we want, what if we need four crawlers in order to achieve the maximum capability, if we can't pay for four crawlers and we only get three, there is a slow-down in the potential system operations. If we get the money, we can buy what we need to do. If we don't get the money, we have to make accommodations in the program, and that affects what the potential maximum performance could be.

Some of the next assumptions that go in is the

facility studies that determine the numbers of cranes and hoists. We took a look at how many cranes we could get in the same area, whether they interfered with each other, whether they were independently operating. Could we slide one down to the end while we're operating the other one? Could we operate two of them in the same space? Could we separate GIB cranes from the main crane hoists? All of that went into a discussion of what were the studies done to show what was the most effective design. Those are incorporated in the models. So, we used the model to incorporate that best experience.

We did do design changes based on those studies in order to go and show that if we had interferences, we designed it so that we provided changes in the equipment to allow the maximum use of the equipment that we thought was necessary, at least to the point where we could achieve the minimum performance specifications.

Last couple of assumptions. The staffing was made available as necessary. That way, if it came down to human resources, it was not the one that was providing a constraint on the repository. The equipment could operate as fast as it could operate.

The next one being is the 75 percent facility/equipment availability. And, I want to hold that because I'll talk about that in a later slide. But, the

assumption was is that there's a 25 percent down time for things like normal planned maintenance, emergent work that comes up, and the impacts of, for example, one building on the other. In case I have to wait for a TEV to pass by one building before another one exits onto that rail system, that's the stuff that would be encompassed by that 25 percent unavailability.

And, the last one was is we took a look, and the assumption was rolling stock, national transportation system. We talked a little bit about this in the panels earlier. It comes back to the availability of the rail carriers, the rail locomotives bringing this material on site. If there is a programmatic interruption that is outside of the repository control, then the repository performance actually has to wait for that material to come in. That's a given.

All right, next, if you would. What we have done is we took each of the individual nuclear facilities and we explicitly modeled them in a software package called SimCAD. It allows us to do a discrete object representation. You can actually display it as a working sequence. You've got the facilities, you've got the equipment. You can actually see the waste packages or the waste containers go through the model and you can see the progress that it makes through each of the stages.

The balance of plant structures outside of the main

nuclear facilities are not explicitly modeled, but they are put in as the assumptions. This is the part where we talk about the on-site prime mover, or the locomotive that actually brings the transportation casks from the rail buffer area, for example, and moves it into that vestibule that we had talked about as part of the design.

There's another modeling capability that the program has provided. It is the Total System Model. We took the individual building models, and we actually fed it into a summation model, where we represented the individual steps in eight hour time blocks. This model actually goes in affects, and we have used this to go and consider interruptions in program flow, for example, if the transportation system cannot deliver at the same rate, what happens to it. If we had only a portion of the rolling stock, the number of transportation casks that we truly need, what would be the impacts on the repository.

So, we used this TSM to explore some of those other programmatic things to see whether the program will still work if we go and change the relationships. This is where some of the cases that we've done and some scenarios that we've taken a look at, is what would the impacts be if we varied the 90/10 split. Some of that information is represented in the SEIS that was considered with the 75 percent, 25 percent case. So, we have looked at this in some

degree of detail.

Right now, the results of the total system model back up what we saw with the individual facility models, and the fact that the results show the repository in general still meets its throughput design requirements.

Next, if you would. All right, we talked about potential upset conditions. This comes back to the 75 percent availability that we currently modeled for the facilities. This covers things like periodic and emergent maintenance. We all know that we've got cranes. You've got to go and do crane tests. It's not just the stuff that you do annually. It's the stuff that you do before shift every time you come in and start your operations again. Other things that you have to run through.

There are things that you've got to take your system, your plant off-line in order to go do some integrated testing. This is all covered in that 25 percent that you're not actually operating the equipment.

Idle time caused by other facilities. We talked about the equipment being available from the rail and buffer yards. If we have to wait for that, we expected some level of waiting, and that was considered in that 25 percent where the equipment was not operating.

The 75 percent is much less than what we would expect the facilities to eventually operate at, but right

now, because we are sufficient with the design to submit the LA, we are still doing the design that would enable us to go and take the drawing packages out to a construction contractor, or to go buy equipment, and until we get more detail in the design, we can start fine tuning this assumption that we have. We do expect that we will be in excess of 85 percent availability, that we will operate at a much higher degree than what we currently modeled. Right now, we don't want to take credit for that, and that provides margin in what we're doing.

What we believe is that the assumptions we've used to cover all of these different things are reasonable for where we are in the current stage of design. All of this will be reevaluated as the design progresses towards more detail, so that we can go into procurement and construction phases.

Now, the events that cause shutdown. There have been several questions that have been raised. What happens if you have a severe interruption in service? We are not required to comply with our design basis throughput requirements during a significant interruption. Can we still achieve our mission? If we have one facility out of service, we have a reduced capability with the remaining facilities. We come close to what we're able to design to, but, we can go and still meet our objectives. Of course, if we have a

significant interruption, we would actually shut down, do the analysis, operational readiness reviews, recovery plans, whatever else we need to do, prior to placing whatever interruption caused the facility shutdown, we would do all that before we resume operations. During that period, we are not required to meet or to continue to push through that design capability for throughput. So, of course, you could say that we're not meeting that mission, but when the mission is 70,000 metric tons over the life of the repository, if I have a six month interruption, I can still meet my mission. If I have to operate for three months longer, so be it.

All right, next, if you would. What we currently have is the throughput capabilities for the canister receipt and closure facilities. The requirement was that we receive and it added up to 700 metric tons of heavy metal per year of commercial SNF to be allocated between waste packages and aging overpacks. We're about 26 percent over that in the capability. Each CRCF can perform at about 1200 metric tons. If you add all three CRCFs together, you're well in excess of what we need to go and handle. If you shut one down, you can still process two-thirds of that capability.

The receipt facility. We actually figured out that we can handle almost 1800 metric tons when the combined requirement for receipts was 1140. That's about 55 percent excess capacity, if you're just looking at a comparison

between what could we get versus what the minimum design requirement was.

Next, if you would. Wet handling facility. The worst case scenario that we had was 307 metric tons per year. This was the worst case if you apply all of it only to small legal weight trucks. And, one of the tables was we changed the design of the facility in order to achieve that. Two of the changes that we did make. One was there was one of the cask prep stations, we take the cask off the conveyance, on the back side of the process, we were putting the cask back into that same station, prep station, in order to put it back on the conveyance. We isolated that, so now there are two stations not one. It allows you to go and have a cask in each station, increasing your throughput. The other part was the process of putting the cask into the pool, we only had one station on that shelf. We actually now provide two, in order to provide an in and out capability, so that you're not putting two pieces of equipment, trying to put them in the same location. So, we have made accommodations to the design in order to allow us to meet the worst case truck scenario with all small trucks.

If you actually take a look at what we can do with what we expect to get, and we mention the fact that we have these small legal weight trucks, and we have the capability to do large rail, bare fuel only casks, if you go all bare

fuel rail casks, we can well exceed that capability by about 60 percent. So, we modified the design to achieve, or make sure we could achieve, the minimum requirements. We expect to be operating about 20 percent excess design capability. So, we'll be operating over what the minimum is with just bare trucks.

ARNOLD: That's all based on the 90 percent?

RHODES: It all starts with the 90 percent, 90/10 percent.

ARNOLD: All right. Okay.

RHODES: In order to operate based on the equipment, we did assume the aging facility, balance of plant, subsurface facility. It's all based on the expectations of equipment performance, and, we can achieve the design for what we expect that equipment to operate at.

Next, if you would. Right now, we believe that as a whole, the repository can show that we can exceed what the design capability needs to be by about 40 percent, maybe not on an individual facility, because some of the facilities ran about 20 percent, but as an aggregate, we figure we can handle about 40 percent more than the design requirements are. So, if you think about it, it's about 3600 metric tons per year.

Total System Model results are very close. They're within a few percent of what the individual facilities

represent. So, what was aggregated into eight hour time blocks and considered the scenario from the transportation and the emplacement drift operations, confirms what we think.

The facility designs currently provide adequate design capability for us to accomplish the mission. And, we have excess capability to allow flexibility and fluctuations in both the receipts and the operations. So, that if we have interruptions from outside influence, from transportation, from program, from waste acceptance, or if we have interruptions on-site from balance of plan or from the subsurface repository or aging, we can accommodate those with adjustments in the current facility operations.

And, the point being is if we do have some operations extending what we expect is about a 24 year operating period just to receive wastes, if we have to receive wastes over a 25 or a 26 year period, within that preclosure period that is currently designed as 50 years, then operating that additional time is not detrimental to our mission.

ARNOLD: Nor does it imply anything unsafe?

RHODES: No. No. All of this assumes operating within the licensing basis and the license that the NRC would eventually grant the repository.

All right, last slide. Follow on work. It has been suggested, and it has been planned by the repository

program, there are activities in our current plan that address the development of an integrated repository throughput model. This is basically to say we'll take the components that are currently in the Total System Model, and we'll actually finish filling out detailed performance models for the aging facility, the balance of plant, and the subsurface facility, tying it all into a very detailed SimCAD model.

The updates to that would include those additional details that would be developed in this next design phase. As we prepare to advance the design that's reflected in the License Application for the eventual procurement and construction, we would include that detail in the future models, and then rerun the case to go and show that those changes still allow us to go and perform at the design requirements that we have specified.

That's it for me if you've got any further questions.

MOSLEH: Mosleh, Board.

Just a clarification. This 40 percent excess capacity that is a result of the SimCAD model, is that based on one CRCF or--

RHODES: What we did was for that determination, we took a look at each of the nuclear facilities, of which in total would be six, there are three CRCFs, the wet handling,

receipt facility. Because the receipt facility was intended to decouple the receipts from the operations, it by itself provides a huge excess capability with the repository system in total. If you take a look at just the three CRCFs and total those up, you already exceed the 2700 metric tons of commercial SNF that would come in in that 90 percent that you can handle and go and process. So, with the receipt facility, that's what jumps us up so significantly to about that 40 percent for the entire repository system.

ARNOLD: Mark?

ABKOWITZ: Abkowitz, Board.

Dave, first of all, the Board is certainly pleased that TSM was developed and is being used. As you know, the Board has recommended the need for such a tool some time ago, so we appreciate your responsiveness.

But, if we can go to Slide 10 for a moment, I want to get some clarity on your second point here where it says, "The Total System Model results confirm repository capability." You're talking about throughput capability; is that correct?

RHODES: Yes.

ABKOWITZ: Okay. And, essentially, what the Total System Model has done is it's used processing times, and then as a result of those processing times, you've come to the conclusion that you have adequate throughput to meet your

requirements?

RHODES: Yes, with the current assumptions, based on what our waste stream input is. And, it's all presumption upon the waste stream coming in as we assumed.

ABKOWITZ: Okay. Now, here's where I think we may separate in our points of view.

RHODES: Okay.

ABKOWITZ: My understanding is that the Total System Model processing times had to be tweaked to generate the throughput results that were being assumed on the front end as being necessary. So, in other words, when you ran the Total System Model without any restrictions, so to speak, you didn't quite come up with the same answers, and there was a series of reruns and modifications to some input assumptions until you got processing times that were similar to the ones that were assumed when you had come up with your throughput analysis. That being the case, and I'm pretty sure I'm right, then wouldn't it be a foregone conclusion that the Total System Model results would confirm repository capability, because you've actually adapted the model to produce the answers that it didn't produce initially that you were looking for?

RHODES: It's not strictly true on what happened. The way modeling works, you have to prove your model actually represents the true system. And, I'll give the examples that

we did with SimCAD. You can set up the model, and then you've got to prove that it works correctly. You've got to do a manual calculation to confirm what goes in, what goes out, processing times. In the individual throughput models that we do do, we actually replicate the model performance in a spreadsheet schedule, and then add all the minutes from the schedule and compare it against performance of the model. So, we actually calculate by hand, go and confirm what goes in there.

The first development of the model always is rough. The logic that you go into for the gates, the switches, the alternative paths, you know, when things turn on and off, programming for that has to be validated. So, the first time you ever do those runs, you don't get the perfect product. It's got to be validated. And, it required several cases in the development of the Total System Model before those cases represented the fact that the model was operating properly. I didn't have something coming in and hanging up and stopping, which is typically what you'll see a model do. It will hang you up and it won't give you anymore.

ABKOWITZ: What if the model happens to be properly constructed, and there are places where you get hung up at times, for whatever reason? It seems to me--I appreciate the idea of going through an incremental process, but anchored to that process was always a here's the throughput numbers we're

assuming, here's the throughput numbers we need to make. And, wouldn't it have been very powerful to have not had that anchor and just said here are different sets of operating assumptions of terms of how things might arrive at the surface facility, and look at the different ways in which we can deal with things appropriately, but also let's look at the different ways in which we may have problems if it shows up that way? That's two very different philosophies in how you approach the use of a tool, and I wonder to what extent you may have severely limited your ability to understand the system because of the approach that was taken.

GARRICK: Speaking of understanding, I think you've done a very good job today of kind of telling us what the input and output was facility by facility.

RHODES: Yes.

GARRICK: What I don't quite understand yet is what happens between facilities, and what--because when you think of this system, it's an expansive system in terms of transport and handling and operations that are exterior to these individual facilities. And, I guess the TSM took that into account, but I think that it's a little fuzzy to me, at least, as to how much flexibility you have to make the kind of adjustments you are suggesting, because of not having as good an understanding as I'd like to have of what goes on between facilities, between individual components.

RHODES: Truthfully, the points you make, we have referred to that as the balance of plant brain. How do you go and coordinate the activities between supporting six nuclear operating facilities, the aging facility, plus your receiving stations, your security stations, you've got the locations where you lift off the personnel barriers, you do your inspections and your surveys when the casks come in. The cars end up being--the conveyances for the transportation system end up being brought in, things are done to it, and then it sits in the rail yard until it's brought into a building. It sits until it's called for by the building. I'll get trains with four to six casks at a time, and they'll just sit there waiting to be processed one by one. That allows us to go and take a look in an aggregate for the operations of those balance of plant facilities and say can I control that in a reasonable fashion.

GARRICK: Yes.

RHODES: This is where we talked about, for example, the site prime mover, the locomotive coming out of the rail yard. If I have one locomotive, it's got to support six buildings. If I have two, each of the buildings is not calling for a cask at the same time, so two might be able to do it. If I have three, then I can use one to cycle in for maintenance, can I be assured that the operation of that rail buffer area can support six nuclear buildings. And, right now, based on

the evaluations we've done for concepts of operations, for the other things, for the balance of plant, which still have to be worked out in the detailed design development, until we know those details, it does not make sense to go and represent those relatively simple operations in a detailed model. TSM did that so they can tie the pieces together, to fairly look at did they think the whole system for the repository can operate, and I thought they represented that very well in the way they modeled those activities in TSM. And, that is probably subject to the opinions of whoever is looking at the model and how familiar they are with the inputs. We felt that that was sufficient.

ARNOLD: Okay, one last question from the Staff?

ROWE: Rowe, Staff.

Just one quick one, David. When you do the revision to the TSM model, what kind of time steps are you going to use for the site operations?

RHODES: To tell you the truth, right now, I don't believe we have plans to revise the TSM model to change the time step.

ROWE: So, you're still not going to get a representative model. It's going to go back to what Mark was saying.

RHODES: What the TSM is currently set up to do, it allows them a tool that represents the interactions of the

different components of the repository to be exercised--

ROWE: --another time step, aren't you?

RHODES: Well, for an eight hour time step, when you're talking about shipping casks from a generator to the repository, and sending the casks back to a generator within a two week period, does it matter whether it's an eight hour time step if you can still show that you can meet the requirements?

ROWE: No question, I agree with you 100 percent. For the up to the gate eight hour time step, it would be stupid to do anything other than that. I'm talking about inside of the gate where you've got evolutions that--

RHODES: We would not revise the TSM to reflect that much detail inside the gate. The model that we had and discussed on the previous slide was intended to be a SimCAD integrated model, not a TSM model, although they both use similar tools, it would be the integrated facility models expanded to reflect the balance of plant.

ROWE: So, you will do a detailed one with a smaller time step integrated for the site facility?

RHODES: The model that we would use would be the minute time steps that we're currently using for the integrated facilities.

ARNOLD: Okay, we're running behind. But, I want to thank John Orchard, Jim Low and Dave Rhodes.

GARRICK: Okay, I guess we have a scheduled break. Let's see if we can limit it to about ten minutes, and get back on schedule a little better.

(Whereupon, a brief recess was taken.)

GARRICK: Okay, Mark, it's your show.

ABKOWITZ: Okay, thank you, John.

We're entering another panel session here, and this one is designed to ferret out some of the issues that are of a cross-cutting nature in such a way that assumption about one element of this waste management system may have implications in terms of behavior in other parts of the system. So, we're really kind of constructing this panel from the standpoint of not only collecting issues that the Board would like to learn more about that are sort of more at the integration level, but also to clarify some of the issues that have been raised already in terms of where they were first presented, but the extent to which there may be some carry-over effects as well.

We're going to conduct this panel similar to the ones we did this morning, where our panelists will each give a brief introduction, and then we'll open it up for more general questions.

We have on our panel today Dave Zabransky from DOE, Adam Levin from Exelon, Rod McCullum from NEI, and Steve Frishman from the State of Nevada. I'd like to ask everyone

to try to be fairly concise with their statements because we are behind schedule at this point, and this particular session doesn't really have a great deal of time allocated to it, given that we've got four people involved.

So, if you would just kind of introduce yourself in the order that's listed here on the program, and then, David, you can start with your comments.

ZABRANSKY: I'm Dave Zabransky from DOE, Waste Management Office, and thank you for letting me come back.

LEVIN: Adam Levin, Exelon Generation. Again, I'm the Director of Spent Fuel and Decommissioning for Exelon.

MC CULLUM: I'm Rod McCullum. I'm NEI's director for Yucca Mountain Project. I've been working at NEI for about ten years now on issues, things we've done to try to support the repository. Before I was at NEI, I was in a variety of design engineering, licensing positions with industry, as well as branch chief of nuclear safety at DOE, Chicago Operations Office. So, I've seen the system we're trying to integrate from both the government and the industry side, and hope I can lend a little bit to the discussion today.

FRISHMAN: I'm Steve Frishman, technical policy coordinator for the Nevada Agency for Nuclear Projects. I've been here longer than I intended to be. I've been a consultant to the agency since 1987. Before that, I was director of the equivalent agency for the State of Texas,

where I worked myself out of a job. So, here I am.

ABKOWITZ: Okay. David?

ZABRANSKY: Okay, I want to start by saying that I'm going to talk a little bit today about the Total System Model, and the presentation here with the number of pages in it, this is actually something that I worked on very peripherally. It's in our office. Mr. Don Kimmel, who I think has talked to you, really works on this on a regular basis. But, unfortunately for me, he's spending a couple of weeks in Europe with his wife celebrating her birthday, so I'm going to try to pitch hit, and hopefully I can answer your questions as they come up.

I'll go through this very quickly. There's a lot of words on these slides, but we've talked about a little bit already. The Total System Model is a model that's used to look at an integrated approach to a whole waste management system from the generator sites to emplacement at Yucca Mountain.

It's flexible, it's used for "what-if" studies and is created to allow a more--look at what would happen if it wasn't part of the system change, and how would it affect other parts of the system.

It provides insights that aid decision-making. It doesn't provide design solutions.

Next slide. Again, I think you've heard this

before, so I'll go through it quickly. It's PC-based commercial software. Real-time, object-oriented. It's flow logic diagrams.

It's an event-driven model whereby the completion of one step triggers the next step. Right now, as you've heard and we've talked about today the simulation is eight hour time intervals, which is sufficient for the level of detail that's being looked at with this model.

It incorporates capabilities and waste management needs at each waste generator site. So, to the extent we have information at each site, those have been incorporated. It uses rail and highway routes described in the Yucca Mountain FEIS for modeling purposes.

Next page. The current version of the model is consistent with the License Application design, and repository surface facilities are modeled using process times determined by others. David Rhodes talked to you about how they did that. That's in this model. This model doesn't get down to that level of detail. It gets input from other parts of the organization.

Moving on to the next slide. In the past, we have used a model for a number of analyses. We looked at in 2005 when we went to the TAD program, to look at the impact of canister-based systems on the total waste management system. An evaluation of alternative operating area configurations to

support the CD-1 decisions. Thermal management scoping studies in 2007. And, we use it annually to support work that's done on developing the--has input to the Total System Life Cycle Cost estimates.

Some of the insights that have been gained by using the model, and this is a summary from various studies. A canister-based approach has faster processing times and higher throughput rates than a bare fuel handling system at the repository. That the canister-based approach can meet the target waste acceptance rate, stay within the 21,000 metric ton aging pad capacity, meet subsurface line load criterion, which was at that time 1.45 kilowatts per meter, and be completed within the 50-year operating time.

Also, the model gave us insights that the TAD canister-based approach can be accommodated by about 90 percent of the commercial spent fuel. That would be included in the License Application.

Moving on to the next slide. Again, key thermal constraints on the receipt of commercial spent fuel are the minimum five year out-of-reactor requirement in the standard contract, and the thermal limit on transportation casks, which has been assumed for use in the model to be 22 kilowatts, consistent with current cask designs.

OCRWM can accept CSNF up to the assumed thermal limit of the transport casks, and can emplace commercial

waste packages up to 18 kilowatts per waste package, and 2 kilowatts per meter line load without exceeding the aging pad design capacity, the postclosure thermal limits, rock wall temperature limits, et cetera, and the 50-year lifetime. Those are other insights that were gained from using the model.

Moving on to Page 8. Thermal emplacement strategy affects the amount of CSNF aging capacity required. Emplacement to just meet the postclosure thermal limits resulted in a maximum aging requirement of only 10,400 metric tons. Now, that's a lot of assumptions that go into that as to who is going to ship what and when, and how they're going to provide it to us. And, those are all assumption driven. There is no information the Department has can really let us know exactly what the utilities are going to ship us at this time.

TSM results from thermal management scoping studies supported the LA. The studies are sited there. A baseline change proposal was initiated and raised the thermal constraints to current LA values of the 18 kilowatts per waste package, and the 2 kilowatt per meter line load. That was approved in March of 2008.

Closing, so we can move on and have further discussion, the total system model current status. Again, as we talked about throughout the day, and I've talked about

earlier, the program priority in FY09 will be to support the License Application. So, at this point, this model is in a maintenance mode. The documentation is current for analyses performed to date, and on-going analyses is merely being done right now to support the annual TSLCC evaluation. And, we think that that level of effort at this point in time is appropriate. And, we can talk more about that later.

ABKOWITZ: Okay, thank you. Adam?

LEVIN: Okay, thank you. I wanted to touch upon two subjects today, one being what I see as being the keys to a successful operation using TADs systems at Exelon, and the second being transportation planning.

So, let me get to the first slide here. The most important item with respect to success is DOE must work with us very closely to plan the shipments, because we need to be able to work around existing plant outages. Our outages normally occur in the spring and the fall. Obviously, low load times for us, that’s an important calendar to maintain. We are refueling annually at the boiling water reactors, and annually at the PWRs, and every third year, we actually have two refueling outages, which I doubt that we would be able to ship anything off-site in that third year.

The winter campaigns are going to be limited at some of the sites. As the temperature drops below 32 degrees, there’s limitations with respect to handling of the

casks. So, we are constrained by weather, by current plant operations in terms of when we can actually load casks and get them off the site.

I should say this. In terms of when we can actually load casks and get them staged for getting them off the site. We can work around the opportunity to get them off site during the spring or the fall, or at some other time.

It's not really as complex as it appears, in my opinion. I think what we need to do is just make sure that we have sufficient ancillary inventory and rolling stock, and I think that's the key to making this successful.

And, the most important thing to us, of course, is adherence to schedule and thoughtful contingency planning if we do run into a bump where we can't get TADs off the site, or systems off the site in a given year, we want to be able to have the flexibility to go to an alternate site to move fuel.

Next slide, please. One of the considerations that we have is that the first time that we actually use the system, we're going to have to have something available for training and dry runs, and that's going to be--we'd like to do that, or we'd like to be able to schedule that about 12 months in advance of first planned use, first planned shipment. And, that's going to require that we had the TAD shell, and we can do the welding mock-up and actually do a

weld, the ancillary equipment available to us, including the cradle and impact limiters, so we can actually do all the physical operations that are necessary and get off-site, as well as the operating procedures.

Subsequent deliveries I think can be made on a six months prior, preferably a nine months prior schedule in advance of planned shipment.

The other thing that I think we need to see is making sure that minimum shipments from the site are equivalent to one refueling outage, 300 BWR or 90 PWR assemblies. That seems to make the most sense in terms of how this is laid out for us. Rather than shipping one cask at a time, we'd like to be able to ship six, seven, eight casks if possible.

Touching for a moment on transportation planning. While we recognize that this is the purview of the Department of Energy, we also recognize that the Exelon name is likely to be attached to that cask, all the way down the road, until it reaches its final destination. And, so, for that reason, we're going to stay intimately involved in one way, shape or form with the transportation process.

From our own perspective, as we look at the long-lead versus just-in-time utility pieces, there isn't a whole lot that we believe that we need to do over the next five or six years, given that the Department doesn't plan on its

first transportation campaign for another 12 years, or so. As we step back and look at all this, we notice that there's been significant changes in security. There's been changes in NRC regulations. Those two have occurred over the past ten years, so we don't know what will be coming along five, six, seven years from now . We certainly don't want to get too far ahead of the game and spend a lot of effort and time trying to do this.

The other piece that we are concerned about I think from our perspective in terms of transportation planning, and we've had this happen to us before with shipping large components, is the high turnover rate of first responders. Typically, we find that two, three, maybe four years, we get our first line, first responders in place, and as such, we're not sure that we'd be ready to go out right away and try and line up first responders and get everybody on board with transportation plans.

And, of course, the final issue is technology changes, and that is that five, six, seven years from now, there could be things that are significantly different than they are today with respect to the casks themselves, the transportation overpacks, with the rail cars that are going to be used. So, we're a little hesitant to get out in front of that game until we know that there's a definitive plan laid out five years or so in advance.

That's all I have for the moment. Thank you.

ABKOWITZ: Thank you, Adam. Rod?

MC CULLUM: Thanks. I don't know how much I can add to the discussion you had between Adam and Dave this morning, and then what they've just said. But, I'll try and cover the broad perspective from the 100 percent of the industry. If we can go to the first slide?

This is the system as it is now. We have approximately 60,000 metric tons of used fuel in the pool, or dry casks. Right now, about 11,000 tons of that is in dry storage, and over 1000 casks at 47 sites. We will more than double this by the earliest projected repository operating date of 2020 at 70 sites. One thing to know here is that if we do deploy TADs, as we hope we do, in 2013, that number of casks will go up, because as Adam mentioned, there's a 1.5 to 1 ratio of the TADs to the types of DPCs we are currently loading. So, that's the system, that's the inventory we're trying to get to Yucca Mountain.

If we can go to the next slide, now, when we talk about integrating in the broad industry context, we have in our industry what we call an integrate use fuel management policy. This is industry's policy as to how we're going to address managing this system. Now, this is integration in a somewhat different context I understand than what the Board is asking about today. However, it is important for the

question because these things will impact the overall system, particularly when you consider the time frames involved. We have a three pronged approach. We're hoping to develop at some point interim storage at centralized locations, particularly with respect to cleaning up the shut downed plants.

And, research and development, there's a lot of things going on in advanced fuel cycle technologies. There was a GNEP initiative. There still is a GNEP initiative. What that will evolve into in the next administration, many new things from new reactor designs to reprocessing products, different types of transportation scenarios, we don't know where we're going there, but certainly there would be some fuel initially going into research, and perhaps to some larger scale facilities at some point in time. Again, the time frames are relevant here.

Of course, a subject the Board has been primarily concerned with is disposal. The Yucca Mountain site was approved in 2002. The Yucca Mountain development is the law. The licensing process will be done, and, by the way, I do want to, on the record, congratulate my friends from DOE for getting that License Application in and getting it docketed. So, we're proceeding with that. It's very exciting to be in that point. And, so, anyway, we have a range of short, long, and medium range goals that we're pursuing on all three

elements of the strategy. I would say that industry is certainly not putting all of its eggs in one basket at this point.

Now, in terms of integration, more in the context the Board is asking, if we go to the next slide, and I talked to the Board about this before, so I won't go into a lot of detail, that really is the value of the TADs. The bridge analogy, cleverly or not, the bridge is built on--there's supports made of pictures of TAD canisters, early pictures of TAD canisters. So, the TAD is the first real substantial integration tool developed, and it really is an outstanding one, because what it does is it eliminates a lot of fuel loading. You only have to load once at the reactor site. That's a tremendous risk reduction in the whole system.

And, the second sentence, I'll pause on this a little bit, connecting the long-term disposal goals to what happens in the real world. I mean, for years, we had folks like Adam here concerned with what they're doing on a day to day basis at reactor sites. We had folks like Abe Van Luik and some of the others out at DOE who are concerned with what's going to happen to this fuel 10,000 to a million years in the future. And, these lines of thought had not come into alignment prior to the TAD exercise. And, we were able to successfully align it. We now have a single system that works for, potentially if the business concerns are

addressed, works for folks at the reactors and works for the folks modeling the repository. That makes it a tremendous integrating tool.

But, just like in Washington, D.C., we can't survive with just one bridge across the Potomac. We have many bridges across the Potomac, and they're all pretty much all stopped at rush hour, but, you know, we can't survive with just the TAD. We are going to have to develop more integrated tools. I would submit to you, depending on how it plays out, interim storage could be a very effective integrated tool, and that if you're trying to harmonize loading of Yucca with the unloading of the reactors, and you had something in between as a buffer, that's also an integrated tool. There may be more. You bring in recycling. How's the recycling facility play into this? All that sort of stuff. So, we need more bridges. And, I think that's really--I encourage the Board to look more broadly at this topic of system integration in light of what we call integrated strategy. Now, of course, viewing the TADs is they're similar to DPCs, but as has been mentioned, they cost more.

Going on to the next slide, a couple points here. I'm not going to go down this in detail. This is what accomplished with the TAD. And, I think this is evidence of a couple things. One, the industry and the Department of

Energy can work together to develop necessary integration tools. We can do so on a very aggressive schedule. You look from November of 2005 to May of 2008, a little over two and a half years, we went from the TAD being something we had never heard of, to the fact we have real vendors out there designing and seeking licensing of real TADs. In fact, one of the vendors has a licensing meeting next week with NRC. So, those licensing processes are proceeding.

And, it's also substantial proof that for those who might have doubted it, and I think the licensing process is and will continue, that DOE can produce a quality product on schedule. And, that's very important. These vendors would not have bid these jobs, they would not be putting their own resources in anything, including a third vendor that's not even getting any DOE money, into working with these things if this wasn't a quality specification, and a quality procurement. So, more congratulations to DOE, but evidence that we can do integration when we put our minds to it.

Go on to the next slide, and I will not dwell on this. We talked about the benefits of the TAD. They do provide a more tangible connection to disposal, which I think as Adam spoke about this morning, has value in his business model, being able to tell folks that this canister says, you know, self-addressed stamped envelope, send to Dave Zabransky at DOE, and he'll put it in Yucca Mountain. It has a place

to go. It's not just a canister sitting in your community.

And, we were able to resolve the technical issues. What remains now are the commercial issues. This gentleman and this gentleman are still working on that. We realize the benefits of the TADs? I think so. Of course, we'll only do it if the utilities can justify it as a smart business decision. And, again, that's up to these gentlemen to figure out how they can make that happen. And, DOE, which they have done so far for the most part, must continue to support the vendors with timely decision making. The vendors, especially if they're trying to get licenses and meet DOE's schedule, can't be in a start/stop process. And, industry must have confidence that the Yucca Mountain licensing process will continue.

And, this is where the timing is absolutely beautiful here. We, if everything goes well in TADs, will not actually be facing decisions on whether or not we will buy TADs, how many TADs we will buy, where we will deploy them, somewhere around 2013. Now, that's after three to four years, so we will know where--we will even know that this licensing process has succeeded in getting a construction authorization, or is at least getting there. And, also, it's at the end of the next administration. So, the next administration will have sought funding, and the next two Congresses will have provided funding to keep that licensing

going.

So, the confidence industry needs to make a smart business decision, because confidence is a big part of business decision making, particularly our industry, you know, where we're investing in new plants, given the history of the old plants, is something that we're addressing challenges us. We will have that level of confidence on the right time scales moving forward, and we'll move forward to the next slide.

So, beyond TADs, building those other bridges. You know, we're talking about 2013 for TADs, 2020 for the repository. The system will evolve significantly between now and then, particularly as interim storage and at least reprocessing research, if not recycling research, advanced technology research, if not a conventional reprocessing facility come into play. And, the TAD experience demonstrates that when we get to those points in time where we're going to need those other bridges, we can move pretty fast and we can move pretty effectively. We can get the right folks in the industry together, we can get the right folks in government together, and we can make the integration decisions.

So, the TAD right now puts us in a great position. It's been developed in just the right time frame and parallel to the licensing process, and this had to be a

parallel process to be successful, so, that we can then take the next steps.

But, I think the bottom small print there, it's really the fine print thing, is very important. It says, "Specific system operational strategies cannot be defined until the configuration of the system at the time is known." And, between now and 2013 and 2020, a configuration of the system is going to change. Business conditions between these two gentlemen are going to change. He's got agreements. He's going to make perhaps more agreements, who knows, different agreements. The utilities are going to make different agreements, interim storage, loading, more casks, hopefully TADs by 2013.

So, given the experience we've had in the two and a half year time frame, we're making a very significant integration step, and given that it's only 2008 right now, I think when you look between 2013 and 2020, we have time to do the system integration. And, I think it's consistent with what Dave said where they've kind of got their model on maintenance mode right now. I would agree with that.

So, going to the concluding slide, that's really the point, is that we're pursuing a much broader integrated approach to this industry. The TADs are tools that we are using, and we should develop tools when it is appropriate to develop them. And, you know, the message to the Board is

perhaps it's too early to get too far into the details of system integration at this level. The system is proceeding I think at an appropriate pace, and perhaps I would suggest also that the Board might look at some of the broader issues, how things like interim storage and recycling might impact the Yucca Mountain system, as well, as we go forward.

But, I think we've got everything stages and are proceeding in the right sequence here. And, look forward to hopefully continuing to proceed with that, continue to work with the Department of Energy to integrate.

Thank you.

ABKOWITZ: Thank you, Rod. Steve?

FRISHMAN: I didn't bring any slides because I decided I'd rather just speak for a very few minutes about one topic that's involved in integration, rather than trying to go over a whole gamut of things that could be talked about.

And, as some of you might suspect, the piece that is of great interest to me, and the way it's tied in, is the aging facility. The aging facility is designed for 21,000 metric ton storage, 2500 spaces for individual aging overpacks, 100 DPCs, and there's no rationale that I can find anywhere for 21,000 tons. We just heard Dave say 10,400, and that it's all based on assumptions. I've seen documents that say less than 11,000. And, the key to it is the suggestion that's made in at least one of those, that the real look is,

or the real need is for--or, the suggestion is that there's a need for four years of inventory in order to support meeting the thermal requirements. I can find no basis for even that determination.

I think what we're really looking at is, and I won't try to build on Rod's bridge analogy, but what we're really looking at is an integration to get the waste out of the reactor and into centralized storage in a location where it's illegal. It is an MRS as being designed. And, there's no basis at all for it becoming essentially an away from reactor storage that would, of course, meet one of their objectives.

It does decouple receipt from emplacement, and it does it on such a grand scale that it does look a lot like it actually is, an MRS. So, from that standpoint, you can--from some of the things that are, at least one presentation we heard today--another thing that I've been able to piece together is that at least 43 percent of the TADs will spend some time in the aging facility. And, it looks like whether they need it or not.

And, if you look at the presentation today on surface facility design, you can find enough numbers in there to pretty well verify that number. So, it really is just an interim storage facility, the extent to it which integrates and optimizes the operation of the repository, can't be

determined, or at least the Department has not shown any way that it has tried to determine it.

So, if its objective is to optimize, then there needs to be an analysis of that optimization. And, I think your staff has done an analysis that shows that if you look at the system hard enough, you may not even need that four years inventory. And, there are other ways to calculate it, and I think DOE needs to find a way to justify it in terms of optimizing repository operation, rather than optimizing the wish to get the waste away from the reactors.

Now, what's one of the consequences of this aging facility? Aside from the fact that it probably will end up with some legal consequences at some point, there is a major consequence that has not been looked at very much, and it's also almost impossible to look at it at this point, and for reasons that I'll mention, and that's that it represents a really enormous unnecessary order exposure. And, it exceeds the project design criteria, which is a goal of 500 millirem per year per worker. It's classified as a radiation Zone 4, which nominally sets out occupancy of less than 32 hours per year, and that's because radiation Zone 4 is designated for infrequent occupancy because it has exposure of 15 to 100 millirem per hour for workers.

The specs for the TAD spec on the aging overpack at 40 millirems per hour contact exposure. So, you have a

facility where you're exposing workers tremendously because they have to be there, and it's going to be, from the looks of it, in pretty much constant operation.

And, just as an aside, in looking at the exposure rates for the aging facility, I came across the reasoning why, for the aging facility, one of the specs is that the aging overpack must remain in an upright position when there's an event with a 3G acceleration. The explanation was that in order to tie these down, what they would have to do is use 24 clips around the base of the overpack, and they estimated it would take a worker 15 minutes per clip to install those, and that that would create an unacceptably high dose rate. So, instead, they came up with it's got to stand alone. But, it's interesting that they, you know, they noticed really high doses, but it's okay to have medium high doses.

Now, the design for the TAD and the overpack is uncertain to the extent that worker tasks can't really be detailed, and that's where you try to control exposure to workers. Now, they're using a whole bunch of assumptions about the design in their dose calculations, and these are all simplifying assumptions, and what they say is that these assumptions would be revised to more realistically reflect the source term when the designs are done. So, right now, you have a facility that is sort of built into the system

mainly to serve another need, perceived need, and results in extremely high worker doses that are avoidable.

And, the level of dose is similar to the dose that the workers who first received the containers at the repository facility would be getting, and they tried to arrange their task times in a way that will reduce their dose. And, now, you have another facility that is essentially unnecessary where you're giving workers an equivalent very high dose, and the way it's designed, the dose is even higher than it has to be, just by the placement of the packages and the way the packages are arranged.

So, the issue of the aging facility I think is an important one because it doesn't demonstrably help optimize operation. Sure, some level of surge probably is necessary. But, the assumption of 21,000 tons of storage is not supportable anywhere. The assumption of four years inventory is not supported anywhere that I can find. And, overall, the consequence is an unacceptable one because it's unnecessarily dosing workers.

ABKOWITZ: Okay, thank you. We'll open it up for Board questions and comments at this point. And, I would encourage any panelist to pipe in if they want to contribute, beyond whoever the initial question is directed to. And, we'll start with Andy.

KADAK: Kadak, Board.

The words sound business decision trouble me, not that I don't understand it, but it doesn't mean that there's a solid commitment to use TADs. And, I don't want to get Dave in trouble here, but what Adam suggested was some, and, actually, Rod suggested there's some incentive from DOE to actually use the TADs. Is there any discussion along those lines that would suggest that in the sound business decision model, utilities would choose to use TADs? Adam, you already said that you'd be willing to take the bullet for the good of the nation, and spend more money over the life of the facility.

LEVIN: I think in any business decision, you're going to step back and look at many factors. DOE's compensation, or lack thereof, would be one of those considerations. I think there's other factors which need to be considered, one that I mentioned this morning, which was that we want to be in a position at some point in time to demonstrate to the folks where we've sited these plants that we will eventually get the fuel on-site, and to us, that has an economic value. It's soft, I can't tell you what those numbers are, but it does have an economic value to us.

So, I think those are just two examples of the kinds of things that would go into the business calculation. There are others.

ABKOWITZ: Rod?

MC CULLUM: Right, I think that that soft economic value is something that all the utilities are thinking about, and I think they're putting different amounts of weight on it. There are some utilities, like Exelon, where they're very big and they have very strong business in the future with the nuclear industry, where they're putting a higher value on that, and that enters into their business decision making.

There are other utilities right now where they're not putting much value in it at all, but that's why I said it was so important, the timing of this, because right now in 2008, it doesn't really matter how we're valuing the TADs in our business cases. It matters starting 2013, and will mean a lot more progress in the life of the process at that point, and it will be another administration and two more Congresses at that point. And, that level of confidence that the utilities may or may not have at that point in this project will certainly affect their calculation of how much value to put on the touchy feely soft aspects of the TAD.

I would anticipate if you had a construction authorization by 2013, if you had an administration that had supported it the whole way, and if you had Congress that had funded it, almost every one of the contract holders would be putting a very high value on TADs at that point.

KADAK: Just another follow-up with Steve. Steve, I congratulate you because apparently you had read our thermal

management report that we prepared, and I thank you for reading it. Apparently, you are one of very few people. Just for those of you who have not read it, what the report basically says is with appropriate amounts of ventilation, the storage pad size could be quite small and still meet the goals of loading the repository. And, the loading of the repository, in terms of packages, could go much higher than the 18 kilowatts, which I think might be the driving assumption for the 21,000 metric tons of heavy metal that's presently being stored.

The question I think is now has anybody thought about the blending needs to reach the 18 for loading? And, I asked that question of a gentleman earlier. He didn't really seem to understand that. But, is there going to be a lot of blending going on at this wet facility, or the other one that's non-TAD, that would complicate, if you will, a need for storage, on-site storage?

FRISHMAN: We're always having to make assumptions about what's going to come in the door. And, it seems to me that the incentive at the reactors, and you can tell me if I'm wrong, but it seems to me the incentive at the reactor would be to get rid of the hottest fuel as early as possible. It's a business case, clearly.

KADAK: And, that's at 22?

FRISHMAN: That's at 22; right. But, at the same time,

I think with the cue the way it's set up, and with just the logistics of shipping and how much can be accepted, I don't think you can call 22 the baseline. I think it's possible that you can be fairly near 18 on receiving. And, if you look at what's there right now, you can't keep up a very long stream at 22, because of the cue. So, I don't know, I think it should be looked at in terms of, as you and your staff did, first of all how can you manage that heat, and are people really going to ship at 22? I'm not sure that they will.

And, then, what's the blending that you need to have, and is it possible you can actually, if it's just, you know, tweaking by 1 or 2 kilowatts, is it possible that the Department, just as it's negotiating a business deal, can negotiate a heat deal when the TADs are being loaded. How difficult would that be? So, I think they can, if you're looking for small difference, and make a big difference, then it's one where the Department, while it can't dictate, if it's willing to do a business deal, maybe it's willing to do a thermal deal, too.

ABKOWITZ: Dave, any comment?

ZABRANSKY: I guess getting back to the original question, you know, then we get to the point of, you know, you asked about the business case, and I spent more of my life in the business world than I have at DOE, so I

understand the business case, and I used to make business decisions as opposed to DOE decisions.

We are aware of what the utilities would have to weigh in any kind of contract amendment that would address the use of TADs. We're aware of the burden that may come from the TADs from the standpoint of more systems, and we need to recognize or determine a way of making that work. And, we are having discussions with people to try to address those issues. I can't speak to--I'll let Mr. Levin speak to what utilities intend on loading, if they're interested in a thermal deal. I can tell you that the reactions I've had to those thoughts are absolutely no on the broader perspective.

So, I'll let Mr. Levin talk further.

ABKOWITZ: Okay.

LEVIN: Just very briefly, and I'm sorry you were not here this morning, but I did go over the fact that Exelon, we fortunately--we fortunately, are a little bit ahead of the curve in that we're very much focused right now on loading intermediate heat fuel into the central portions of the systems that we're currently loading, with some low heat fuel on the periphery. And, the reason we're doing that is for dose management.

But, I anticipate that down the road a stretch, in the 2013, 2015 time frame, that we will still have significant quantity of low heat, low thermal load fuel that

we'll be able to load into TADs. I do know that other folks in industry are not quite so lucky, particularly as a difficult issue with the PWRs, in that a number of them have already run out of cold fuel to load into TAD systems at a later point in time. But, I can tell you from our experience that I believe that we'll have the kind of cold fuel necessary to be able to ship and potentially be disposed of in the repository come the 2013, 2015 time frame.

ABKOWITZ: John?

GARRICK: This Board has been quite outspoken over the years with respect to the issue of interaction, speaking of integration, interaction between DOE and the utilities, and of course fully aware of the court cases and the other obstacles handicapping that very important process. But, I was struck by Adam's comment about the importance of scheduling the removal of the fuel from the generator site, recognizing that plants engage in a lot of activities, and have real sensitivity to manpower availability when you start thinking about outages and seasons and other activities associated with plant operations.

So, it appears that one of the real bottlenecks here could be dispatching of the fuel from the utilities, and I guess the question goes to David in terms of what information and what research have you done to be able to have confidence that you have a method of scheduling fuel

retrieval in a most efficient and effective manner?

ZABRANSKY: Well, let me answer your question. I'm not sure the system is set up to be the most efficient system that could be created. Adam just told you his constraints are such that he's not looking at system efficiency. He's looking at his efficiency. So, we're going to have to deal with the fact that the system hasn't been created to run efficiently. It's been created to service needs of individual utilities.

Now, having said that, one, there is a scheduling process in our contractual relationship that calls for utilities to begin that process once we notify them that we are now scheduling things. That starts about five years before the beginning of operations. We will go through that scheduling process in the current contracts, and it will result in Adam telling us what he wants to ship when from which site, us coming back with a proposed schedule, then negotiating an actual shipment date. That will occur, although like I said, beginning 63 months before, and ending 12 months before the actual delivery year.

Beyond that, some of the things that we have to deal with is--I think it's encouraging, and I think Rod talked to you a little bit about it, are we in litigation with many people? Yes. Have we been able to talk to people about a lot of things? Absolutely. We've become--you know,

litigation has gone now for almost 12 years. We've become a little more mature in our management of that litigation, and we can have very constructive conversations with our utility customers without causing either of us problems in that litigation front. So, that's really not been the issue that I think the Board identified years ago. I think the whole-- indicated that, you know, Adam and us have a different relationship, in that we have the settlement, so we have no ongoing disputes. Other utilities who at the time we were still litigating with, participated fully in that whole TAD discussion, without either party feeling it was giving anything up in the litigation front.

So, I think that's been managed fairly well. The other complication is, and this is just an illustrative example, Adam has specific schedules by which he's going to shut his plants down and start his plants up. He considers those proprietary, and won't divulge them to others, because they're business sensitive. It's difficult for us. We will manage that, but basically when he tells me my schedule is this, I can't divulge that to anybody else because it's proprietary, and I've got to work within those constraints, because if other people knew when he was bringing his plants down, they would sort of maybe jack up the price of replacement power when he tried to buy it. Now, that's the real world that we deal in, and we have to make it work

within that real world.

I will also say that, you know, it depends on the timing. Had we begun operations in 2010, had we finished that scheduling process we started in 2004, the fuel that I would have been told by Exelon they wanted to pick up from which plant beginning in 2010, it probably would be totally different than what they're going to tell us they're going to have picked up in 2020 by location and by fuel type. So, it's really a dynamic process. It's got to fit together pursuant to the rules that we have, pursuant to our contractual relationships, given what the business world he lives in, which is I'm not telling others what I'm doing, and we've got to make it all fit together.

ABKOWITZ: Okay, thank you. I'd like to get some clarification from Adam on a comment that he made on his slide here where he says that "Subsequent deliveries six months in advance of planned shipment." I take that to mean that you would like to have the rolling stock and the transportation cask available to you six months ahead of when it's planned to leave your facility, loaded and ready to go; is that correct?

LEVIN: We would like to have the TAD canisters on site. Certainly, we would like to have the overpacks on site, the transportation overpacks. I don't know that we need the rolling stock six months in advance. But, we certainly want

to be able to get the TAD systems and do the necessary inspections that we have to do in preparation for going ahead and loading it.

ABKOWITZ: Okay. The reason I was asking that question is that I'm trying to make some sense, and Dave referred to the fact that you all are talking on a more regular basis now, which I think is a good thing, but my understanding in terms of the TSM runs that have been made is that there's an assumption that there's a one week turnaround at the utility site between when the transportation equipment is delivered and when it's ready to go back out again. And, that seemed extremely unreasonable if I were a utility and I was--to me, that's just kind of exemplary of some of the integration discussions that need to continue to take place, because if that rolling stock is tied up for longer, then that means you need much more rolling stock, and it has implication on cost, et cetera, et cetera, et cetera. So, am I way off on the disparity there?

LEVIN: No. Well, I did mention earlier that given the reactor outages schedules, the time of year, et cetera, et cetera, that I would anticipate that to resolve that, we would need additional rolling stock. That's one of the ways of doing it. You pointed to a specific example, which is a one week turnaround of the rolling stock being brought to the site, casks being put on the rolling stock, and taken away.

We certainly, if we have the opportunity to get TADs on site in January, load them in June, and put them into transportation overpacks in June, you can bring the rail cars and impact loaders, impact limiters, excuse me, onto the site July 4th. I think I can get them off by July 11th.

ABKOWITZ: Okay.

LEVIN: I think that's the turnaround issue. But, yes, it will require more transportation overpacks in that circumstance. So, I think there's some things that need to be detailed a little bit more closely at some point.

ABKOWITZ: Before Dave answers this question, let me ask another sort of related question. Like John, I appreciate your comments, Adam, about these outage schedules, and seasonal changes, and so forth. And, from a systems integration standpoint, the surface facility is kind of assuming that it's going to be fully utilized all year long, but it sounds to me like the shipping schedules are going to be more intense at times and less intense at other times. Do most utilities plan their outages at a similar time of year? And, clearly, all those up in the colder regions of the country are going to all experience a desire to avoid shipping in the wintertime. So, is there the potential for those types of decisions to really disrupt the continuity in terms of operations and receipt at the surface facility?

LEVIN: There may be some limitations. With the Exelon

facilities, although I said we generally are spring and fall, there's quite a bit of latitude in that. We actually have some outages going on in late January. We have outages going on in November. So, there's some movement around that. I was just trying to characterize it as a general nature.

I would expect that during the wintertime, you might be looking at servicing the facilities that are south of the Mason Dixon Line, as opposed to trying to bring fuel in TADs out of Indian Point. So, I think it really will be-- it's not going to be a trivial problem to solve, but, it's solvable.

ABKOWITZ: Would it be more solvable if there was some flexibility in the allocation cue?

LEVIN: I don't know.

MC CULLUM: I think there is sufficient flexibility in the allocation cue. I mean, you have a lot of consolidation in our industry right now. These contract holders are now parts of bigger companies, and cue spots are fungible. So, to the extent to which Dave can go to a contract holders and they can arrange to pick up the Prairie Island fuel after the spring thaw, or whatever, that can be accommodated. And, again, those negotiations will have to take place based on the conditions that are in play at the time DOE is ready to pick up fuel.

ABKOWITZ: David?

ZABRANSKY: All I was going to add to the discussion was that, you know, Adam expressed a want, he'd want to see or like to see, and, again, we've known for years, and I think we being the industry, Adam, myself and others, that ultimately what's going to occur nearer term to operations is we're going to negotiate, in essence, sub-agreements as to how we're actually going to implement on a utility specific basis what happens when. And, that will occur. We've called those site servicing agreements. Those will become contractually binding documents on both parties. We intend to do that. We intend to do that within that five year planning window. That allows us to say, you know, this is when I want you to do this. This is what I want you to bring. And, that level of detail will occur, but it can't occur until we know exactly where we're going, when we're going, and what he wants done.

With respect to the overall industry, since I've been doing this in the Seventies and early Eighties, yes, it's historically been nuclear plants come out in spring thaw because that's when the lowest power needs are. Now, having said that, everybody can't be happy in this exercise. So, DOE is creating a system that will have to have some service capacity for things like that, so receipts can occur, maybe not equalized over the year, and others may have to load fuel when they really may not prefer to. But, that's part of the

negotiating process that will occur in the scheduling system.

And, as Rod brought up, the contract relations we have allow for exchanges of places by utilities with our approval, as they see fit. And, it was done for those kinds of purposes, that only they can decide what matters more to them as far as getting something out or not getting something out. And, to the extent we can accommodate it, we'll agree to do that.

ABKOWITZ: Okay, thank you. I'd like to thank all of our panelists for their participation. And, Mr. Chairman, I return the meeting back to you on time.

GARRICK: Thank you. That's an outstanding performance. And, I'm going to turn it immediately over to Henry Petroski.

PETROSKI: Before I invite our next presentation, while they're clearing, let me make a few comments that I think certainly interest me, and I hope they will perhaps interest you. But, lately in the news, there's been a very large science/engineering project discussed almost constantly over the past month or so, I'd say. It's a project that has been decades in the planning, and construction. It costs many billions of dollars in the final accounting. The bulk of the project is underground. That's the whole purpose of the project. But, it takes a large surface facility to make sure everything is going underground correctly.

The project used a lot of computer models for the

design and planning, and it will continue to use a lot of computer capabilities for its operation.

The project I'm talking about, of course, is the Large Hadron Collider that was supposed to, more critical just a couple of weeks from now near Geneva, was very visibly in the press as starting up and starting up to full power, which was supposed to coincide pretty much with a grand celebration that was to take place in mid October.

For those of you who have been following this, you know that it suffered some considerable embarrassments. After a few days of shooting protons around the 17 mile ring, it had to be shut down. It appeared to be a problem with a magnet, one of the super cooled magnets that makes the whole system work. They thought they fixed the magnet and started it up again, and after another few days, they had an even worse problem, and I think it spilled about a ton of liquid helium, for example, which was super cooling the magnets.

Basically, the status now is that they've had to shut it down for the winter, and I guess they're going to try to regroup and figure out what happened and how they can be sure it won't happen again.

Now, this is why I think prototyping and testing are so important, not only to save the embarrassment of something like this, but also to save the investment and to save the credibility of those involved, and also to make a

system work as well as it could be.

So, I don't think I'm misrepresenting the next presentation by David Rhodes, but he's going to tell us why the Yucca Mountain project is not going to be a super collider problem.

RHODES: Thank you. Just to set the stage, before I joined Yucca Mountain Project in various capacities, I started off the career with General Dynamics Electric Boat Division, and I was a reactor plant start-up shift test engineer and the assistant chief nuclear test engineer for a couple of programs. So, I've had over eight years of experience doing facility start-ups, operations readiness reviews at a couple of other facilities, both through the pre-operational phases where you're finishing construction and turning over for testing, all the way through both cold and hot operations, both pre and post core loads, and critical operations and start-up testings, and including PSA testings after they do their shake-downs. So, just to set the stage.

Next slide, if you would. I do want to cover, and I will mention the prototype and factory testing. I'll talk about the pre-operational test program and the start-up test program in some detail.

Next, please. The purpose of testing program, primarily to ensure that the components and equipment can be

operated safety and dependably, and will not adversely affect health and safety. Kind of generic, very high level, but it's the intent of all the activities that we're going to be doing here, this is the proof that what we said we were going to do, will operate the way we said it will in a safe manner. Will determine whether it has been properly constructed and installed, whether they fulfilled both the operational and the safety functions that were defined in the safety case, the License Application, and in the technical specifications of the design, and how they're executed by the contractors for construction and equipment manufacturers.

The programs that we will be doing will be verifying the respective design basis requirements. We'll be doing hot testing to confirm radiation levels, making sure that we're using surrogate materials, things like that, to show that what we had done in the planning and the analysis has been carried out, and that the associated exposure times involving actual radiological sources are in line with what we expect them to be.

We will meet all the regulatory and the licensing requirements, and show that we're capable of complying with the licensing specifications that we get back from the NRC.

Prototype/Factory testing. Prototyping is a fairly well defined program. It's executed by OCRWM. We have defined it. We are directing it. We are controlling its

performance by our partner contractors. It is conducted by program contractors. Right now, the waste package prototyping is done by the Idaho National Laboratory for the waste package closure systems and the development of the waste package prototype. They've got the top section that they're putting together to actually show both the fabrication and the closure systems for it. It is being audited and observed through our QA programs and INL's QA programs. And, OCRWM is providing evaluation of those results to make sure that that prototyping program is meeting our need in terms of the development of those components.

The prototyping of the waste package closure system currently include full size waste package top and bottom closure systems, or top and closure systems. Like I say, we are developing the full size mock-up, the equipment, bridges, weld arms, remote manipulators, all of the things that go into it. It is set up to be two machine concurrent welding. So, we'll start at opposite sides of the circle and then work around the circle. It is the demonstration of what we did analyze we need for the waste package performance. The waste package performance includes those closure welds as part of our confinement boundary. And, we are trying to demonstrate that we can close that weld so that it has the integrity needed to assure that the TSPA inputs were modeled correctly, and that that package will perform as we analyzed

it.

The schedule, right now, it is ongoing. They are rolling out those demonstrations of that two machine concurrent welding to us right now. Those prototyping activities will be complete prior to the final equipment specifications before we go out for procurement of the items. So, we'll do the complete program. We'll evaluate it, make sure that it meets our needs, prior to going out and buying any equipment related to the component. That's what the prototyping that the developing force is going to be done for.

Next, if you would. Right now, we have reviewed the results to date. It is meeting our expectations for the development both for the waste package and for the closure methodologies. It will help define the final processes that we actually go and mandate on the facility for actually performing those closure welds inside our nuclear facilities, the CRCF, and demonstrate other items that go along with that closure, including the non-destructive examination techniques, the qualification of the operators, the stress mitigation that will be performed after the closure weld is done to make sure that there are no residual stresses. So, we'll be doing both the techniques and the performance in developing the programs by which we will train operators and everything else.

The largest gain in the throughput resulted from the elimination of the middle lid in what was previously called the three lid design. And, this is probably iterative design, the analysis, the prototyping, it's all feedback on itself so that the lessons we learn from the first part get carried out in the second part. And, that's where we're currently at in the prototyping, is this next iteration of that part of the performance package.

We have realized reductions in the weld times based on the prototyping activities to date. Previously, we were above 50 hours for the welding. We are currently projecting down about 44. We do expect that we will realize additional gains in that welding time just for that portion of that process.

Next. In addition to the closure system, we do have prototypes set up for both waste package, waste package emplacement pallet, and the drip shields for prototyping activities. These activities are to confirm that we can manufacture what we are designing. Can the methodologies that the commercial vendors do actually product what we need them to do with the needed level of reliability and precision. We're going to be confirming the fabrication methods, including obtaining the final desired material properties, the capabilities of those performance welds, developing a cadre of qualified vendors in order to provide

that equipment, confirm the techniques that we use. We talked about the residual stress distribution and the outer corrosion barriers of the waste packages. The NDE methods, defining the components, the lessons learned and incorporating that in both the operating procedures, the inspection procedures, and all the other things that go along with that.

Right now, those activities are scheduled. We will be going and deferring some of those activities in the development process until the program realizes that point in the detailed design where we have to go and prototype those activities. The need for the prototyping will all be completed before we develop the final performance specifications for the procurement of those items.

The dual purpose canister cutting machine will also be prototyped. It's an activity that we have DPC cutting activities. There is commercial information for that, not specifically in the set-up in which we're configuring the equipment, so, we'll go through the prototyping activities in order to go and demonstrate that function, and will demonstrate our ability to remotely perform those steps. And, again, this will be a--it's a flexible schedule for when we actually go and do that, depending on the program funding, how much we get this year, next year, the year after, but in all cases, it will be done before we do the procurement

specifications for buying that equipment.

Next, if you would. Factory testing. Factory testing is an important component of what we're asking our vendors to go and do. Engineering products will define the SSC's performance, the systems, structures, components, the performance for the individual items that we're going to go out and procure. From the specifications, we'll identify what we need from the applicable codes and standards, because there are specific pieces that need to be confirmed by factory tests. We'll pull them from the design performance specifications, so that when we go out to a vendor, we'll tell them exactly what factory tests we want them to perform for us.

The contractor deliverables will provide those factory results back. We'll also have a chance to review them for acceptance and go and audit the facilities while they're performing those tests. It will be both by the engineering organization providing the specifications for them, and the quality assurance organizations that will be confirming that they followed the appropriate procedures.

And, then, the OCRWM program will actually pull those, will audit those, will determine whether those factory test results are acceptable or not before we accept the delivery of the products. It's just the way we do business.

Next, if you would. The factory testing schedule,

right now, it is flexible, but it does start based on the receipt schedules for the procurement activities. You've got to back up from when your planned procurement is, so that you can identify when they expect to do the factory tests, negotiate, plant visits, whatever it is. We will be completing the factory tests prior to accepting the products at the repository for installation in the facilities.

Until we actually get to the point where we have the detailed design for the procurement or construction, which could be several years for various components, we won't know a detailed schedule for when we're doing factory testing. It's just impossible to predict at this point with any accuracy. We do have the opportunity--

GARRICK: Does that present any problems in having time to do the tests?

RHODES: We don't anticipate any problems for that. The baseline repository schedule, which I get to in a later slide, actually has a layout staggered sequence that includes those periods when we're going to be procuring the equipment, doing the factory testing, and then transitioning into pre-operational phases where then we confirm what we need to here, and go into the rest of the test phase.

All right, as I was saying, we do have the opportunity to go back and refine what we're currently doing, for example, for the throughput studies, based on the results

of the factory tests. As we go through this development process, if we get different results than what we expect, there's that process where you go back and re-analyze, redesign, figure out whether specification changes are necessary based on delivery capabilities of vendors, and you can modify your throughput process to reflect any changes that you determine by program analysis that you are going to incorporate, and go back through, you do your license evaluations, you do your equipment changes, you do the redesign, you respecify the change, and then you again go through the whole sequence, the factory testing and acceptance of products.

So, we will be using the factory test program to first, confirm, and then as necessary, make program changes to what the design says for the proper performance of the repository facilities.

All right, next, if you would. The pre-operational test program can be looked at more along the lines of a parts test. It starts with the installation inspections that they do during construction, and the process of inspection, turnover for testing, the actual component testing, this is where we start with that more complicated inner actions that we need. It continues through turnover, initial preparation and conduct of the component functional tests, and you confirm that the component works by itself, and then fits

within the system performance that you're going to be testing as part of your integrated testing.

This is where they start with a dry run of the equipment, including the mock-ups of the waste containers. If I'm doing a crane, I have to say does that crane pick up that waste container. That's where we go and determine the basic performance of the crane, will it do the mission that it's assigned.

Next, if you would. Schedules for this will be defined in a very detailed testing program plan, which is currently under development. It is expected, and we do plan on doing the initial handling facility first, and then we'll go through the canister receipt and closure facilities, CRC-1, and then the wet handling facility, we'd go through the pre-operational testing afterwards.

In the License Application general information, Figure 2-1, there is a current plan that is provided that outlines a staggered schedule for each of the facilities. It's there for your look. I will offer that when we provide the update to the License Application to the NRC post-docketing, and then again when we do the update before receipt and possess, there will likely be the updated schedule that we have, with more detail than what you currently see now. So, right now, it is a preliminary staggered schedule that you can go take a look at.

All right, we do plan on using the initial handling facility testing program as part of the operator training program. We will be using that as part of our try-out, shake-out of the other facilities. It is expected that the IHF will be available a year before the operations, so that we have that period of time in order to go and work out the operational programs, and all the other procedures, in order to demonstrate that we can satisfy our license requirements that we expect to get back from the NRC.

Next, if you would. The start-up test program picks up from those pre-operational or equipment testing programs, and starts talking about the system performance testing and integrated system testing. It's not just the operation of the crane, but it's the operation of the crane in relation to all the handling. It's the operation of the canister transfer machine in relation to the whole facility. Is it going to be operating with the slide gates, the transfer trolleys, and the rest of the equipment that we have? Is it going to work together?

Cold testing will include the dry runs of the different waste types, based on where they're handled in the facility. And, then, we proceed into the operational readiness reviews that kind of bridges the cold to the hot operations. We have to go and confirm that we are going to be ready for the hot operations.

The hot testing is the initial start-up operations, and this won't be done until after we do the receipt and possess license from the NRC, so we'll have the issued license in our hands, and allow us to actually go and use hot materials. We have to go through that hot testing at that point to confirm that we can handle the hot materials before we actually go into full operations.

The schedule that we have will be defined in detail when we do the test program plan, but right now, it is preliminary, the IHF, CRCF and the wet handling facility, and, again, what we have is identified in the general information, Figure 2-1.

Next. The timing and things that we have between the program that we're going to execute and the actual dates when we get a receipt and possess license from the NRC, currently, it's very preliminary. I don't want to talk about it here. But the testing programs that we do put together and we define in the test program plan will be based on what we saw at other NRC license facilities. Right now, it's characterized in some detail in the NRC inspection manual, and INPO actually has a start-up program that they have.

It will also be similar to the DOE program for start-ups that has been followed at the WIPP plant and some of the others, so we know that the programs, they're very similar, they're put along the same lines, our start-up and

test program will be done along those same industry standard lines.

Next, if you would. Right now, confidence in the results. The prototyping that we are doing is confirming that what we assumed going into the development of the design is coming out to be shown to be correct. As we're going and doing the design prototyping, the design is being validated. Right now, we have not seen anything that is contrary to what we expected from those results.

We expect that the prototyping for the waste package, the emplacement pallet and drip shields will prove out those fabrication methods that we're going and doing. And, right now, we do not expect that those fabrication methods and things that we're going to be proving by prototyping will have any great effect on the facility throughput analyses that we've been talking about.

And, each step that we go through for the prototyping and factory testing will further provide additional confidence that what we did was done correctly.

And, the last part, I guess, was that the current prototyping results currently are supporting what we're modeling and that is, in part, because we're modeling the results that are coming out of the prototyping, but the assumptions that we had for those things that were not based on our known personal experience, were able to go and bound

with the model results. So, what we're finding is less than those activities that we currently did model. So, I think we've got confidence in our facility throughput, and the prototyping and things will end up being the proof of the design and the analysis that we have done.

And, I'll open up to questions.

PATROSKI: Perfect timing. Howard?

ARNOLD: Arnold, Board.

We're familiar with the waste package closure one. Is there anything else going on? I seem to recall from a meeting back that somebody talked about prototyping the actual Alloy 22 material and its fabrication, but I haven't heard anything about that lately. Is there anything else going on in this area other than the waste package closure?

RHODES: They were doing prototyping of the fabrication methods. How do you go and bend the plate? How do you go and get the welds on the side of the barrels, things like that. Some of that is going along in conjunction with the closure system that's going and welding the top plate. I'm not the one that was involved with the development of that waste package prototype to date, but right now, there are some waste package development activities, like I say, being done to support that final closure weld.

ARNOLD: But, that's it? The rest of this is all future?

RHODES: Well, the emplacement pallets and the drip shields will necessarily follow the waste package development. Right now, those are not in next year's planning. But, we do have them in the out-year planning. So, we've got target dates for that based on what our funding assumptions are to perform those prototyping activities, but just not this year.

PATROSKI: Ron?

LATANISION: Latanision, Board.

Could we go to your Slide 4? I just want to return to the short conversation that David Zabransky and I had this morning about the TAD development and the interface between that process and now the prototyping of the waste package. For example, will the--you have listed here the full-size waste package top and closure system.

RHODES: Yes.

LATANISION: Will the waste package have simulated loaded TAD packages included inside the waste package at the time the closure welds are made in the prototyping?

RHODES: I don't know enough detail about whether they're going to have a heat source in there or not, whether they're going to have a simulated package. I believe that they will have the heat source in there to represent what the canister is. But, there probably won't be a mock-up of a full scale waste package, just mocking up the closure weld.

They'll be using about the top third of the waste package.

LATANISION: Yes. Henry's preliminary comments are significant I think in lots of ways, and that's an element that the issue here reminds me of, you know, the situation with the Hadron Collider. I mean, if in fact you leave out a detail, in this case, the thermal mass of the TAD canister, et cetera, will that impact the prototype, the study which is being done to prototype the closure weld? I think that's something that's got to be investigated, otherwise, you could find it in the final analysis.

RHODES: Yes, it's one of the things that's always demonstrated during hot testing. Things react very differently than during cold testing. The mock-up and the prototyping for that closure system will be done under a full heat load in order to demonstrate its capability to go and do that. The initial prototyping, I don't believe is under that full heat load. It's the mechanical systems and things to go and mock that up, but as we go through, it's the process refinement and the development as they go through this prototyping process. We'll get to that hot load prototyping during the development. I just can't speak personally to that sequence.

PETROSKI: Ali?

MOSLEH: Mosleh, Board.

On the prototyping of the drip shield, does that

include the process of emplacement beyond just the hardware?

RHODES: Not knowing the details of that, I think that the prototyping plan for the drip shields has been identified as a schedule activity. They have some concepts that they need to go and do in terms of fabrication methods for the drip shields to make sure that it can be manufactured correctly. I am not sure that that plan includes or it doesn't include sequential mock-ups of the handling operations. I think as long as it's handled in the facilities where it's being mocked up, that's one thing. It's not necessarily mocking up an emplacement configuration.

MOSLEH: And, to the extent those things could actually have significant implications on the design of sending people back to the drawing board, how are these things going to be factored into the testing?

RHODES: There is a factor in terms of placement of the drip shield, such as the overlap, whatever, for the alignment of the drip shields as the emplaced configuration would represent. I don't want to speak to it. I don't know the details. I don't think they've identified all the things that they have to mock up or prototype with the fabrication of that drip shield yet. We're a little preliminary. We haven't even developed the detailed work activity to that level of detail to go and say these ten items have to be validated. I don't think they've gotten that in the plan

yet. We won't develop that plan until we get there in the schedule.

PETROSKI: Mark?

ABKOWITZ: Abkowitz, Board.

I'd like to pick up on Ali's question, just for clarification purposes. We see that the prototyping process for fabricating a drip shield is different than the prototyping process for fabricating a piece of equipment that's capable of installing the drip shields, and I think that's where he was going. And, I would say that also applies to the transporter that would be used to take the waste packages and emplace them in their appropriate locations. So, we certainly would like to see the prototyping program include those mobile parts that are going to be the interfaces between getting these things from where they were to where they need to be.

I also had a question as to whether or not there's any thought about prototyping with regard to the instrumentation that would be in the control room. It seems to me there's an awful lot of different elements to making this operation sync. And, I was wondering if you could comment on that?

RHODES: I can't speak to the control system panels, the operational control centers, not being part of that design group. Peripherally, though, I think that we're--Kirk, did

you want to address that?

LACHMAN: Lachman, DOE.

On the waste package closure system, it does have the full control panel system, the full operational user interface, if you will, as part of the prototype. The other, I cannot comment on at this time.

RHODES: I don't think we have a need right now in order to go and do the rest of the facility control panels, such as you might find in the CCCF that you might have heard about, the central control center. That type of detail will likely be an outfall of the detailed design that we'll be doing over the next couple of years to support the construction. An operator panel is pretty basic. There are guidelines for that. There are human factors that go into the design. We'll meet all those human factors as we've specified in our design criteria.

PETROSKI: Andy?

KADAK: Kadak, Board.

I think the reason that we're bringing up this question of actually physically testing the installation of the drip shield and possibly retrievability of the waste packages is because I think a few meetings ago, we heard a very compelling presentation from a mining engineer who said that it's not so simple. And, what looks good on a drawing, or even a schematic simulation, isn't really what you're

going to find out there, particularly in the clearances. So, we hope that you will seriously consider the fact that even if you don't have to make the real drip shield, but just look at how you get stuff in and out of there, because retrievability is something that you're going to have to demonstrate, and very little discussion has been held about how you're going to do that.

RHODES: I'm not sure that we would read the requirements on demonstration of retrievability would be the same.

KADAK: Okay.

RHODES: That might be something that we leave for another discussion with the Board in terms of what that is. We do have the design concepts right now that would allow us to go and identify what we believe we need for retrieval, and the time frames with which we would need to go and develop a set of detailed designs for equipment or facilities to execute that retrieval.

KADAK: Can I understand what you just said in the sense that you have no capability right now to describe how you're going to retrieve the spent--

RHODES: Not strictly true.

KADAK: Okay.

RHODES: We have identified what we believe is a set of equipment in terms of preliminary design, what those concepts

are, to accomplish the retrieval as we currently understand it. However, we believe the regulations allow us a period of time in the future that once a retrieval decision is made, in order to go and retrieve the fuel from the repository, now this is not to say that if we identify a waste package, for example, that we've identified that does not meet our preclosure performance requirement, or postclosure performance requirements during this operations period, that we can't pull it back out using the equipment we have on hand. That, we can do right now.

KADAK: I think this is an important question. I apologize, but the requirement is for retrievability after 50 or 100 years after closure.

RHODES: Yes.

KADAK: I'm assuming that the design would have some information about how you do that as part of the design.

RHODES: Yes.

KADAK: And, I don't necessarily mean every waste package has to be retrieved, but certainly you ought to be able to say a waste package, you know, halfway down the line ought to be able to be retrieved.

RHODES: I'm going to have to defer to Kirk in terms of the design.

LACHMAN: Lachman, DOE.

The requirement actually is a minimum of 50 years

from the start of emplacement up to closure to retrieve.

KADAK: Say that again.

LACKMAN: The requirement for retrieval is for a minimum of 50 years after start of emplacement, up to permanent closure.

KADAK: So, it's only retrieval during operation?

LACHMAN: Yes, sir.

KADAK: Not retrievable postclosure?

LACHMAN: That is correct. Otherwise, we wouldn't close if we felt the need to retrieve.

KADAK: I'm sorry. I said it wrong. Once the repository is full, it is supposed to be retrievable for 50 years, a minimum of 50 years; correct?

LACHMAN: 50 years from start of emplacement, per the regulation.

RHODES: If I can clarify that? After we complete the 50 year preclosure period, then we start the clock, so it's between 50 years and 300, roughly, until closure.

LACHMAN: Until permanent closure, when we have a license for closure, we will have demonstrated there is no need to retrieve.

KADAK: Right. And, I'm trying to just get the number of years after the repository is full before you think you can close it.

LACHMAN: Well, the current operational scenario is for

50 years of ventilation post-completion of emplacement. So, that would give you 100 year life from initial--from the start of emplacement until we anticipate closure.

KADAK: Okay. And, the understanding right now in your design is--do you have a design that says this is how we will retrieve it?

LACHMAN: Yes, retrieval is the reverse of emplacement. The equipment David is talking about, and correct me, David, if I'm incorrect, is that 100 years after start of emplacement, should a decision be made to retrieve, the surface facilities as we know them would not exist. They would have been decommissioned, decontaminated, and the regulation allows you an amount of time equal to emplacement to execute your retrieval. So, you would have to determine where you're going to put this.

KADAK: That's my question. Have you thought about that?

LACHMAN: Yes, we have.

KADAK: And, where could we find this information?

LACHMAN: I believe it's in--it's in the License Application.

KADAK: It is?

LACHMAN: Yes, in the retrieval section. I was going to say 1.12, but I'm not sure. Off the top of my head, those numbers get blurry.

KADAK: Thank you.

PETROSKI: Howard?

ARNOLD: Arnold, Board.

Just a clarification. When you define retrieval, is that a reversible process in which you would then be able to put it back in, or is it a one shot deal, you pull it out and that's it, and you've perhaps ruined some of the--ruined some of your capability to put it back in? Which way do you define retrievability?

LACHMAN: Lachman, DOE.

Retrieval, for us, is the reversal of emplacement. It does not do anything to the systems that would negate re-emplacing it. For instance, say the middle package in a drift, you decided oh, this is not good, you need to take it out. So, you would back out the ones in front of it, you can't carry over, so you have to back out the ones in front of it, using the TEV, pull out the package, whatever package that is that you decide you need to take out, we would call this a recovery operation, not retrieval, retrieval is taking everything out, but if you want that one, you could then put the other ones back in. There would not be anything that damages the system or makes it so you could not emplace waste in that drift.

KADAK: I apologize. So, you're saying that you have the capability right now to do what you just described in the

sense that this is where you're going to put all the stuff that you take out, there's room somewhere, and store it and shield it, and then you'll be putting all that stuff back in. That is not in your design

LACHMAN: The specifics for where I would put a waste package after I pull it out are not determined. You could put them on the aging pad with an appropriate overpack, which does not exist. That's where the regulation allows me, if I'm retrieving waste, the amount of time equivalent, approximately equivalent to emplacement, to determine and make those plans.

KADAK: Thank you.

PETROSKI: Are there any questions from the Staff? Yes, Carl?

DI BELLA: This is Carl Di Bella, Board Staff.

I have a question about waste package prototyping, not waste package closure prototyping. As far as I know, the project has done one full scale waste package prototype, and that was done a couple years ago. Part of that prototyping process was heat treatment of the Alloy 22 outer barrier. Part of the heat treatment is a quench after the heating process has taken place. That quench did not go entirely 100 percent successfully. And, now, that was with a 20 millimeter thick waste package. Now, all the waste packages are 25.4 millimeters thick. The timing that you said for

your next waste package prototype is not going to allow that technical question to be resolved, that is, how does one do the quenching, now that even the waste package is thicker. So, what intermediate development work are you doing to resolve this issue?

RHODES: Actually, I think we're going to have to get back to you on that level of technical detail. I'm not familiar enough with that prototyping activity in order to go and say what our further plans are in that area, or even to speak to what you allude to are the results of that. I personally have not read it.

PETROSKI: Any other questions?

(No response.)

PETROSKI: Let me ask one final question. You've laid out a very seemingly thorough program. What if you were asked to cut back on this program, do you see any room for that, and if so, what would you recommend be cut out of the program you've outlined?

RHODES: You're referring to both the prototyping, factory tests, pre-operational tests and the start-up test program?

PETROSKI: Yes, that's right.

RHODES: There is a certain amount of test program that you have to perform. I don't think you can operate any facility, whether it's a manufacturing facility, certainly

not a nuclear facility, without doing the minimum necessary testing. We have not identified any of the items that we're currently prototyping that would be cut out of what our plans are. We believe we need all of it. We would perform all of it.

In terms of the pre-operational testing, there may be some shift from maybe more factory testing, and maybe a little less pre-operational, or maybe less factory testing and more pre-operational. That level of detail is not currently available, and until we get the level of design we need for construction and procurement, I don't think we can venture an opinion.

PETROSKI: Okay, well, thank you. I think we've reached the end of the program, as far as formal presentations are concerned, John.

GARRICK: Thank you.

PETROSKI: Thank you.

GARRICK: Thank you. Okay, we're at the point on our agenda for public comments, and I have three names that have asked to make a comment. And, the first one is Irene Navis.

NAVIS: Good afternoon. As always, welcome to Las Vegas. Irene Navis, Clark County Planning Manager for Clark County's Nuclear Waste Division.

I want to make a couple comments, first, to thank you for addressing many of the topics that I mentioned last

meeting that would be helpful for us to talk about, for you to consider, and I think your agenda was a very good one today, and thanks for coming out and conducting the meeting here in Las Vegas.

We want to put on the record again that Clark County supports a continuing oversight role for the Technical Review Board, and later on in my comments, I'll give you some thoughts about some potential future agenda items that you might want to consider.

Just some comments on some of the things we heard today. We have recently completed a transportation video that covers a lot of the issues that you discussed today, including public safety and first responder impacts, impacts to ranchers, comments made by the State of Nevada, and if your staff requests a copy of the video, I'm happy to provide it. That might provide you with some additional insights into those topics.

With respect to funding under Section 180(c) of the Nuclear Waste Policy Act, one of the emerging issues that we're looking at is the fact that the Department of Homeland Security and the Department of Energy both have some responsibility for funding first responder capability. One of the missing links that we're seeing is some coordination along those lines, and how that impacts the Department of Energy's 180(c) policy that you heard about today.

Some of the work products that Clark County has put forward have sort of evolved into statewide analyses that are ongoing. We sort of were the kick-off in terms of a commodity flow study that I think I mentioned to you last year. That is turning into a statewide commodity flow study that we think would provide some useful information to this Board and others.

We also conducted some identification of critical infrastructure that is now turning into a threat assessment and risk analysis report that's being funded by other funding sources beyond the Nuclear Waste Division's efforts to again look at critical infrastructure from a statewide perspective.

We are also updating our public safety impact report that has some analysis related to transportation impacts that you might find interesting. So, any of these reports that I've mentioned that you think might be interesting or helpful to your work, the staff certainly is welcome to ask for them, so I can provide them.

The other thing that we're going to be keeping a close eye on in terms of the margin issues are the types of issues that typically come up at our State Legislature. In the year 2007, the State Legislature addressed issues related to transportation, overweight and oversize trucks, security issues, ports of entry, and a variety of other things that could have implications for DOE shipment campaigns. Rail

issues, rail safety and security, all those were issues that came up in our Legislature, and I believe that we will probably see some additional State Legislative initiatives in 2009.

Clark County every two years updates a state law's report that addresses many of the issues you talked about today, including inspections, permitting, placcarding, and fees at the State level, that could impact DOE shipment campaign. We provide that report to DOE every time that we produce it, and if the TRB would like copies of that, we can provide that as well.

Also, I want to say that we completely agree with the Technical Review Board, especially Chairman Garrick's comments about looking at system effectiveness, including throughput versus just demonstrating compliance with the minimum requirements for the safety case. We thought that was a very good point, and we hope that you will take a look at that in future meetings and continue to press on those issues, because we think that's really the crux of some of the concerns that we have at the County level.

Also, are looking at some emerging transportation issues that you might want to consider for potential future agenda items. I already mentioned that we are looking at critical infrastructure identification, threat assessments, vulnerabilities that might tie into some of the

transportation systems analysis that you're undertaking in terms of conflicts with other critical infrastructure, with the utilities, with other types of transportation decisions that are being made. For example, our Southern Abatta Water Authority is making decisions about where to lay pipelines to bring water in from rural communities, it's going to provide drinking water to the Las Vegas Valley. That impacts rural counties, such as Lincoln County, and, in fact, we have learned from the Water Authority that there may be some conflict between where the rail line is potentially going to be located and where the pipeline is being laid. So, we think that that is a potential systems interruption issue, transportation conflict issue, that might be something the Board might want to look at in a broader perspective.

The other thing that we learned as the Regional Transportation Commission for Southern Nevada is looking at building a light rail passenger train from California into Clark County. That's within the Union Pacific right-of-way, adjacent to Interstate 15. So, that brings in a whole other layer of conflicts and potential disruption and interruption to the DOE transportation system that might want to be considered as something to at least learn more about.

We also agree with the State of Nevada that the Technical Review Board should examine in greater depth issues and implications surrounding the aging facility, as currently

proposed by the Department of Energy, and encourage you to have a future meeting on this topic.

Thank you for your time. I appreciate it.

GARRICK: Thank you. Excellent comments. Judy Treichel.

TREICHEL: Thank you. It seems to me that there's some cart and a horse issues with the last presentation that you had. On the slide about prototype and testing for waste package, waste package emplacement, it says to determine manufacturability, and to measure the relationship between defects, and so forth. And, it seems to me that that stuff should be known before you're trying to get a license for the building of it. You need to know if things are manufacturable, or if they're workable.

And, I know that the Board doesn't need to get into licensing, but you do have a great deal of interest if whether or not stuff works, and that's what this prototyping is, and I would think that you would want to be satisfied, and certainly Nevadans want to be satisfied on whether something works before there's a license to actually do it. So, it just looks like things are coming in a little bit backwards.

And, there was the issue of confidence, trust and confidence that the utilities would want to have, that they would have TADs, that the system would work in the way that

they were told it would, because the TADs, for them, mean more time, more money, more doses on their sites, but then as Paul Golden told us, it makes for a cleaner repository here. So, you've just kind of switched those burdens.

Certainly, the confidence thing needs to happen for the public as well, and the Board has provided a lot of that, and I would hope that you would stay in business and keep exploring these issues, because public confidence has been shaken a lot lately. I'm not sure it's going to come back with the waste issue.

GARRICK: Has somebody told you we might go out of business?

TREICHEL: Boy, almost everything does, John.

There are just a lot of things that seem as though they're going a little bit backwards. DOE, although Gary Lanthrum didn't stress it in his presentation, it did say that they would not be paying for or doing anything about infrastructure improvements. And, we've seen a lot of cases, I'm from Minneapolis, so I watched a bridge go in the water while I was visiting, and there's a lot of things that need to be updated, need to have some work done on them before the stresses of a nationwide nuclear waste transportation system go into place.

In reading the LA, or parts of it, at least, you keep coming across things where there is decisions being

deferred, or analysis being deferred until a later time when something comes in. And, that sort of has to do with this prototyping, too, and particularly with retrievability. That's one of the things where if we need to do it, we'll figure it out. And, retrievability is sort of tricky, and I think I talked about this before, where retrievability, in DOE's definition, means that you unload the entire repository for just the leaker that's the third one in, like Andy was talking about, that's called either recovery or removal, and that's a whole different deal. And, it seems to kind of slip out of the regulations in the same way that a decision to retrieve would be something entirely different and a big deal.

So, when the question was asked where would you, if you had to cut money, where would you cut it from, and it was referred to in the testing and prototyping, I wouldn't think that's where you'd want to slow down. I would think that's where you would have to keep going, and they would have to continue to find out if anything works. And, if you need to slow something down, you'd slow down the licensing. Because until you can prove that you can do what you're asking a license to be able to do, I don't think it's worth going on with that. It's another place where things are just a little bit backwards, because the license is being given on the basis that you can do what you say you can do. So, you

should be able to show that you can do that.

Thank you.

GARRICK: Thank you. Victor Gilinsky.

GILINSKY: I'm Victor Gilinsky. I'm a consultant for the state. I realize I'm the last one here to stand between you and drink, and I'll just take a moment.

I want to underline the importance of the Board's questions about prototyping, installation of the drip shields. Of course, that's the hard part. Not making the drip shields, but installing it under the conditions that will be years from now.

I thought it was particularly significant at the earlier briefing, they didn't even mention drip shields, surface facilities, you're certainly going to need some kind of surface facilities to continue to maintain the site and perform installations, and the ones on systems integrations.

Despite this, we were assured that at least as far as the surface facility design is concerned, it's 100 percent complete as far as is necessary to support the LA. Now, that would be okay if you were not counting on the drip shield, if you weren't relying on the drip shield to maintain the EPA standard. But, we know now that without the drip shield, the analysis in the license application exceeds the EPA standard by something like a factor of ten. And, this happens not hundreds of thousands of years from now, but according to

their simulation, less than a thousand years from now, or roughly a thousand years from now.

So, it's really important, and it's really up to DOE to show in a very convincing way with high confidence that this will really happen. And, the fact that they haven't mentioned it in the other briefings, and barely touched on it in the last one, and really didn't have plans to deal with it with the prototyping of the emplacement, tells me they are not coming close to that.

And, I think that this should be a priority issue for the Board, because I mean, people look to you. I mean, who else is going to tell the Secretary things that he doesn't want to hear, and his staff is not going to tell him. So, I would urge you to put this high up on your list.

Thank you very much.

GARRICK: Thank you. Any other questions or comments or statements that anybody would like to make?

(No response.)

GARRICK: Hearing none, any comments or parting remarks from any of the Board members or Staff?

(No response.)

GARRICK: I want to thank everybody that participated in the meeting today. I liked the format of the panels. It's a format that we may use more often, and we appreciate everybody that attended, and contributed to answering

questions, and we look forward to seeing you again. And, this meeting is adjourned.

(Whereupon, the meeting was adjourned at 4:55 p.m.)

C E R T I F I C A T E

I certify that the foregoing is a correct transcript of the Nuclear Waste Technical Review Board public meeting held on May 29, 2008 in Las Vegas, Nevada taken from the electronic recording of proceedings in the above-entitled matter.

June 6, 2008

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