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NUCLEAR WASTE TECHNICAL REVIEW BOARD

Meeting of the Panel on Transportation & Systems

Nuclear Waste Technical Review Board

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ANN RILEY & ASSOCIATES

1612 K Street, N.W. (202) 293-3950 Washington, D.C.

P A R T I C I P A N T S

Board Members Present:

Dennis L. Price, Member and chairman of the Panel on Transportation & Systems

Ellis D. Verink, Member

Staff Member Present:

Sherwood C. Chu, Professional Staff Member

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P R O C E E D I N G S

(9:00 a.m.)

MR. PRICE: Good morning, and welcome to the meeting of the Panel of Transportation and Systems of the Nuclear Waste Technical Review Board.

I am Dennis Price, chairman of the panel. With me today are Dr. Ellis Verink, the other member of the panel, immediately on my left; and on my left and around the corner, Dr. Sherwood Chu of the Board senior professional staff.

This will be a two-day meeting. The focus for today will be on the Department Of Energy's, or DOE's, transportation program. We will get an overview of the program and its priorities, and we will get an update on a number of issues that we have raised in the past. These are enumerated in the printed agenda. Tomorrow we will shift and focus on systems engineering issues. This will be a follow-up of a briefing the Board received in July of this year on DOE's systems engineering approach, the Waste Management Program. We hope you can join us for both days.

We have a lengthy agenda today, so we need to get started. Leading off for DOE is Ron Milner. Mr. Milner is associate director for storage and transportation of the

Office of Civilian Radioactive Waste Management at the DOE.

MR. MILNER: Good morning. I wanted this morning to talk about four management initiatives that we have undertaken in connection with the transportation program: they are the technical advisory team for transportation, peer review of the cask design requirements that we have undertaken, an independent review of the Initiative I cask development program, and also a two-phase cask development and acquisition program.

(New viewgraph)

Dr. Bartlett has been using a number of different independent groups to review various elements of the OCRWM program. He established the technical advisory team for transportation about a year ago. The purpose of that was to review the transportation plans and activities, (1) to ensure their completeness, (2) to make sure that all the alternatives are being considered for various aspects of the program, and (3) most importantly, that it meets the needs of the overall OCRWM program that is currently envisioned.

The group is comprised of myself and the firm E.J. Bentz & Associates, and, of course, it draws heavily on the existing transportation program staff of the headquarters and in the field.

(New viewgraph)

We had initiated a little while ago a peer review of the cask design requirements. As you know, the design requirements were prepared in 1986, well in advance of the establishment of the OCRWM QA program. The peer review was undertaken to look at the process that was used in developing those requirements to satisfy the QA program requirements. The review is scheduled to be completed at the end of this month. I have not seen a preliminary or draft report on that yet, but I understand that the initial indications are that, in fact, the process that was used would satisfy the existing QA program.

(New viewgraph)

Another issue that we have undertaken is an independent review of the Initiative I cask development program. The purpose of that review, which was just recently undertaken, is to evaluate the casks against the current program requirements. The review is being conducted by both the DOE and contractor staff as well as outside input, such as the utility industry.

The review includes analysis of feasibility of meeting schedules, program schedules; the impact of budget constraints, both past and potential future ones; and most importantly, the compatibility of the reactor site

infrastructure. It is also going to look at the operational capabilities and efficiencies in the casks and the estimated cost for developing those casks. We are expecting a report in the latter part of November, early December on that review.

(New viewgraph)

The last one I wanted to talk about is the two-phase cask acquisition program. Dr. Bartlett announced this at the July 16th TRB meeting. A revision of the program in transportation casks to ensure transportation capability in 1998 and provide time to complete a review of the Initiative I cask program, Phase I of that program, or the near term phase -- near term in the sense that it is intended to cover operation of the MRS for its first several years -- is to acquire current technology casks for that start-up period. I say "current technology" in the sense that might utilize either existing casks or enhancement of existing casks or new casks using current technology, and it could be any combination or any of the above, actually.

Under Phase II the current Initiative I casks as well as others casks would be looked at as part of the overall developmental program for second generation casks. For Phase I we are hoping to have the RFP for the acquisition out in the near future, and for that reason I

can't get into too much detail on that point. But I will be happy to answer any questions you have on the rest of those.

(No response.)

DR. CHU: I'm Woody Chu, member of the staff. On your terminology of near-term, long-term and Phase I, the prototype casks, are they in Phase I? Let me be more specific: the ones that are being developed by Babcock and Wilcox and GA.

MR. MILNER: They are in Phase II.

DR. CHU: They are in Phase II?

MR. MILNER: Right.

DR. CHU: So when you say the existing casks on that slide, you are talking whatever is out?

MR. MILNER: Whatever is existing now and certified.

DR. CHU: And that is a very limited number.

MR. MILNER: Yes.

DR. CHU: Like, for example, the IF-300.

MR. MILNER: Yes.

DR. CHU: Is that what you are thinking of?

MR. MILNER: Right. Well, as I said, it is a combination or all three of either those current existing casks, those few casks, or enhancements that may be made to those casks at an increased payload, or whatever, or it

could be wholly new casks that use current technology. As you know, the Initiative I casks are using some basically cutting-edge technology, the idea being that there might be a vendor that would propose a new cask using current technology.

DR. CHU: I guess I am still not totally clear about the terminology. In other words, if the negotiator was successful and an MRS was cited and operational by 1998 so that transport could begin or should begin in 1998, then the fleet that you would use would be the ones that are mentioned in Phase I?

MR. MILNER: Yes, for the first several years.

DR. CHU: For the first several years.

MR. MILNER: And the Phase II is intended to be basically the long-term operational capability. The Phase I would be in the first several years of operation, and, of course, would continue to be used throughout the useful life.

DR. CHU: So that the ones that are being developed right now would not be used in the start-up of Phase I?

MR. MILNER: Not necessarily. I think the idea is that we want to ensure that we have a transportation capability in 1998. If any casks, be it the ones that are

currently under development, are available in 1998, they certainly would be utilized. But primarily we are looking at existing casks to ensure that capability at this point.

DR. CHU: Okay. Thank you.

DR. PRICE: On Phase I could you describe how a cask would actually be used? I recognize it is going to be used in transport, but how is it actually going to be used? Do you see it going to this MRS in 1998, the contents being removed, going back to some other place? Or what is the actual concept of how these casks are going to be used? Is it going to go to the MRS and stack up there? What is going to happen to it?

MR. MILNER: The intent of this certainly -- and we don't have the final MRS storage technology determined, but I think it is pretty safe to say that those casks would go to the MRS, be unloaded into a storage mode, whatever that may be, return to a different reactor. They would not be stored at the MRS. That is not intended.

DR. PRICE: They would be "unloaded," was the key operative word, and then return to receive another load?

MR. MILNER: Right.

DR. PRICE: And Phase II, do you have a concept about how those casks will be used?

MR. MILNER: Basically the same as the Phase I

casks. If it ends up that the MRS utilized, for example, transportable storage casks, then certainly they would be stored there. But if that is not the concept, then it would go out and load at the MRS and pick up a load.

DR. PRICE: Tomorrow we will be getting into the system side of things, but it is going to be very difficult to walk these lines and keep transportation and systems, especially since we are one panel here, separate. But one of the things that kind of makes me a little uneasy, whether I should be or not, is it appears that some of the lack of confidence and trust has started right from the very beginning in the conceptual stage of things.

So this is like an illegitimate child poorly conceived, or on the conceptual side of things not really being fully exploited but rather someone has something, sort of amorphous, and the starter gun went off and they said we have to run with it, and they run as far as they could and they handed that amorphous something to the next runner and they ran. And if we continue going around the track like this, we end up at the goal line with something that amorphous and not totally viewed from a systems standpoint.

If we have got this partial view of cask transportation at this point without getting the entire systems view of things -- and again, we will be looking at

this harder, I think, tomorrow -- I am wondering, when we get all done and we hold up our hands and we still have this amorphous something in them, how much applause there will be from the stands and those who watch?

MR. MILNER: I would suspect that if we had an amorphous something at that time, we wouldn't get any applause. Let me try to start out by talking about the MRS and what we are looking at in terms of storage concepts there.

An RFP has been issued by our M&O contractor to get information on a variety of storage concepts that might be used. One factor that we think could weigh heavily on the decision in terms of what storage concept we use at MRS is input from volunteer hosts. Until we get further along that process in terms of locating volunteer hosts, we obviously don't have that input.

We are not going to be making any hard and fast decisions on the casks themselves until we are closer to the MRS siting and we have some knowledge as to whether or not a volunteer may or may not have input to that storage concept. So at this point in time, I think we keep the options open in term of what we use in the transportation area and mesh that with the MRS storage technology that would be used.

So if it ends up being some sort of a

transportable storage cask arrangement, I think we have that option in the transportation program to go that route. If it is another dry storage concept, we would be off-loading one or more types of transportation casks at the MRS.

DR. PRICE: So I guess the impression I gathered from your first review of what was going to go on in Phase II was perhaps not accurate in that at Phase II, you are going to step back and take a good look at things?

MR. MILNER: Right. One, we are stepping back and taking a look at the Initiative I casks under development, and then we are going to look at whatever else we may need for the long haul of the MRS.

DR. PRICE: Is there a definition of the Initiative I? I think that is the first I have heard of that actual term.

MR. MILNER: The current cask development program that we have underway.

MR. PRICE: So you are going to step back and look at what has been going on. How pivotal and how much of a total view of the system are you really anticipating exercising before you continue on?

MR. MILNER: I think pretty completely. We are certainly working with Dwight Shelor's group, who will be talking to you tomorrow.

Next, Jim Carlson is going to talk about some of the nuclear program priorities in next year's budget.

MR. CARLSON: Dr. Price, Dr. Verink, Dr. Chu, let me first say it is a pleasure to be back to talk to the Board a little bit and provide you a little overview and background and perspective on the program. The presentations will be primarily made by the program staff and a few of the contract and support groups that are working with us. You know Chris Kouts. He will be, to a large extent, orchestrating or coordinating presentations today.

Certainly you know me. I am Jim Carlson. I am the director of the Transportation and Logistics Division. I am responsible now for the transportation program and the waste acceptance activities. I interface with the utilities in trying to make the administrative arrangements for the transfer of spent fuel. I think Alan Brownstein, who is the chief of the Logistics and Utility Interface Branch, will be talking to you later about the contract and the administrative relationship with the waste generators, which I think is of interest to you and impacts the discussion you had with Ron just a minute ago.

I am going to talk through an overview of the transportation program; what the program structure is with

regard to participants; the plan; who the current participants are; our planned transition to the M&O contractor, who recently was brought on board -- I think Dr. Bartlett briefed you on that at the full meeting -- and some discussion of our priorities in '92 and the way that our budget is being distributed, our plan, how we are doing it at this point.

I think I will start off by indicating the objective of the transportation program is to ensure that a safe and efficient transportation capability is available and an institutional environment is in place that will link the operation of the federal high-level radioactive waste management transportation system as needed. I think this ties in with Ron's discussion of the director's new initiatives: to make sure we have transportation capability available when it would be needed, in this case in 1998 at an MRS site.

The Initiative I cask development program, which has been ongoing for years in Idaho, is looking at more efficient transportation capability than the existing casks. So the major difference is the current technology doesn't have the carrying capacity of those casks that are under development. Bill Lake is going to give you a briefing on that cask development program, that CSCP program, as it is

referred to.

(New viewgraph)

This is how we historically have broken down the program, or the work breakdown structure; it is how our budget is tasked when it goes forward to Congress. It includes four major program areas within transportation: the cask system development program -- and I am going to talk a little bit later in details about what the priorities are in each category, so I am not going to do a lot of that with this particular viewgraph. Again, as I said, the specific updates in the individual areas will be presented by people later today.

The cask system development is responsible for the development of the Initiative I casks, or the next generation of casks which are more efficient. There also is a subset of that program that addresses applied technology of generic issues associated with achieving these higher efficiencies in transportation. One of them is that cask seal performance, which you specifically asked that we cover, and we have Tom Sanders from Sandia here to cover that.

The support systems and operations planning has to do with identifying the equipment requirements to support the operations, the actual operation planning, which is the

focus of most of this afternoon's presentations. This is looking at what utilities can handle, looking at the fleet size, fleet requirements and specific equipment, logistics planning, those items that you identified specifically in the agenda.

Economic and systems studies look at the infrastructure at the utilities to determine what the casks -- or what is needed, or what can be used at each reactor. The actual decision on transportation casks is a utility call; what goes on inside the fence is their determination. So we will supply them a carrier, they assume it at the gate, they load it, they turn it over to us at the gate to take out. They are the ones that are responsible for the operations inside the fence.

Alan will talk a little later about the specific arrangements with the utilities through the contracts that we have with them, or the contracts they have with us, since they are purchasing a service from us. In this area we also have our NEPA support activities, looking at the development of NEPA compliance plans, the development of models and preparing to support an MRS environmental assessment, or EIS, or eventually a repository.

The last area is the institutional program area, which Susan Smith will talk to you later today about. There

we are looking at compliance with Section 180(C) of the Nuclear Waste Policy Act, which requires the Department to provide technical assistance and funds for training for public officials in the states and tribes through which we may be transporting spent nuclear fuel under this program. Also our cooperative agreements are covered under that activity with various regional groups and other support groups.

(New viewgraph)

The transportation program, the current organization or prior to the M&O transition integration, which I think could be characterized as this week versus next week -- the cask system development activities are conducted, are technically managed through our Idaho field office. Margaret Fisher is the project manager on cask system development program.

The casks are being designed by a commercial cask vendors of a commercial organization. GA is working on the truck casks, a fully funded cask program. Babcock and Wilcox is rail cask, NAC is a backup rail cask, and Westinghouse is a backup trust cask, which are partially funded activities.

The generic issue: We are looking at generic technical issues, which are being done at Sandia. As I

said, Bill Lake will give you more details on the status.

The second major participant from a management viewpoint is DOE Chicago office. They are responsible for managing portions of the program that have to do with institutional activities, economic and systems studies, support systems, and operational planning. They had multiple contractors supporting them, Battelle, Argonne National Lab, Lawrence Livermore, Oak Ridge National Laboratory, the operations planning entity. Ron Pope from Oak Ridge will talk to you this afternoon about some of those activities, and SAIC supports them also.

On this viewgraph we also show the Nevada Yucca Mountain site characterization project office, which does not report to Ron, although they are part of the overall office of Civilian Radioactive Waste Management Organization. They are responsible for transportation-related studies and activities within the state of Nevada related to the OCRWM program. I believe Kathy Grassmeyer briefed you in Albuquerque on that a little bit.

We do have Bill Young here with us today who can answer any questions with regard to the Yucca Mountain activity. He is a contractor who, I think, was responsible for the conduct of most of those studies.

(New viewgraph).

This is sort of a depiction of how the transportation program management structure will be changing with the acquisition of the management operating contractor's support and the office in the execution of the program. The Department of Energy's Idaho field office will continue to be responsible for the cask system development of the Initiative I casks. Future initiatives in cask development, cask procurement, as Ron indicated, are being handled through our M&O contractor. The M&O is the TRW Environmental Safety Systems. I believe we have representatives from that group out here in the audience. Phil is here, I can see even with my vision, sitting back there. He is the head of the transportation group.

So Idaho retains responsibility for the Initiative I work. The TESS organization would be responsible for the management of the institutional activities, economic and system studies, support systems and operational planning, and future cask development and cask procurement initiatives.

The Yucca Mountain work is as it was. I believe the only change in the Yucca Mountain activities are with a higher priority being applied to the access of the site and the site work. There is probably not as much transportation

infrastructure related activities going on there as there was in the past.

Any questions on that? I see you are pouring over the chart a little bit and I am going pretty fast.

(No response)

(New view graph)

A little discussion of the priorities as we see them in the near term in the various program areas. As Ron mentioned before I got up, within the cask system development area we have a high priority at current technology cask, or near current. This is the director's initiative to ensure we have a shipping capability in 1998 to satisfy our needs. We are moving ahead with the development and licensing of the Initiative I casks. These are the casks Bill Lake will talk to you about. They are being conducted through Idaho, General Atomics and B&W casks. We hope to have the safety analysis reports for packaging to NRC for these casks in fiscal year '92.

The technical issue resolution activities, or the burn-up credit -- and this is to take credit for the depleted fissile content of the burnt fuel -- this is a generic effort that Sandia has been working on and will be used to support the licensing of the new efficient cask.

Source term evaluation, taking a hard look at the

actual radiation source term within the casks during transport and examine how they would behave in normal conditions.

The weeping or surface contamination issues are a real operational problem that the casks face, where they will be cleaned and suitable for transport when they leave a facility and they will arrive at their destination and do another survey and find there has been an increase due to absorption and release of contaminants on the surface of the casks. There has been a fairly extensive effort to understand that and see what can be done to eliminate that problem.

DR. PRICE: Is the present thinking on the weeping thing similar to the last I heard from Phil Bennett? Isn't that his lead?

MR. CARLSON: Yes. Dr. Bennett is the lead on that, yes.

DR. PRICE: And it is based on an ion exchange concept?

MR. CARLSON: That's correct.

The final area in this, which is in applied technology or generic issues, is the closure seals requirements. Tom can talk to you about that later this afternoon.

(New viewgraph)

In the area of support systems and operational planning, since we are responsible for providing the transport of casks, multi-- casks or the casks requested to our fleets to the utilities, we do need to understand the impacts of the way the standard contractors work and the utilities' responsibility in our planning. So part of this activity is to understand and evaluate the impacts on the transportation system of the way the contracting arrangements are with utilities.

There is functional analysis of the operational system and specific studies to look at optimization spinning off from that. That is Dwight's area, and I don't know whether he will get specific into what is going on in the transportation area, but he will address it programwide. It is ongoing and it is a pretty significant effort in light of staff contribution.

We also look at the operation reviews of the systems, the design, to evaluate the reactor handling and loading, what we need for it, and how it impacts our proposed operations and procedures.

The identification of needed system components: Again, look at what the utilities do have and can handle, what will be needed to address the loading requirements at

the specific sites, the definition of the cask maintenance facility requirements, and what do we need specifically to maintain a fleet of casks?

The observations of ongoing shipping and compiling of lessons learned: I think as a systems safety advocate, it is a point that is near and dear to your heart and it is not one we are specifically looking into. Although we will not be shipping for a number of years, there are shipments going on with utilities, and the Department makes shipments. Particularly the WIPP case is a good example to see what we can learn to make our program better and avoid any problems.

(New viewgraph)

In the economic and systems study group or area, as the way we breakdown the activities, we have the analysis of the infrastructure studies that have gone on, the FICA study; the facility interface capabilities assessment activities; and the near-site transportation infrastructure study, one inside the fence and the other between the fence and either the nearest rail head or maybe a barge facility or the Interstate Highway to look at what capabilities are to move heavy casks in those areas. You will be getting a briefing on that from Mike Conroy, I believe, this afternoon.

In the area of model development and

documentation, there are systems models, there are risk models, there are a variety of models that we need to analyze and determine what is the optimal way to deal with this. I think it touches a little bit on your discussion with Ron as to, we do need the analytical capability to determine how specific changes and system configuration or choices in technology do affect costs, radiation, our ability of having the system ready in the operation.

We do have planning to support an MRS environmental report if one is needed in the near future. Then, in all of the environmental assessments done to date, there has been specific transportation impact assessments that were part of those activities. I anticipate we probably will be proceeding on those lines in the future.

(New viewgraph)

The last area is institutional planning. Susan Smith will be briefing you later on the status, giving you more detail of the activities. A large part of our effort is in the Section 180(C) strategy, in the development of a plan in how we would implement the requirement in the Nuclear Waste Policy Act Amendment that called for the Department to provide technical assistance and funding to states and tribes to which we will transport waste; both include normal operations and emergency preparedness. So we

are trying to work with regional groups. We hope very shortly to be issuing a draft strategy which describes the process we hope to use to incorporate the views of the various people who actually developed a specific implementation plan, and then implement 180(C) requirements.

The cooperative agreements: I won't try to run through the whole list. I will let Susan do that during her presentation. But we do work with regional groups at this stage in the program to try to receive input from the regions to understand their views with regard to the transport of nuclear waste and to help factor that into our planning.

The CVSA inspection procedures: This is an effort to develop a uniform inspection procedure for our nuclear waste shipments. We hope to get into an actual demonstration or test of these procedures with the WIPP shipments to allow us to get the kind of feedback to see if they look good, whether the state inspectors' feel this is a good procedure, how it could be improved. I think we have heard a little bit about that at the briefing with the WIPP people that we had in Albuquerque.

The last activity is an ongoing activity to resolve institutional issues, or issues that have been raised over the period of time that we have been interacting

with these external groups in the transportation program.

(New viewgraph)

This is an initial or preliminary look at how we see the distribution of the programming funds in '92. I won't characterize these as final because we have not got guidance; we are still interacting with various program groups. Ron hasn't sent anything out yet, but this is sort of our initial feeling. The overall program has taken a small cut this year; that is, with the access to Yucca Mountain and the potential of getting on with some site characterization activities. The major emphasis has been a focus on pushing forward in the site characterization area. And the rest of the program has not had the growth that I think we had hoped for in the early time, although we still have a very firm commitment to be able to meet 1998, which is where Ron was talking about the new initiative.

The cask system development: There is a fairly significant portion of that set aside for the new procurement initiative. So we do see sort of funding going down a little bit on Initiative I, but some money set aside for the procurement initiative.

Support systems and operational planning: That one was actually staged fairly level. We see the 1991 carryover funds in there to support the continued working

forward on the operation planning to develop the site specific plans for the interaction with the utilities.

Economic system studies --

DR. CHU: Excuse me, Jim. Are you saying that this FY '91 carries over on top of FY '92?

MR. CARLSON: Yes. The actual level of activity is pretty close to the same. There are carryover funds that we apply in that area.

DR. PRICE: So you had about a 1.5 on '91 and it would be about a 1.5 on '92, or something like that?

MR. CARLSON: I don't follow what you mean.

DR. PRICE: It is the average of the two?

MR. CARLSON: No. Actually, it is closer to 2 million. It is like a million carried over to apply to that area. I don't have the specific numbers here, and as I said, we haven't cut the actual guidance letters or moved forward on it yet. But the level of activity is pretty much the same in that area.

DR. VERINK: The final bottom line, then, will be about the same?

MR. CARLSON: With available funds for spending, yes, that is correct.

The economic and systems studies: There is a small reduction in the effort in that area. I think with

FICA and NSTI activities wrapping up, it is sort of a natural progression to feel a little bit of reduced activity there.

Institutional area is roughly the same. We have cut a chunk of money out of the program management area. With the M&O coming on board, I think we see more efficiencies in the integration of the activities.

That is pretty much what I had to present. I will be happy to entertain any questions.

DR. PRICE: You presented quite a bit of material to be forthcoming today, and it sounds like we have a lot to listen to.

DR. CHU: I just have one question related to the one that I asked earlier; that is, again, one of clarifying the Phase I, Phase II. If I can go back to the slide on cask system development, where the first bullet under that was current technology casks.

MR. CARLSON: Okay.

MR. CHU: That is, in Phase I you were going to make use of existing technology --

MR. CARLSON: That is correct.

DR. CHU: -- for the purpose of transporting the spent fuels to the MRS by 1998?

MR. CARLSON: That's correct.

DR. CHU: Now, when you say that, do you mean that you are restricting yourself to the existing fleet or the existing technology? Again, I go back to the fleet is very small. There aren't very many IF-300 that you can lay your hands on.

MR. CARLSON: I think we all recognize that. When Ron talks about the current initiative, he is talking about inviting -- and I don't know how far it is still in preparation -- but looking to purchase existing or things that could be developed with a great deal of confidence so we would be able to have a fleet available in 1998.

DR. CHU: So "existing" refers to the technology and not just the total fleet?

MR. CARLSON: Correct. I believe, as Ron said, the Initiative I casks are looking at very highly efficiencies, recognizing the age and burn-up of the spent fuels that is going to be handled. The current casks do not have anywhere near the capacities. So we are still looking to develop these highly efficient methods. And certainly if continuing investigations prove out that there are very good efficiencies with these casks, we will pursue that and that will be the backbone of the fleet.

But also the director has put a very heavy emphasis on: Make sure you have the capability available

when needed. The need date has been identified as 1998. So we are looking at what gives us that schedule confidence, but at the same time we are looking to develop this more efficient fleet to be the backbone of the long-term operations.

DR. CHU: Thank you.

DR. PRICE: In this full plate you have set before us for the rest of this day, to what extent are you -- we hear quite a bit of concern, particularly from the railroads, about emergency response. To what extent are we going to get into emergency response sites and things today? The reason I hesitated before is that we didn't really, I think, make this a point of something we were looking for in the agenda, but I am just wondering to what extent.

MR. CARLSON: Probably not to the extent that you would like from the way you have addressed the question. I will be happy to set something up in the future to provide more details in that area. Susan will discuss a little bit on the 180(C) related activities, but as far as the specifics of how we would respond to various things, I don't think we will get into that kind of detail today.

DR. PRICE: Okay.

MR. CARLSON: Thank you.

I will be happy to introduce the next speaker, who

is Bill Lake. He works in the transportation branch. He is here to talk to us about the cask system development program activities.

MR. LAKE: As Jim has said, I am going to speak about the cask system development program. I would like to start by just giving you a little bit of the philosophy of this development activity. First of all, all of our casks will be NRC certified, and along with that comes the fact that they will be designed to the current NRC standards and practices. We have extensive use of engineering tests in developing data on materials' properties, particular components; for example, the impact limiters will undergo extensive testing. These are things that generally are needed for design practice.

Finally, with the designs themselves, safety will be demonstrated primarily through analysis. But in the very end, we will be doing verification tests and each of the casks will undergo scale model testing for structural concerns. The GA cask, which was the truck cask, will be using a half-scale model; the larger rail/barge casks will actually be using a quarter-scale model.

Finally, what we have recognized is that there are a number of broad technical issues that affect more than one cask, and in general might affect any cask that we might

develop under the program. Those recall our technical issues. We have a program on this technology development performed mainly out of Sandia National Labs. I will be talking about a few of the activities certainly there.

(New viewgraph)

I would like to give an update on the cask program right now. We have got four cask contractors in place. Two of them are being fully funded. One is the General Atomics legal-weight truck casks, and the second was the Babcock & Wilcox, which is actually rail/barge; it is not a trail/barge. We are not planning any off-road activities.

(Laughter)

We also have two partially funded contracts. One is a legal-weight truck, and that is being developed by Westinghouse. The other is a rail/barge being developed by Nuclear Insurance Corporation. These two casks were actually looking at particular technical issues that we identified following preliminary design that we felt needed a little bit of additional work before we proceeded with the casks. I will explain those a little bit later.

Jim mentioned that these new casks have much higher capacities. As a matter of fact, the current casks that are proved have capacities -- for instance, the truck casks, over-weight trucks can carry one PWR or two BWR

assemblies. The GA-4 is our PWR truck cask, and that carries four. So it is only a factor of four and costed (sic) nine carriers, so nine fuel assemblies. We have got similar capacity improvements on the BR-100, which is being developed by Babcock & Wilcox. Why do we get these improved capacities? Well, first and foremost is the cooling time.

(New viewgraph)

Current generation casks were developed for a reprocessing scenario. And there the plan was that fuel would be shipped after something like 150 days cooling. Now, 150-day cooled fuel -- for example, PWR assembly -- puts out about 11 kilowatts per assembly. The 10-year road, which is our fuel optimization plan, is about 600 watts. So not only do you have this drastic reduction in heat, but also the gamma radiation, which requires very heavy shielding. So that is a primary factor that comes into the improved capacities. Of course, both casks benefit from that.

The second activity that we are pursuing is the burn-up credit activity. Both GA and B&W are using burn-up credit. They are not using full burn-up credit -- and I will describe that a little bit later -- but they are using some burn-up credit that is available to them. They are only using it for PWR assemblies and only kind of at the

high end of enrichments. Basically what it does is allow you to move the fuel closer together, which keeps the outer cask body smaller, and therefore, the weight goes down.

The square cross section is something being used by GA. Since the fuel assembly is a square, by following very closely to the configuration, you save another little bit of weight. The depleted uranium gamma shielding for GA -- the two most popular gamma shielding materials are lead and depleted uranium. Basically the higher density the material, the more efficient it is as gamma shielding. In the truck cask you get a very significant benefit from going to the more expensive but more efficient depleted uranium.

Another item that GA is using is the separate cask bodies for PWR and BWR assemblies. Basically the PWR needs slightly thicker gamma shielding, but they are generally shorter fuel assemblies. The BWR is longer, but needs less shielding. If you have one cask, then probably both of them would be shipped PWR. If you have a longer cask than you need, if you ship BWR, you have more shielding than you need. So they get quite a bit of efficiency out of that.

Then finally, GA has developed aluminum honeycomb impact limiters, which is a very efficient system, high performance, low weight.

(New viewgraph)

I have probably covered some of these things already, but I will go over it again for the GA legal-weight truck cask. The GA-4 has a maximum capacity of four PWR assemblies. The separate GA cask, the GA-9, has a maximum capacity of nine BWRs. Both of these casks, again, have a square cross-section and they both use XM-19, which is a high strength stainless steel, for the structure material. Both use depleted uranium gamma shield. Both of them also -- and actually all of our casks use solid neutron shields. This one uses a solid borated polymer, and the boron, of course, absorbs a little bit more neutrons.

The aluminum honeycomb impact limiter.

The fuel support structure -- and I will show you a cross section later -- is basically for the PWRs, a cruciform. For the BWR it is a crate arrangement and that holds the fuel in place during transport. Those are constructed of stainless steel and they include boron carbide, which is a neutron absorber for criticality control.

The GA-4, of course, is a PWR cask and that uses burn-up credit.

(New viewgraph)

Here is a picture of the GA-4. You can probably see as well, maybe better than I can, but pick out where the

neutron shield is. That is the outboard section. Inside of that is a stainless steel body and that is the main containment system. Going further inboard, depleted uranium. Then you have your four assemblies, which are in a square configuration.

I know you are interested in seals. I will just tell you that the seal for this is an EPDM, which is an ethylene polypropylene polymer seal material. Actually, we selected, based on some of the preliminary Sandia tests, the cask contractor which we got through the cask, to demonstrate the adequacy of that seal under the NRC review process.

(New viewgraph)

Of course the only difference between the GA, or the obvious difference you can see here, is that you have got nine assemblies instead of four.

(New viewgraph)

I think this is probably easier to see the cross sections. On the left, of course, is the PWR casks. one of the things, incidently -- just briefly look at this. Another help on the weight on these two casks -- generally the containment vessel is the most inboard piece of steel. Because of square corners on this, it was decided to move it from the outside to eliminate the stress concentrations.

Steel gives some gamma shielding, but it is not as efficient as depleted uranium. So actually, the added benefit of moving that containment vessel outboard is you move the depleted uranium further in and you really increase the efficiency, probably marginally, but it does increase the efficiency. You can't see the boron carbide rods, but actually they come in axially through a series of drilled holes.

(New viewgraph)

The milestones: I have got milestones actually for both casks. General Atomics, the preliminary design was completed in January of '90 and a report issued in April 1990. Actually, a number of people have already submitted comments on that, which we have responded to most of them. The final design report is scheduled to be released in the first of '92. The scale model, which is a half-scale for GA, is under fabrication. That will be completed in August of '92, and the tests will be completed in October '92.

Now, I just thought I might add here, one scale model is going to be tested, and that is the PWR, which is the more constraining of the two from a structural standpoint. The designer will then show that the performance of the PWR bounds the performance of the BWR. The SAR, or SARP, or Safety Analysis Report, and the

application to the NRC is scheduled for May of '92 for this cask. We are expecting about a two-year review cycle.

(New viewgraph)

For Babcock & Wilcox, again that doesn't have the capacity in its title so I will have to tell you what it is here. It is 21 PWRs or 52 BWR assemblies. It is a circular cross section. It uses lead for gamma shielding, which actually is easier to work with. It is less expensive than depleted uranium. Actually, when you get to the very large cask, the rail cask, there is a lot of self-shielding. So the benefit of DU isn't as much as it is on truck casks.

This uses a borated concrete neutron shield which also acts as a thermal switch. We will going into that in a little more detail later. The cask body is, again, XM-19 stainless steel. The fuel basket is a combination of stainless steel, copper and boral. The stainless steel, of course, is for the strength, the structure of the material. Copper is used to enhance the heat dissipation, to pull the heat out of the central portion. Boral is a boron aluminum composite. That is in their preliminary for the boron which would be neutron causing. The BR-100 uses a balsa wood impact limiter which is covered with a thin stainless steel shell. That uses burn-up credit for the PWR.

(New viewgraph)

Again, this is an artist's picture of the cask. It is a little hard to see this, but I will just let you look at it for a few minutes and just point out again that the sealing in this particular cask is going to be a silicon material, and that also has been tested under our Sandia program. The results of the Sandia program has been the basis for selection of that material. Again, the contractor will have to do some further tests that would be particularly geared to his cask.

(New viewgraph)

This just shows a picture of the basket configurations. Again, this is one single cask body with removable, interchangeable baskets. You see the PWR on the left is the 21 assemblies, and 52 BWRs on the right.

(New viewgraph)

This is a little cut or section of the cask wall, the innermost, the inner container. Again, this is conventional; it is the inboard steel structure. There is a one-inch XM-19 steel that is surrounded by two seven-eighth-inch thick lead gamma shieldings. That is followed by the concrete neutron and thermal shield. That is followed by this one-and-three-quarters thick stainless steel outerlay.

Now, the ribs, or the copper fins, are added in

the concrete section for heat transfer. Basically they are fins. If you look at the fins that are attached to the lead, their function is to draw the heat out of the lead system, the heat from the spent fuel. If you look at the path, then, across to the adjacent freestanding copper bar, that is a rather short heat transfer path. That also acts as a fin in carrying it up and out of the system.

In a fire accident the fusible plug would melt out and the heat from the fire as it transferred into the system would actually cause removal of water vapor from the concrete. That would draw some of that heat out and allow it to escape through the fusible plug. In addition, when you dry out the concrete, it has a fairly low thermal diffusivity, that is the combination of the conductivity, specific heat and the density. Actually, it responds very slowly to a change in temperature. That protects the inner lead shield from a fire accident.

(New viewgraph)

The milestones for the B&W cask: The preliminary design report was issued in February 1990. The final report is scheduled for February of '92. The scale model will be completed in December '91 for that cask, and the verification tests in March of '92. B&W plans to submit their application to the NRC in August of '92. They are

anticipating a more accelerated review in the NRC.

DR. VERINK: Before they submit it --

MR. LAKE: Excuse me, '94.

DR. VERINK: That would be very fast.

MR. LAKE: Very accelerated, but they also have the trail system.

(Laughter)

(New viewgraph)

MR. LAKE: I am going to speak very briefly about the two partially funded contractors. Again, what we found with the two, both Westinghouse and NAC, each of them had a particular feature that was somewhat innovative, and at least unfamiliar, not only to the industry but to the NRC. We felt that these particular design features needed a little more work before we proceeded ahead with the cask designs.

In the case of Westinghouse, they have decided to use a titanium, grade 9 titanium, for the structural material. It has a good strength to weight ratio, much better than steel, and it allowed them to increase from a two-five capacity to a three-seven. So they decided to go along with that. Unfortunately, the NRC is used to primarily austenitic stainless steels for cask systems, although they have approved ferritic steels. This

particular material, of course, had to be demonstrated to the NRC's satisfaction in terms of its fracture mechanics. With no prior history, what the contractor decided to do was to go through ASME code process. They now have a code case -- I believe it is N-492 -- which accepts this particular material for the nuclear components, not only casks but any nuclear component.

The next process, of course, is to go through NRC approval. They are now in the process of presenting the code case along with the materials data that they have developed for that code case to the NRC.

NAC has proposed an innovative wedge-loc closure design. Rather than the conventional bolted flange closure system they have developed a wedge-loc closure, which is a quick actuating -- it is actually hydraulic actuated closure system which cuts down on work of exposure. Instead of taking an hour or two to close up a large cask lid, the contractor indicates that they estimate about 15 minutes for that same operation. But again, this is something that the NRC is unfamiliar with. One of the things that we had NAC do is build a plastic model of the lid just to show how it operates because that is the first step. The next step, of course, would be to show that under both normal and accident transport conditions, this type of lid behaves well enough

to be approved.

(New viewgraph)

I would like to talk a little bit about the technical issue resolution. Two of these topics Dr. Sanders will talk about in much more detail. I will be talking very briefly about burn-up credit, source term evaluation, closure seal performance tests, and weeping and surface contamination. And, actually, Dr. Sanders will be talking about the closure seals but also about the source term, which is an integral part of containment.

(New viewgraph)

I think Jim already mentioned that basically burn-up credit is accounted for reduced reactivity of spent fuel. Two things happen to this spent fuel. One, net fissile content goes down so it makes it less reactive; in addition, fission products build up which tend to absorb neutrons. So these act as poisons. You might call them internal poisons as opposed to the external poisons which we introduce in the basket to withdraw neutrons.

First of all, it reduces the complexity of baskets. Many of the current large capacity casks, the rail casks, will have something called flux traps, which are basically spaces, air spaces, which in water flooded conditions would become water spaces. We don't need those

with burn-up credit. If we would take full burn-up credit, we could probably eliminate a lot of the external causes as well.

What does it do? As we have said before, it increases capacity. It does bring us a few headaches, of course. The NRC and the industry is geared towards a fresh fuel assumption of spent fuel. That is about as reactive as it can get. When you introduce the use of the burn-up credit, you then have to demonstrate that you can calculate and accurately predict the performance of this fuel in these conditions. We have also had to gather, actually assay in spent fuel to develop what the inventories of fission products and things of that sort, fissile material from spent fuel verses new fuel, which we know how it comes out of the manufacturer.

We are not taking credit for all of the fission products; they add up to about 240. We have identified the top eight, or top ten, if you will, and we are concentrating on those, which is an effective way to go. In addition, right now when you load up a cask for criticality control, you have to know the initial enrichment. We are now introducing a new parameter that you need to know that it is burned up -- that you need to know what the burn-up is. We are going to verify that initially with some sort of direct

measurement.

(New viewgraph)

The source term evaluation basically is trying to develop a consistent and technically defensible approach to demonstrate containment adequacy. The source term approach has been used by the NRC, and in most of the casks that are currently approved, they have used the source term approach. However, it has been done on a case-by-case basis rather than the more consistent basis that we are trying to develop. Tom will go into some more detail.

First of all, we have identified the contributors to source term, which I will let Tom tell you in the interest of time. We characterize those contributors the "source term contributors."

Developing release models.

Finally we will have to do some verification tests to show that these models do adequately predict containments.

(New viewgraph)

The closure seal performance: First of all, we are trying to determine the seal behavior and the failure mechanisms. Once you know that, you can choose a seal that will behave well with your cask. Each cask has its own performance characteristics basically at the high end on,

say, impact limiters, how far the steel is buried in the system, and so on. The objective of the Sandia work is to identify a group of seal materials that can be used. The design will then be selected from those. The additional things that the program is trying to do is establish some criteria and seal design practices. Finally, it will develop some equipment that we can use to verify the performance of seal materials.

(New viewgraph)

The weeping and surface contamination, Jim had alluded to a little bit before. Basically, the problem is a surface phenomenon and it is observed when a cask leaves a utility, within regulatory limits, only to arrive at its destination having some removable surface contamination. This surface contamination, of course, is picked up in pools, which are usually pretty clean. But even the minute particles can tend to be absorbed into the cask surface.

The intent of the program at Sandia is first of all to investigate the root cause of weeping, what the fissile phenomenon are in the absorption process. Based on that, we feel that we can develop some sort of design approaches to avoid the problem. And in addition to that, if the problem does occur, we want to be able to develop some ways to correct it, some cleaning fluids. And as Dr.

Price mentioned earlier, ion exchange seems to be the phenomenon that Sandia has identified. That means we just need to find something that can reverse the process.

That is all I have. Are there any other questions?

DR. VERINK: I was interested in your mention of the solid borated polymer in the case of GA design and the mention of the borated cement in the B&W design. Can you give any kind of a comparison between the structural properties of those and their longevity in terms of stability, time and temperature?

MR. LAKE: I will try to give a thumbnail sketch. It is a good question. Actually the cask contractors are looking into it. The polymer, of course, has some very narrow range of temperatures that it will perform in. At the high temperature, of course, you have to be very selective. The neutron shielding does not need to survive an accident condition. That is the primary contributor to the dose rate as gamma radiation. So the casks are designed so that the neutron shield can be lost.

What we really need performance on is at the normal condition A, and the polymer actually behaved rather well. Again, if the structure breaks under accident conditions, you can get some streaming through that, but

again, you don't need it.

DR. VERINK: Is the polymer more malleable than you think of concrete being?

MR. LAKE: It is a fairly rigid polymer, but it is designed to withstand normal conditions of transport.

DR. VERINK: And to absorb some load mechanically by deflection?

MR. LAKE: Yes. Well, it is more or less freestanding. In the analysis, the safety analysis, it is actually not able to take any load other than its own body weight.

DR. VERINK: I guess what I am exploring is what does solid mean? Does it mean that you can make a dent in it?

MR. LAKE: Oh, no. It is kind of like a thick -- it is as hard as this table top.

DR. VERINK: But not as hard as concrete?

MR. LAKE: No, definitely not as hard as concrete.

MR. KOUTS: Dr. Verink, we made that distinction because casks in the past have had liquid neutron shields, basically water. What we are saying is it is solid as opposed to the liquid neutron shields. That is what we are referring to there.

DR. VERINK: Okay. Is there a particular polymer

that is currently the leader of the pack?

MR. LAKE: Actually, they are looking in to two, and polypropylene and polyurethane. They come in all different kinds of combinations. Does that answer the question on the concrete as well?

DR. VERINK: The concrete has just got some additional boron species mixed in it? Is it just a typical concrete material?

MR. LAKE: No. I think it is an aluminum based concrete. Actually, it is very free flowing. It is much different than the parking (sic) concrete. This particular design concept has been used by Row Battelle (sic) in France.

DR. VERINK: Is this a poured in solid, or is it granular solid, or is it a liquid?

MR. LAKE: It is poured in as a mixed liquid and then it sets.

We are not to be taking questions from the audience at this point.

DR. PRICE: We will have an opportunity later, perhaps.

MR. LAKE: Thank you.

DR. PRICE: Let me ask a couple of questions.

MR. LAKE: Sorry.

DR. PRICE: In your philosophy of your approach, you indicated reliance upon analysis and scale testing, and I am sure you are aware that there is a lot of skepticism out there about that reliance on analysis in scale testing. At some point, I guess it would be good for us to hear -- it may not be appropriate at this time -- a carefully thought out defense of the scale testing approach and analysis approach. So kind of just maybe put a flag up where we need to look at this, and perhaps at some point we can get a very carefully delivered examination of that.

MR. LAKE: Yes, I think that would be very worthwhile.

DR. PRICE: The casks, particularly the rail casks -- do all the casks basically depend upon a breakaway concept in their mounting to the vehicle that is carrying them, so that given an accident condition, they break away from the vehicle rather than stay with the vehicle?

MR. LAKE: Yes. Traditionally they are designed that way. For one thing, the NRC rules kind of stop at the tie-down and then DOT rules pick up. As a result, the basic thing with tie-downs on the NRC requirements is that the tie-down should be the weak link in a cask, such that if an accident occurs, the tie-down should fail rather than somehow damage the nuclear safety components.

For instance, it probably really isn't a problem with the spent fuel casks, but if you had tie-downs attached, let's say, to a small container and you tear the entire shielding off as a result of an accident, that is what you want to guard against. That is the way those regulations are set up. The 10-5-2, or the tie-down requirements, are the minimum design requirements.

DR. PRICE: Is one of the reasons behind this really to minimize the g-loading overall by just turning this thing loose?

MR. LAKE: Oh, no. If the tie-downs were stronger and the g-loads were higher, you would, of course, have a design such that the tie-down did not fail the system under those g's.

DR. PRICE: What you meant by minimizing the g-loading, the g-loading in the cask itself overall by allowing it to break away and absorb the energy rather than have some large peak duration because it is still attached to the vehicle?

MR. LAKE: No, I don't think so. It is more administrative, as I said, because of the jurisdictions.

DR. PRICE: Are you familiar with the shipment of the submarine parts in which the tie-down was actually integral to the vehicle that was being carried, and I guess

NRC approved it? Do you know what the reasoning behind that was versus what you just portrayed?

MR. LAKE: That was probably the designer's choice. These are the naval reactor shipments that I assume you are talking about. Yes. Again, the naval reactor shipments, I believe, were on specialized conveyance, specialized trailers and rail cars. They have chosen to include the rail cars as part of the safety system. That is my guess.

DR. PRICE: The reason I am bringing this up is we heard testimony from The Association of American Railroads in which I thought they were implying they preferred that kind of a tie-down concept, going back to the old issue of grappling, which I know you have grappled with over quite some time. I was just trying to get a better handle on the two different designs and perhaps why they exist. In one case the railroads seemed to like the idea they could grapple with a car and cask, they think it was easier than just grappling with the cask.

MR. LAKE: The difficulty of including the rail system, the rail car or the trailer, as part of the safety system is then you have to demonstrate that it is, in fact, with the system. That is why it is traditionally not done by the cask designers.

MR. KOUTS: Dr. Price, you put us in a position where we are actually speaking for the NRC, but I think what Bill is quoting, I certainly feel comfortable with. He has been with a program about four years and he has 15 years of experience at the NRC in cask certification, cask design certification. So although Bill doesn't speak for the NRC, he has a pretty good idea of how they view things.

DR. PRICE: Another issue that the Association of American Railroads brought up to us in testimony, just as a point of information to see if there is any comment -- we have asked for comment on this from DOT -- and that had to do with the cask design coupled with the rail car in which there was a concern about the overall length of the car and its driving tendency for the car to hunt and become less stable than, I guess, they think they would like it to be, and indicated that almost any length of car, either shorter or longer, would be better than the length of car that seems to be in use. Any reaction to that?

MR. LAKE: Yes. I think it is a good point. We are following it; we are aware of the comment. Basically the cask contractor has chosen a subcontractor to design the rail car. The rail car is being designed by what, I presume, is a competent rail designer. And finally, the rail design will go into the American Association of

Railroads for approval before it can be used on the rail systems. We are monitoring that design. Although it is a concern and we are watching it, we kind of have to follow the designer's opinion, at this point, and his expertise.

DR. PRICE: On your closure seal performance, you mentioned -- I know we are going to hear more about this -- verified performance in closure design for the OCRWM casks. And in your comment you talked about verified performance of materials. Is this the materials in the design that you are really trying to establish a means to verify the materials in the design? Because, you know, I see a difference between closure design and verifying materials. So I was a little unclear about what you were representing there.

MR. LAKE: Now, the seal program is looking at the seal materials. Then finally, when the designer chooses a seal material based primarily on its thermal performance, that would then be incorporated into the cask design. Then there would be some prototypes, further testing. Ultimately, there is a test on the finished product and every cask that is put into service, you actually have to demonstrate that it meets its containment requirement, which is basically a new cask (sic) of some sort.

DR. PRICE: That is all I have.

MR. LAKE: Are there other questions?

(No response)

MR. LAKE: Thank you.

DR. PRICE: I believe we are scheduled for a break at this time. We are running about 15 minutes behind. So at this point, let's plan on being back, if it is all right, about 10:45.

(Brief recess)

DR. PRICE: Let's gather around. Our next speaker is Tom Sanders. The topic is cask seals testing.

DR. SANDERS: Thank you, Dr. Price, members of the Board. My name is Tom Sanders. I am with Sandia National Laboratories. We are supporting the OCRWM's program area in technology development, as you heard both Bill Lake and Jim Carlson talk about this morning.

One of the areas that you requested in a previous meeting to hear additional information on had to do with cask seals testing. In the interest of kind of tying things together, I would like to approach that issue as a containment issue in general and talk to you a little bit about how both the seal and the fuel form contributed to the cask containment functions.

(New viewgraph)

Stepping back a little bit, it is important to

remember that the transportation regulations address three basic safety functions that a spent fuel cask has to perform. Spent fuel transport casks must provide adequate containment for the radioactive material, and that adequacy is defined by regulations. Spent fuel transport casks must provide assurance of nuclear subcriticality; also that is primarily to ensure that containment function is performed. And the spent fuel transport cask must provide adequate shielding against any radiation being emitted by the content fuel, or the radioactive material shielding cask.

(New viewgraph)

There are several barriers to the release of radioactive materials from spent fuel cask. You can look at these barriers as a number of resistances in a series, particularly for gaseous radionuclide migration from a source point into a leak site in a cask body or cask seal area.

The fuel pellet and fuel rod cladding: Both the pellet, in terms of certain characteristics it has, and the cladding, in terms of certain material properties it has and maintains even after discharge from a reactor, which serve significantly to prevent the potential release of radionuclide materials.

Physical and chemical characteristics of the

material are working in our favor from the source term perspective. These characteristics include mostly solid forms; mostly fission products are trapped in solid particles. Most of the radioactive gases released, such as krypton, have minimal health/physics affects, and so on.

There are also certain characteristics that are apparent. In order for a radionuclide to migrate from a source point from a fuel release, the potential leak site, it must be convected in some fashion and driven by some sort of a force, such as a pressure differential, and be convected by thermal or convectional gas occurrence. During that convectional process you have gravitational settling of larger particles and you have diffusive deposition of smaller particles.

The major containment function of the cask itself, being of such a robust body, has to do with the actual seals. There are a number of penetrations of the cask that perform numerous functions: loading the cask, testing the cask, leak testing, draining, and so on, are all accomplished through penetrations that are sealed against the external environment.

Then the actual size and nature of any leak paths that haven't formed in a potential pathway has a significant impact on how the radionuclide might leak from an actual

cask. That leak path may be very tortuous, it may be a straight shot, it may be a circular dimension, it may be a squared dimension or a hairline sized, or so on.

(New viewgraph)

For the bulk of my talk I would like to address two elements of containment. I am going to talk a little bit first about the radioactive source term itself, and then the cask containment seals programs that we have going on to establish off-the-self type of seal material.

(New viewgraph)

Radionuclides in a spent fuel cask originate from three distinct media. First you have activated corrosion and free fission products that adhere to the surface of spent fuel rods. This type of product in the past has taken on the acronym known as CRUD. To be honest, I don't remember what that acronym means. It has been around about 30 years. I think it has something to do with corrosive reactor deposits.

DR. PRICE: Seems appropriate.

DR. SANDERS: As the gas is used and between maintenance services, you have a certain amount of this CRUD that will become free from spent fuel rod surfaces and build up in a cask over time. This is called residual contamination, and it provides a potential source term both

for spent fuel shipment as well as an AP cask shipment on the return trip.

Finally, the major potential source of radionuclides in a cask is spent fuel itself.

(New viewgraph)

The ANSI N14.5 standard provides standardized methods for demonstrating that spent fuel packages -- in fact, all radioactive material packages -- comply with regulatory containment requirements of 10 CFR 71. This is basically a simple algebraic relationship between a maximum permissible leak rate, which must be designed and demonstrated in a cask, as the function of the released limits to both normal and accident conditions released in the transport. These released limits are based on no particular fuel material. The quantity A-2 is the function of all materials that are in the mixture in the fuel.

This maximum permissible leak rate for normal conditions, for example, is -- this is the release limit which happens to be A-2 times ten to the minus six per hour over a concentration that is available for release.

From a source term approach, what you are looking for: What is that concentration that is available for release? Accident conditions, regulatory requirement is A-2 per week release limits. Then again, concentrations of the

activities per unit volume of the cask medium that could escape, if you have nothing there that is available to escape, or very limited quantities that are available to escape, then the containment requirements are very different.

(New viewgraph)

Our source term program is basically trying to lump these into a functional relationship and to determine

this concentration associated with potential CRUD, residual contamination of fuel components, and spent fuel. These are lumped together. And while the relationship looks fairly simple in this simple algebraic format, it is actually a very complex function of particle transport physics, leak geometry, failure modes, potential for plugging, and so on.

(New viewgraph)

This chart is a little bit of a description of how the program is going to go. I am not going to talk about it too much because Bill covered it earlier. Basically, we have three phases of the program. The end goal is to have a methodology, evaluated methodology, in terms of an acceptable calculational tool that has been benchmarked and validated appropriately to be able to take the conditions of transport experienced by casks in terms of either impact or

thermal events, translate those conditions into initial conditions on the actual spent fuel content, evaluate the response of those spent fuel contents to, for example, side drop or end drop: How does the fuel behave? How do individual rods behave? Do they collapse upon themselves? Where are the likely failure points? And how does it fail? Is it pressure driven release, and so on? And given a point of failure, based on experimental data, how much actual data would that particular matter release from that fuel? This then becomes a source term that can be migrated, or transported, from that fuel breakage site to a hypothetical lead site in the cask.

When all that is laid out on this particular diagram, we have basically completed Phase I. We do have extensive analytical techniques for CRUD, residual contamination, and spent fuel. We are now in the process of validating those techniques. You have two part, basically: an analytical part and a constitutive relationship. Constitutive relationships are being expanded using the material properties of the fuel that can be convected out of the transport. And then you have got the analytical component which describes the physical behavior and how it, the fuel, responds to those kinds of events.

We are basically at the beginning of Phase II. We

have the detailed code developed. We are now in the validation phase.

(New viewgraph)

All the work to date has been reported in very extensive volumes. We have an "Estimate of CRUD Contribution", which was the first feasibility analysis. In this kind of approach we have documented, validated and so on, what has evolved. That was published in January of this year. I think you guys should have a copy of that.

We have two more: "The Spent Fuel Contribution", which is a multi-volume set, as well as "A Methodology for Estimating the Residual Contamination Contribution to the Source-Term in a Spent Fuel Transport Cask," which has completed the review phase and are now in publication phase and should be available shortly. We are basically cutting a lot of the material out of those and coming up with an executive summary report. Hopefully in a few pages you could march through the basic process. That should be done by the end of the calendar year.

(New viewgraph)

Basically there were several conclusions that could be made from this preliminary model development. What we did was exercise these models using data that was available in the open literature at this point in time

regarding -- thermal burst experiments, for example, gave us an indication of how much activity is released if a fuel rod actually bursts. We have some structural data, and we have lots of fuel characteristic data that we can bring in to some preliminary analysis.

Also we did an extensive analysis of how much CRUD -- I mean, CRUD is a problem -- or is a potential source of reducing significantly in the future. A lot of utilities have gone to certain practices with respect to chemistry, and so on, that limit the amount of CRUD built up on spent fuel. CRUD builds up on spent fuel and affects end-reactor operations. Anything that affects end-reactor operations is a high priority item from the utility perspective because they want to be able to extend the life of that fuel.

At any rate, the CRUD contribution for normal conditions is the dominant component of the source term. Spent fuel is really quite tough. It does not break in normal conditions of transport and dynamic thermal load encounters. However, CRUD spallation does occur, particularly off the BWR fuel rods. CRUD then become available as a particulate matter that could hypothetically find its way to a release point.

Residual contamination contribution is developed as several magnitudes lower than what one would expect from

a worst case CRUD component. That was based on data from numerous shipping containments where actual measurements of the activity, again, picked up by GM detectors along the plane of the cask that viewed the --

In terms of the fuel rod, fuel is quite tough. We calculate failure frequencies that are less than one rod per rail cask accident event. For example, cases were evaluated and that has led us to the conclusion that the typical assumption of massive fuel rod failure, under the regulatory conditions, are unrealistically very conservative. That doesn't mean we will change that, per se, down to one rod particularly, but certainly 100 percent of the rods soon to be built on transport activities will be very specific.

Fuel fines, rather than gaseous or volatile species, dominate the potentially releasable source term. They dominate the activity that could be available and the potential health aspects of that. At any rate, though, experiments will be required to obtain this data, verify these methods, preliminary conclusions and end results.

(New viewgraph)

That pretty much gives you a capsulation of one barrier of spent fuel releases, that characteristics of the fuel itself, and the sources that are available on that fuel.

Next I would like to talk about the actual cask components that governs, and is typically believed to be not maybe the weak link in the containment system, if you will, and that is the seals.

(New viewgraph)

This viewgraph shows a few photographs I put together of the seal technology program. On the upper left is basically a seals laboratory we have in operation. Major components are extensive computational capability, measurement capabilities using helium mass spectrometers, and a computation routine that takes that data and allows us to do long time types of analysis.

The center picture shows a typical model of a face-type seal. That is one you would find in most closure designs. Seal behavior as a whole is not a scaleable quantity, as you talk about. However, the material properties are how a seal responds to environmental conditions in terms of thermal and pressure-type conditions and are more typically driven by material properties, and that is what we are after here.

On the right you see an environmental chamber. In these environmental chambers we are able to take these seals which are set up in these configurations. The little area between the two seals is evacuated to a level of ten to the

minus seven -- or the leak rate of ten to the minus eleven CCs per second. Then they are placed in these environmental chambers and you go through either heating or cooling and evaluate any change that you see in that seal behavior during that period of time. Then they are taken apart, seal material properties are evaluated, and so on.

(New viewgraph)

The primary objectives are to characterize currently in-use seal materials, examine new materials and types of seals, investigate alternate tracer gases and leak detection methods. One of the problems of measuring very small leak rates is typically it requires a helium mass spec type of measurement. A lot of your elastomeric seals absorb heat. You end up with convection plus an infusion as a potential leak drive. That infusion process causes permeation of these seals which gives you an erroneous indication that a leak is there, when it is actually the fusion process is going on.

We also want to provide guidance to cask contractors on the best choices for some of their seal material by issuing regular milestone reports, and we hold regular workshops, participant regular workshops.

(New viewgraph)

Regulation specifies the environments that seals

have to survive in. One of those is radiation, normally incident radiation in transport, which is significantly lower than other applications, such as long-term storage where the radiation incident level on a seal material in a sealed area could be significantly different.

We also have the vibration associated with normal transport, shock associated with the accident occurrence, internal and external pressures.

Under temperatures: minimums down to -40 degrees Fahrenheit and maximums up to whatever the hypothetical accident is; that is, a 1475 degree fire yields in a particular gas design. Those temperatures can range from 3 to 600 degrees Fahrenheit. Also maximum normal operation.

(New viewgraph)

Gasket materials used are typically either elastomer and metallic, depending upon the particular application. Metallics are generally used more in a storage type application, where elastomers are used more in transport type applications. Elastomers used include butyl, ethylene propylene -- which was talked about earlier -- fluorosilicone, silicone, fluorocarbons, and so on. The metals include inconel, stainless steel and coppers.

DR. VERINK: Why don't they make use of soft aluminum?

MR. SANDERS: Possibly because of questionable thermal performance. I don't know for certain that is the reason we don't use it, but that is certainly one I would consider.

(New viewgraph)

Typically seals on the interface between the cask body and closure lid -- an O-ring groove is the type typically used in the closure design. This figure just shows two different ways of creating that group. It is much easier to machine than a rectangular shape, so that is what is used. But there are some dovetail configurations out there.

(New viewgraph)

The ability of a seal to perform its intended function really depends on the surface of the sealing, or its primarily driven by the surface of the sealing. That surface is affected by roughness, which occurs as a result of machining; roughness spacing; the cycle in roughness, which is called waviness on the surface; and the lay, which is a direction of dominant pattern. If your machining something in a circular fashion, you will have a seal that is parallel to that machining stroke, if you will, and it will be parallel to roughness elements.

(New viewgraph)

Radiation and elevated temperatures produced by the spent fuel cask contents can result in compression set and elastomer degradation. Compression set is a measure of the ability of the elastomer to recover. If you take a spent fuel cask and then took the lid off and measured the seal, does it have the same circular pattern it had before, or has it been scratched down, or so on. That also affects how the seal will respond as exposure movements occur in transport conditions. These are some of the characteristics of measurement in this program.

(New viewgraph)

An experimental approach has been basically based on all those kinds of measurements, both environmental -- we are mainly concentrating on the temperature extremes going from -40 to the temperatures in the range of the hypothetical accident conditions, looking at permeation rates, leak tightness capabilities. We are also experimenting with different tracer gases and leak detectors.

We get to ten to the minus six, ten to the minus seven CCs per second leak rate measurement range using nitrogen or argon or other traces of gases and alleviate some of these problems that we have. We are also performing materials/chemical evaluations on all these materials.

(New viewgraph)

This is just a plot of preliminary results of one particular seal material. It shows as the temperature came down, we achieved a several order magnitude -- two orders of magnitude -- increase in the loss of vacuum, basically. Two thing to point out: Number one, we started at a ten to the minus six level and went down to almost -90 degrees Fahrenheit before this particular material lost a little bit of its capability. Even in losing that, it still was maintaining a ten to the minus 4 CCs per second leak rate.

(New viewgraph)

This is just a small plot that shows the problem we had with helium permeation. It gives erroneous leak indications. This is a long-term experiment where we left helium between two seals and plotted the time and the asymptotic behavior as it defuses through the seal material. That is really all I wanted to show you on this plot. That is one of the primary motivations behind looking at alternate leak issues with seals from tracer gases.

(New viewgraph)

Some of those tracer gases we are looking at include neon, krypton, argon. Halogens are a possibility, such as fluorine and chlorine. Alternate methods include mass spec detectors tuned to other gases besides helium.

One very promising approach is called residual gas analyzing, which actually can be used, or has been used, to look at oxygen diffusion through seal materials. Halogen leak detectors and pressure rise tests using very sensitive pressure gauges are another approach.

(New viewgraph)

To summarize, tying it together a little bit, the seal technology program is currently working toward mechanical or cask design objective, where source term is more a generic kind of activity that is working toward better understanding of behavior, radionuclides and transport and how they are released, and so on. In the seal technology program we have done substantial experiments on the permeation rate, leak tightness, to characterize currently-used seal materials. It appears that some of the better choices in the future may be some sort of a composite, for example, that would incorporate a metallic as well as an elastomer approach.

We have also examined some new seal materials and seal types, and we are investigating alternate tracer gases. The residual gas analyzer approach seems to be the best, at least for a laboratory environment. That is another point that needs to be made here: this is a very elaborate laboratory environment and one would hardly want to do these

kinds of tests in an operating mode prior to shipment kinds of activities.

Any questions?

DR. PRICE: Let me ask you a couple.

MR. SANDERS: No problem.

DR. PRICE: The thermal burst analysis that you referred to, that was an analytic effort, non-experimental data?

MR. SANDERS: No. That was experimental.

DR. PRICE: Experimental?

MR. SANDERS: It is an effort that Sandia and Battelle performed about six years ago.

DR. PRICE: Could you roughly described that?

MR. SANDERS: Basically we took radiated fuel rod sections and heated them up in an enclosed oven, if you will, until burst point. I think the burst temperature was quite high, very high. There is a report of that. I can get you a report.

DR. PRICE: As you described your seal technology effort at Sandia, you covered the environment, describing the heat and cool, and I think you had an "et cetera" in one of your slides. How completely do you feel your tests at this time are tapping those things which may be environmentally important, including the accident scenario?

MR. SANDERS: Well, the first thing we want to do is characterize those things which are stable; in other words, temperature is a simple kind of thing to look at first. And if you had issues associated with temperature, then you would want to get those weeded out first.

Right now we are doing that in an environment chamber. One of the "et ceteras" is the radiation environment. We are not looking at that because the calculations are such that the integrated dose of these elastomeric materials we see during transport operation is too low to cause any significant effect. The storage application, that issue would have to be looked at in more depth.

In the actual accident environment, then, we are talking about a little bit different kind of experiment because what is going to happen relative to the seal capability to withstand those environments is not scaled; it is not something that is material specific. It is very design specific, if you will. And at the present time itself, from a generic viewpoint related to the source term program, what we look at is the possibility of particular release, plugging and those kinds of things. We don't intend to do anything in the actual --

DR. PRICE: Well, the closest that it seems to me

that you came to anything with regard to vibration and impact capabilities of material was a set measurement, which, because of the confound recovery from set, doesn't really tap into the effects of a seal given an impact or given a vibration environment. It would seem to me -- also, am I not correct that some of the drop tests have resulted in seal popping?

MR. SANDERS: What they call puff release? There have been estimates of puff release occurring, but nobody, to my knowledge, has ever actually been able to measure closure movement during that particular event. Bob Luna has a longer history than I do in that area and may be able to add something to that later.

What you have to do is measure puff release, measure actual closure response to the end or the side drop impact, if the response is perpendicular to the bolts or, as a result of the contents, pushing up.

DR. PRICE: But don't you feel that the seal material characteristics with regard to vibration and impact, particularly in terms of recovery, is as relevant as temperature and pressure and so forth?

DR. SANDERS: Certainly.

DR. PRICE: But you are not doing anything in that area; is that correct? Anything in the area of vibration

and impact characteristics of the materials.

DR. SANDERS: At the present time, we have those included in our plans in the source term. Again, the primary motivation is to look at radionuclide transport to an event, but we are not looking at it through a material perspective. In other words, we are not trying to identify seal width.

DR. PRICE: That would be more --

DR. SANDERS: It would be more elastic.

DR. PRICE: Because in the comparisons of materials -- and I have read some of your articles in the ranking of materials and have been given some designs -- it would seem to me that it is a major component that is not present in looking at seal materials. If you say, for example, it is a composite with metal, maybe if you cranked in that additional factor, you may get a different view.

DR. SANDERS: Right. But, again, when you are looking at that kind of behavior there -- the bigger picture is you are trying to maintain containment of particular material. Our goal is to look at puff release in the laboratory, ultimately, of powder type material, and there we will start cranking some of those things in. Our goal for this materials evaluation program is really to look first at those factors which may have a major impact on the

seal capabilities, and that is primarily temperature.

These seals have to be able to withstand a range from -40 to 400-500 degrees Fahrenheit. That is asking quite a bit. It is something that is relatively new in terms of regulatory involvement. Those are the easier questions to answer. We will get to some of the more difficult ones later.

DR. PRICE: And these aren't necessarily mutually exclusive?

DR. SANDERS: No.

DR. PRICE: That is, vibrations or impact and temperature?

DR. SANDERS: Definitely the closure is a part of the system. When you look at the containment system, you have to look at all those things and how they all respond together.

DR. VERINK: Seals are never reused, are they?

DR. SANDERS: The current practice is to reuse seals.

DR. VERINK: What about the deflections that may have been --

MR. SANDERS: Well, a seal can be reused as long as it meets the regulatory requirements of prior-to-shipment leak test, which is demonstrating ten to the minus 3 CCs per

second leak rate. There is no requirement to replace the seal after one use. In fact, some people may replace them once a year during manual maintenance check.

MR. KOUTS: They are inspected as part of the loading procedure, and then the final test in the operator's mind is putting the pressure test on it. If the seal holds the pressure test, then the assumption is that the seal is intact. After visual inspection also, that is confirmatory. But seals are reused. There are maintenance programs where they are replaced, but typically they are not replaced for each shipment.

DR. PRICE: In your look at set, did you do anything with regard to recovery?

DR. SANDERS: We are looking at set shrinkage and the interdiameter -- by recovery you mean elasticity?

DR. PRICE: Yes, how long it takes for it to lose its set.

DR. SANDERS: No, only as that is indicated by reduction. And then it would be very difficult, you know. These are environmental chambers at this point in time. It would be very difficult to somehow correlate that loss to an actual slow decrease in set.

DR. PRICE: Thank you very much.

MR. KOUTS: Thank you. My staff has told me in

the past that I have a tendency to look at viewgraphs and speak to them. My feeling is if I stand up at that podium and try to look at the viewgraphs, my cervical structure won't survive the attempt. So if it is acceptable with the Panel that I sit here and go through it to keep my neck intact, I would appreciate it.

DR. PRICE: We wouldn't want to put your neck in a sling at all.

MR. KOUTS: Thank you. I feel somewhat of a -- and I hate to use the word inadequate, but I am going to be talking about two subjects that I am not fully trained in. However, I will be providing some insight. I have lots of backup around me who I hope will not be shy in participating if there are some questions.

The request that we had from the Panel was to provide an update on where we are in our human factors activities and also our systems safety activities. In the next half hour I will attempt to do that.

(New viewgraph)

We all read with interest the first report to Congress of the Nuclear Waste Technical Review Board that was issued in March of 1990. There were a variety of recommendations that were contained in that report. The two that we will be addressing this morning is that the NWTRB

identified the need for the human factors engineering program to be established within DOE and recommended such in that first report.

Back last October when we met with the Panel, we indicated that we were going to be taking two actions, and those two actions were essentially that we were going to be adding specific human factors engineering capabilities, specific specialists to our fully funded designs efforts, the General Atomics and B&W designs; we also indicated at the time that we would be developing a human factors implementation plan for the transportation program. What I would like to do now is update you on where we are in those two activities.

(New viewgraph)

In relation to the cask development effort, we essentially asked the specialists that we added to the design teams to review the designs with an eye toward the following subjects. The first is certainly minimization of time that workers would have to spend around the cask. This translates into the turnaround time to the cask inspection time that would be necessary, also in service and maintenance times. Those, in turn, address worker radiation exposure. We are also very interested in any way to eliminate human errors in relation to the handling of the

casks, and also human errors in relation to handling the equipment that would be necessary to service the cask.

(New viewgraph)

I would like to now address some changes that were identified specific to each of the designs for both the GA and the B&W cask. Basically we directed our Idaho office to go to cask contractors and ask them specifically what have these specialists done over the past year in terms of what they provided to the effort -- and, Dr. Price, I will look for your input on this. Basically what we tried to do was enhance the definitions of how robotic, remote, and hands-on activities would be applied to the cask and hopefully segment out very specific procedures as to how each of those basic handling techniques would be applied.

We also, as the slide indicates, added match marks basically to the impact limiter so the operator of the cask could simplistically and with visual feedback indicate whether or not the impact limiter was being put on in the right configuration.

We also added markings to the cask to indicate its correct orientation to the trailer.

(New viewgraph)

We also added a variety of detailed labelings to clarify the gas sampling port/leakage check ports so there

wouldn't be any confusion on that.

I think one of the most significant aspects of what came out of this and what I was very pleased to see is that we had a recommendation to add a positive indication to show whether or not the lifting yoke is fully seated in trunnions. I don't know if you remember previous presentations on the GA cask, but we basically have an ice tong approach in terms of a lift. What we are showing now is that we will have a positive indication, remote positive indication, to the operator to let him know that indeed that yoke is seated properly in the trunnions for lifting and for orientation.

We have also moved the bottom drain to the side to eliminate the need for the operator to reach under the cask, making that operation a little bit easier.

(New viewgraph)

Moving on to the B&W rail cask, I am glad to see that we have moved it off the trail. We have done a lot of work in relation to the filling of drain lines and also the location -- as you see in the next -- of the bottom drain. Again, these were to make an easier operable cask and to, in turn, reduce radiation exposure.

Another issue related to the B&W cask had to do with how we are going to align the basket in the cask

cavity. We had two alignment dials that we were using for that, and instead we decided, based on recommendations from the human factors specialist, to go with keys and keyways. This essentially avoided a blind fit-up in relation to the alignment of the basket, which we felt was certainly more acceptable.

We have also redesigned the basket retaining ring. Basically the retaining ring keeps the basket in place prior to the time you put your closure on. That also is going to reduce radiation exposure, hopefully, to the workers around the cask.

(New viewgraph)

I have talked a little bit about the last one. Perhaps you might want to provide us some insight on this. We had, up until this point, assumed that we were going to go with left-handed threads. But basically on the advice of our specialist, we have gone back to right-handed threads to avoid the possibility of a mistake. So we do now have conventional right-handed threads so there is no question that he knows how to operate the tool. Also, you would have had to have had a special tool in order to turn the left-handed threads. We have also eliminated that.

So what I wanted to do was provide you some feedback, again, as to what these specialists have been

doing for the last year.

(New viewgraph)

In addition to that effort, we have had developed a human factors implementation plan. I have to be very frank with you about this. As Jim indicated with the turnover of our contractor structure to TRW Environmental Systems -- basically turnover occurs at the end of fiscal year, which is basically next week. What we are going to do is take this implementation plan, which I will be getting into in a minute, and turning that over to our TRW contingent, with their capabilities, to give us some insight as to how they view how this plan fits into the overall transportation program.

TRW does have human factors expertise in-house. We will be looking for their input to enhance and modify, where appropriate, where we are headed with this program. I think we can generally agree that the purpose of the plan was to establish that human factors engineering would be considered as an integral part of the transportation system, and in it, development and operation. It hopefully provides a structured approach to the use of the human factor engineering concepts, and it is tailored so that hopefully it will meet our performance objectives.

It covers all aspects of the life cycle. Cradle

to grave is a term that we have become very familiar with.

Also, although we are employing it from a top-down approach, we are building into it that there will be a bottoms-up approach in terms of the identification of the need for identifying specific issues that may arise in the human factors area.

(New viewgraph)

We will be using computer models as necessary, or physical mock-ups, to examine the role of humans within the systems design. The plan also identifies each of the activities that will be accomplished, or each of the activities that the human factors specialists will be involved in, in each phase of the systems development.

I think an item that I remember from our Albuquerque meeting earlier this year -- I know you have a concern, Dr. Price, about proper data management requirements. We are providing in our plan also for that.

(New viewgraph)

Where we are headed in the future, I think, is the next question, and certainly in the cask development effort we have underway and any new ones that we may have, we will -- let me talk, first of all, about the ones that we have under development.

We were planning on having the human factors engineering capability to be applied throughout the cask design, licensing, and prototype acceptance process. I think it is very important to have those specialists available when we are going through give-and-take with the NRC. We are trying to design changes that might be made due to the certification process, and we certainly need human factors input on that. When we build our prototypes, we will also make sure that those specialists are available and will be involved with the acceptance process for those prototypes.

(New viewgraph)

In terms of the implementation plan, our near term activities are, as Jim mentioned earlier, to design the transportation system. There is a large effort within the program, not only within the transportation but other areas, as you will hear tomorrow, in terms of identifying functions and allocating those functions. We will make sure that human factors engineering are certainly addressed in those activities, also our operations test planning. As I mentioned earlier, we will be continuing to have human factors input into our ongoing and new cask designs. Also we will be getting an operations assessment and human factors input into any new internodal considerations that we

might want to pursue in the future.

That is a tour de force, if you will, of our activities in the last year. Again, the next step, I think, is to maintain the specialists with our design efforts through the prototype acceptance, and then basically get the input from TRW on the other areas of the program that we are going to have.

DR. PRICE: These recommendations, design recommendations that you ran through a list of -- quite a number of -- it is good to see this practical application of it. Was this a result of a formal task analysis? Or was it a result of a survey by people looking at the designs, potential designs? Or did they do a formal task analysis and include as part of that a document which would identify these things and then the end result was some design changes?

MR. KOUTS: My assumption would be that they did a formal task analysis, but I can check on that for you and verify that. The direction that we gave the Idaho office was to add these individuals to the design teams, with the expectation that they would be intimately involved and work with the design process. How the contractors chose to implement that and how the individual on the team decided to exercise his responsibilities, I can't really address, but I

can find that out for you.

DR. CHU: Chris, related to that question, to what extent does QA play a role? QA also has the objective of reducing the opportunities for error and accidents and so on.

MR. KOUTS: That's correct. Prior to the time that our cask contractors initiated the work, they had NRC approve QA plans. And any activities that are undertaken on that design fall under that improved QA process. My perspective, more of QA in this regard, is that QA provides the initial oversight in terms of the computational considerations for the analysis. Also it provides a series of checks all the way along the line that any design change is appropriate. It provides the backup and formal documentation for that.

I think QA provides additional oversight, kind of as an overview. This individual, or the individuals that were identified and put on the design teams, focused on their areas. And, of course, any work that they did had to be under the approved QA plan.

DR. PRICE: The instance you referred to on right-handed versus left-handed threads calls up the issue of criteria. The criteria, I take it, that was used basically relied upon the expertise of the human factors

people involved, but you have not yet developed a criteria document for design related to human factors?

MR. SANDERS: That's correct, we haven't. That is one activity that we are addressing in the implementation plan. Had we, I think, had a meeting with the panel, or the report had come out not in March of 1990 but March of 1987, I think we would have had that plan in place prior to the time the design effort was initiated. But what we are trying to do is to make sure that we are covering ourselves with these designs, getting as much input as we can, and then the implementation plan is to provide a structure so those types of considerations are built into the structure in the future.

DR. PRICE: You are going on to talk about systems safety?

MR. KOUTS: If you would like me to, I would be happy to.

I would like to welcome to the table, if we could pull his chair up, the consultant that we utilized. This is Ludwig Benner, who has a long list of credentials in the systems safety area. What I am going to be doing is basically updating the Panel on the activities that we undertook in the systems safety area, and if you would like to ask Mr. Benner some questions about his activities and

what he found in relation to the transportation program and, indeed, systems safety issues programwide, I think he would be pleased to respond.

(New viewgraph)

Again, back in the March 1990 report from the Board we had a recommendation that a systems safety program be established within DOE. Again, in the October meeting last year we indicated that we were going to be obtaining the services of a professional systems safety engineer to review the transportation program and to give us basically some insight as to where we might head in this area.

Mr. Benner was tasked with designing a transportation systems safety program and an implementation plan for the transportation program. I should mention that we have had several briefings with Mr. Benner. We are all becoming more educated, if you will, in the discipline of systems safety engineering. We are finding it a very interesting area, and we are certainly learning a lot.

I also should mention at this point that the contractual relationship we have with Mr. Benner was initiated through our headquarters and the support contractor, Weston, and basically Mr. Benner is a subcontractor to Weston in this area.

(New viewgraph)

Mr. Benner provided after his review -- and again, his original task was to write a safety plan for the transportation program. But I think, as he certainly preached to us, that we can't do this in a vacuum. Instead of giving us a transportation plan in itself, in a vacuum, what he gave us was essentially three documents. The first was a document that identified and established a systems safety and management engineering task for the overall OCRWM program. Then from that, with that program in place, the transportation system safety plan was actually a patron or customer of the overall program.

He did provide us a document which provided us guidance on how to identify hazards and associated risks during the development, operation, and disposal of the transportation system. He also provided us a supplemental technical guidance document that gave us some guidance on how we might implement this in the overall program management in the transportation area.

(New viewgraph)

The major conclusions of Mr. Benner's report were that systems safety, as I mentioned earlier, certainly is broader than the system transportation program. I think this was recognized in the initial recommendation that the Board gave, and it essentially applies to all program

elements.

He also believes that it is important to establish a systems safety component office within the overall program. And it will be absolutely necessary to have our contractors, especially our M&O contractor, now that we are transitioning into him, to be heavily involved in the systems safety process.

(New viewgraph)

The proposed actions in Mr. Benner's report were to establish a systems safety organization within the program and to implement systems safety concepts and practices within the transportation program.

I would like to now give you the status of where we are in that regard. Mr. Benner provided a draft report to us, actually to Weston, in June, and then a revised report in, I believe, mid-July. The Department hasn't yet formally received a report from Weston. Weston is essentially reviewing the report and giving us some insight on how we might tailor this entire concept into the hierarchy of systems documents that are now under development with the program.

Certainly we need to sit down with Dwight Shelor and work with him very closely on this to make sure that the overall structure is in place and we can begin by

implementing where we want to head in the transportation program. Dwight has certainly been aware of this effort. I think he looks forward to the receipt of that report and factoring that into his overall work in the systems area.

What I would like to do now is basically we have Mr. Benner here. If you would like to ask him any questions or me any questions in relationship to the contents of the report, he can speak far more authoritatively about it than I. But we would be happy to entertain the questions.

DR. PRICE: First of all, you mentioned draft systems safety documents. I wonder if it would be possible for us to have copies of those draft documents?

MR. KOUTS: The draft reports?

DR. PRICE: Yes. It would be good for us to look over. We would be able to get a firmer handle on what has come forward.

This is kind of a funny question because we have treated the human factors and then the systems safety. If you talk to a systems safety person, sometimes human factors is a subset of safety; and if you talk to a human factors person, safety is a subset of human factors.

MR. KOUTS: I asked that very question.

DR. PRICE: Did you?

MR. KOUTS: The systems safety specialists felt

human factors was a subset.

DR. PRICE: Predictably.

I was going to ask if your concept was also, then, that human factor is generalizable to the entire program as well, not just limited to transportation?

MR. KOUTS: I certainly think it can be. We have two other facilities and we hope to build MRS repositories. Certainly in the operation of those facilities, I would think that human factors would have to be very carefully addressed and integrated into it. I am sure the other managers of those areas would attest to that. Since we have had the honor to present to this Panel on numerous occasions, and since the focus has been mainly in the transportation area, I think we are a little more ahead of the rest of the program.

DR. PRICE: I might ask, Mr. Benner, one of the primary problems I think faced is to be able to encompass the potential accident potentials before they occur, to cover the waterfront as much as is foreseeable, what can be foreseen. Sometimes techniques are applied, such as defense analysis or something. In the documents that you have provided, do you agree how to go about identifying to the extent that it is a reasonably foreseeable accident potential?

MR. BENNER: Yes, that was a major task consideration in the design of both the program and the program plan. As a matter of fact, in the draft report that you will be seeing there is a system definition task that addresses that point specifically.

DR. PRICE: Do you get into both inductive and deductive approaches, and do you expect those to be laid out?

I think one of the overall concerns is that there come in both these areas an adequate background of documentation, documents similar to those Mil Standard 882, or similar to Mil Standard 1372. Not to put these up as the ideals to be followed, but rather that there is a documentation process that needs to be into a system to really get both human factors and systems safety involved.

Do you foresee that you're working toward establishing a thorough documentation? By that I mean a thorough set of documents.

MR. BENNER: Clearly yes. Those kinds of documents are written into the specific details in all three documents that Chris described to you: the management, the engineering, the planning documents. There is also a provision, for example, for tracking hazards that are identified, to make sure they are resolved. And over the

life of the system, the life cycle is an added ingredient to what is presently being done.

DR. PRICE: What I hear is tantalizing, and so I have to wait until we see something specifically to look through, because it sounds like the directions we have really been interested in seeing accomplished here.

Our next speaker is Susan Smith on institutional activities.

I take it, Susan, you do not have the same anatomical problems that Mr. Kouts indicated?

MS. SMITH: No. I am far more flexible than Chris is.

DR. PRICE: You are not nearly as stiff necked.

MR. KOUTS: I will be happy to leave the room.

MS. SMITH: First, I would like to introduce myself. I am a recent employee of the Department of Energy. I have been a consultant for several years. I am glad to be here today. One of the key things that Dr. Bartlett has said is that the institutional component of these programs should be more integrated with the technical components. So to be able to give you a summary of the institutional program at the Technical Review Board, I think is qualifying in that area.

I would like to go over just briefly some of the

components of the institutional program today. We don't have enough time to go through everything that we are working on.

(New viewgraph)

First of all, as you know, planning for the development of the transportation system requires OCRWM's interaction with many different and diverse organizations. The purpose of the institutional program is to have mechanisms for which we can communicate and share ideas.

One of the main goals of the institutional program is to hear from external parties, including technical review boards, peer review boards, things like that. We want to hear their concerns with both the institutional and technical components of the transportation system, and we would like them to provide a mechanism for our staff to hear what the concerns are, and then also to provide mechanisms for us to share our information and where the program is in laymen's terms to the public.

(New viewgraph)

I particularly like this viewgraph because it shows who I talk to every day.

DR. CHU: So that is what the universe is all about.

MS. SMITH: Yes.

This just gives you a brief idea of who our groups are. I would just like to go over, real quickly, starting with the review bodies. We have the peer review groups, which are more involved with the technical end of the program. Then the Nuclear Waste Technical Review Board. We also have other DOE transportation offices in which we have to coordinate our transportation policies with their transportation policies so that we are uniform in our decisions. We have the other federal agencies. We have the utilities that we need to hear their input on how we are developing our system. And we have the transportation industry; at the transportation coordination group meetings they are usually there to hear where we are going with the program, to keep abreast if there is an interest in either being a carrier or developing materials that we could use. Then the transportation program, of course, has to integrate with the rest of the OCRWM program.

The last area is the national and regional governmental groups, which we talk about a lot and is only one component of it. However, we do have cooperative agreements with these groups.

(New viewgraph)

When the institutional program was developed in '86 it was concluded that the United States is a big country

and we have limited resources and that the best way to be able to tell about our program and to hear the concerns of the United States about our program was to work through regional and national groups until we have a site to go to and then be able to develop quarter jurisdictions. So we have developed these cooperative agreements with national and tribal groups, state tribal groups. The names are the National Conference of State Legislatures, the National Congress of American Indians. The regional groups are the Western Interstate Energy Board, Southern States' Energy Board, and Midwestern Office of the Council of State Governments.

(New viewgraph)

This next viewgraph just shows a little bit of an idea of who the regional groups cover. The blue area is the only area that we currently do not have a relationship with in a regional capacity; we do have it from a national perspective. We are budgeted to have a northeast group come on Board in FY '92. The reason that Idaho and Oregon are blue is that the Western Interstate Energy Board currently does not include those two states, but we have a lot of interactions with the Western Governors' Association and activities with the National Conference of State Legislatures.

(New viewgraph)

We also have cooperative agreements with two state technical groups -- which I will discuss in more detail later -- at working with developing uniform safety inspection procedures with us. The two group are Commercial Vehicle Safety Alliance, which are the state inspectors within the country; and the Conference of Radiation Control Program Directors, which are the health physicists and safety officers within the state.

(New viewgraph)

Some of the mechanisms through which we coordinate are through national, regional, formal, and informal meetings. I believe Dr. Price has been to the transportation coordination group meeting and some other meetings that we have had. The agreement process, which I have already discussed briefly, in the scope of works of these agreements their activities include developing research documents and specific topical papers for the regional groups that are regional specific and for the national groups that are national specific, and tribal for the tribal groups.

As you all know, the external parties comment on our materials. This is a very public program. One of the processes in the institutional program is receiving the

comments and then providing our responses to those comments, both on policy, technical, and institutional documents.

Through our contractor support we also do legal, regulatory, and news analysis as another cost effective way to get a sweeping idea of what is happening in the United States through trends within the industry and affecting our program.

Our public information program is, as I said, pretty self-explanatory. We provide exhibits to the national program, and we develop videos, fact sheets and basic layman information to the public so that they can understand our program.

(New viewgraph)

As I briefly mentioned, in 1985 we had the first transportation coordination group meeting, which was a meeting set up that interested parties could come and hear about our program. During that time there was a list by these external parties of the main issues that they saw the transportation program needed to look at. These issues are operational, in the cask area, and also just pure institutional.

Of these issues, some of the external parties wanted us either to clarify OCRWM's policy on these issues or to actually initiate activities that would help resolve

those things within the industry as perceived concerns. I won't go down the list. I think everybody is pretty familiar with them.

Today I would like to talk about a few of them. The last one states the implementation of Section 180(C) regulations. Previously the list had emergency response and inspection enforcement, and the implementation of 180(C) pretty much wraps those up.

(New viewgraph)

As I said I, would like to cover just three of the main areas today, in the interest of time: the Section 180(C) planning, the development of uniform state inspection procedures, and some recent developments with prenotification and physical protection requirements.

Dr. Price, you had asked about our emergency response. There are numerous documents and a lot of planning that is going on, both at DOT, FEMA, and us on the issue of nuclear emergency response. I could spend a lengthy time on what the responsibility of the Department is, both from multi-agency relationship and specific to OCRWM. There are several documents that I believe we sent the Board in '88 on the Federal Emergency Response Plans, the FERP document, several documents that DOE has produced on just generic emergency response procedures. A lot of

times the issue of emergency response and 180(C) become very synonymous. I love doing diagrams.

(New viewgraph)

Basically, 180(C) states that the Department of Energy should provide technical assistance and funds to states, to local governments, and Indian tribes. The training should cover procedures both for emergency response and safe routine transport. Emergency response is only half of the requirement of Section 180(C). Then if you split out emergency response, there is the issue of emergency response, DOE's role as far as an actual incident, which I am not going to cover today and which I said we could explain in detail later, and then the role of what we are to do to meet our requirement under 180(C), which is merely to provide funds and technical assistance for the training of state officials, Indian tribes, and local governments.

(New viewgraph)

I would like to quickly go over what we have proposed in our strategy that we discussed at the December TCG meeting. We issued a preliminary draft stating a schedule and a five-step process. The schedule basically says that we are going to issue the draft strategy, which we are in the process of doing now. Strategy merely outlines in longhand this road map as far as how to get to the

process of implementation.

The next step along the way will be developing an options paper, which is to basically look at the various funding mechanisms within the United States to get the funding and technical assistance to the states, Indian tribes, and local governments. When we issue the options paper, it will show various options. The public parties, external parties, will be able to comment. We have been receiving input on what they feel are various appropriate mechanisms for funding and technical assistance.

Finally, we will then develop a policy statement which will narrow down which option the Department has decided to use. One we have developed the policy statement, we will develop an implementation plan which will spell out the nuts and bolts of actually how we will get the assistance to the states.

Then the training: We have stated in our mission plan in 1988 that we will begin to provide assistance three to five years before we ship. Presuming that we are shipping in 1998 to the MRS, the assistance is expected to begin in '95 as far as actual funds and support.

Comments from the groups have always said that we need to ensure that there is monitoring of how we initiate this program because it may not be right when we first start

it. So we will look at it again and see if we can fine-tune it before the shipments begin in '98. And because of the rapid turnover rate, we will need to provide the states and the local governments and Indian tribes the mechanism for retraining before the 1998 date.

(New viewgraph)

I would like to quickly go over status of where we are. As I said, we held a December meeting that issued the preliminary draft of the strategy. We are hopeful to issue the draft strategy shortly. The only difference between the preliminary draft and the draft, as far as the review process, is the preliminary draft will receive comments from the TCG, groups, and interested parties that have been following our program closely. The draft strategy will be issued in the Federal Register and we will provide the formal mechanism of a response document on the comments we receive through the register.

There are several key comments that were given to us during the TCG meeting and various places along the way. One of them has been that we need to integrate the DOE programs for emergency response funding to the states. Currently the WIPP program -- as you heard in Albuquerque -- provides assistance for the corridor states for the WIPP shipments. The EM group also provides a generic training

for state officials and firefighters and people throughout the country, through a contract support structure. And then we will be implementing our 180(C) program. One of their concerns is that we need to pull those programs together and figure out a way that the people receiving the training don't need to go to three separate training programs.

We have also been integrating with the Federal Radiological Preparedness Coordinating Committee, the FRPCC, who are a body of federal agencies, and their specific expertise is in the training for radiological emergencies. My role currently in sitting in the group is to receive information on what exists now within the structure, federal structure, and to keep them abreast on how we are planning our 180(C) program.

With the implementation or the passing of the Hazardous Materials Uniform Safety Act, with the specific language in there that is very close to the Section 180(C) requirements, we have needed to integrate closely with how they are going to implement their program. I will go into that in a minute. Then we have started to draft the options paper.

(New viewgraph)

I am going to skip over what is probably in your book, some of the comments that we received on preliminary

draft. They are in there for your information. Basically they are comments that we received from state, local, and tribal representatives who have an interest in emergency preparedness and wanted us to be sure to incorporate their comments in our next draft.

To integrate with the other DOE programs, EM has taken a lead on this activity. They have developed the transportation emergency preparedness program. As I said, this program is to try to integrate all the emergency response activities for transportation and shipment within our agency. Their activities include both preparing for an incident and for emergency preparedness for all of the shipments going along the United States today that are a DOE shipment. They also are trying to integrate the state, local, and tribal support meetings, which is where the Section 180(C) would fall. We have representatives that serve on these groups and the idea of doing this is to minimize duplication within the agency.

(New viewgraph)

As I said, TRW is also working DOT in the implementation of Section 117 of the Hazardous Materials Uniform Safety Act of 1990. Dick Hannon is in the audience today, if you want to know latest and greatest on what is happening. On the other areas of the act, he can probably

help you a lot more than I could. As I said, I am just focusing on Section 17.

The law for DOT requires that DOT will provide states $5 million for each year '93 to '98, for emergency response planning. They will also provide states and Indian tribes $7.8 million per year for emergency response training. They also are to provide technical assistance for carrying out emergency response training and planning.

As you can see, there is a slight difference in some of the language. The planning, the first bullet, DOT is to only provide to the states the $5 million for the planning. In the language for the training, it is to go to the states and Indian tribes. Section 180(C) closely resembles the second bullet, and 180(C) is also to provide technical assistance, so we are also coordinating our technical assistance plan with DOT.

(New viewgraph)

The status right now with the implementation of Section 17 is that they are drafting a notice of proposed rulemaking that they will be issuing on how they plan to implement their program. They developed an interagency group to try to have the input of all the five federal agencies that are vested in how DOT implements this program. We have been meeting on a practically weekly basis to try

to provide our input on how they best could handle or develop their program.

What we plan to do for an implementation of Section 180(C) is to see how DOE implements their program, and that will affect one of the options, or a couple of the options that we are looking at in how to develop Section 180(C) in our program.

Now I would like to move onto the issue of developing uniform state inspections procedures. We have an agreement with the Commercial Vehicle Safety Alliance, which may have been discussed at previous meetings. In 1985, as I said, state inspections and enforcements of the NWPA shipments has been identified as an institutional issue. The group recommended that we should evaluate current state inspection standards and sponsor the development of a uniform procedure.

(New viewgraph)

So we entered into an agreement with CVSA to develop that uniform vehicle inspections. The idea of developing the uniform inspection procedures would be that the state officials that were developing these procedures would then ultimately adopt them within their state, so that we are working with a uniform system within the whole United States as we cross across the state borders.

The criteria that will be developed in the inspections is that they will be inspecting the driver, the shipping papers, the vehicle, and the package. As I said, the goal is to eliminate the need for multiple inspections. One of the assets of the CVSA inspection program that is currently in existence is there is a reciprocity capability within their decal system. And if these procedures are adopted, then we could use a reciprocity system.

As Jim mentioned, these inspection procedures are going to first be tested on a WIPP shipment and potentially the cesium shipments that are underway, and that one day may be out of the way. The purpose of testing these procedures is merely to -- the procedures are a detailed interpretation of the regulations. And it helps the state inspector inspect the shipment. The test is being developed, and as this viewgraph shows, there are seven states, WIPP states, that have signed agreements that they will inspect shipments coming down from INEL to Carlsbad using these draft procedures.

We are going to train the state inspectors along this corridor so that they are familiar with the procedures and can inspect the shipments along these lines. The procedures, as I mentioned, slightly enhance the DOT regulations, mostly in terms of being more specific and

detailed.

(New viewgraph)

The next viewgraph is just a picture, and I won't go into it, of basically what the proposed course agenda would look like for their training. Seven states and the DOE traffic managers will be trained before the WIPP shipments are inspected along with these procedures, and this is just what the course agenda is proposed to look like.

(New viewgraph)

The last viewgraph I have is just to discuss briefly an issue regarding prenotification and physical security. DOE as a department is considering amending its prenotification policy to include a notification to Indian tribes, instead of merely to state governors' offices, state designees. If it is not an NRC shipment that is under the NRC physical protection requirements, that is not a problem. However, due to the NWPA requirements that the OCRWM shipments will follow NRC physical protection requirements, we are in a little bit of a quandary as to how we will work out being both in compliance with DOE policy and with NRC requirements.

To notify a tribe, we will be in a breach of NRC physical protection requirements. A lot of discussion --

and Lydia Ellis is going to discuss the TRANSCOM program later today. There has been a lot of interesting satellite tracking, and that also is in conflict with physical protection requirements currently in place with the NRC.

We are right now working with offices within DOE and talking to the right parties to figure out a way that we can be both in compliance with the DOE, if this policy goes through, and NRC requirements.

Basically I have covered only three of the thirteen issues, and I have done them pretty quickly. However, if there are any questions on any of the other issues that we have, or on these, please feel free to ask.

(No response)

DR. PRICE: All right. Thank you.

I think what we will do at this time, because of the shortness of time and we are running just a little bit late, is give an opportunity from the floor to anybody who might want to ask questions of either you or any of the other speakers this morning. We will open it up that way for people to participate from the floor.

So if you would please, if you had something that you would like to address either to this speaker or to any other speaker, we would like to make that available at this time. We would like you to state your name and anything

else you care to say.

MR. HALSTEAD: Good morning, or almost good afternoon, Dr. Price and Dr. Verink and Dr. Chu and other members here. I do have a question for Susan.

I want to start with a couple of other general observations and give you an overview of how the state of Nevada sees some of the issues that have been raised here.

I will identify myself for the record. My name is Bob Halstead. I am transportation advisor for the Nevada Agency for Nuclear Projects.

I would like to start, Dr. Price, rather than getting into the questions, with an observation and invitation. One of the things that has not been discussed in any great detail this morning, and as I understand the agenda will not be discussed in the rest of the meeting, is the specific issue of transportation access to Yucca Mountain. We believe in Nevada that this is a critical issue, along with another issue that has received scant attention so far and is, again, not listed on the agenda, and that is risk assessment methodologies and data requirements.

We would like to invite the Panel to hold a meeting in Nevada sometime in the January to February time frame. I say that because our current group of reports in

those areas are scheduled to be completed in November, which I think means that by January we will have those reports ready to send to you. And at that time, at the invitation of Bob Loux, the executive director of my agency, we would attempt, in cooperation with the Department of Energy's Yucca Mountain project office, to put a three-day field trip together for you, which we think would be useful in addressing some of the transportation access issues.

Coincidentally, January and February is not only the time frame that we think we can have our reports done, but that would be the time frame when we would expect the worst weather conditions on some of the highway routes that are involved. And we think that is an appropriate time to look at some of those highway structures. But also, it is a very good time to look at some of the stretches of desert terrain that are involved with some of the rail corridors. So I throw that out for your consideration.

I have a list of about eleven areas that I was looking for, based both on the comments that the Technical Review Board has made in its past meetings and reports, and the reviews that we have done at the state level. I would like to very briefly run over some of those issues and the way they have been addressed.

The first several points involve the cask

development program. Point number one: The state of Nevada has still not received a formal response to our detailed written comments on the preliminary design reports, which address many technical design issues and many human factors issues as well. I realize that we were late in getting our comments in on those reports, but it still has been over six months since we put the comments in. Many of the detailed issues I would like to raise with you in response to our discussion this morning, I can't yet because I haven't seen how the Department is going to respond to those. Those include questions, for example, about the fabrication of the depleted uranium gamma shield or the GA truck cask, or questions about the fabrication and performance of the cement neutron shield on the BRW-100 cask. So we are waiting for those comments.

Point number two: We had hoped that we would see some indication of a retreat from the overly optimistic payload objectives that are being sought from the reactor cask program. From what I heard today, I don't see that there has been any change there. There is still an attempt to maximize payload in the cask without full consideration of some of the other objectives which are being triggered off; areas, for example, like a reduction in surface dose rates, and indeed, other issues which have to do with

reducing some of the complexities of licensing over what the NRC will or will not accept in the way of administrative controls that may be necessary because of the extended burn-up issue.

Point three: We continue to be concerned about the early development of a new rail cask, particularly which might be used for 1998 shipments. Again, this is addressed in some detail in the written comments we submitted to DOE and which we also submitted to you. I would like to have asked Ron some questions about how his RFP, as I understand it, for the new Initiative I cask program would address this, but presumably we will see an RFP shortly.

I think the bottom line right now is that the highest efficiency cask we have in this country is IF-300 cask which is capable of handling seven PWR elements per shipment. And so far we are not sure when Ron says that he is going to use existing technology to build up a fleet of casks that would be available before the new cask, whether, for example, we are talking about purchasing more IF-300s or whether we are going to try to modify this existing design. So I think we need more information there on this new element of the cask procurement system.

The forth issue: Full-scale testing of cask prototypes prior to their certification and possible

additional full-scale testing to show compliance once commercial production begins are issues that we have laid out in the past. I was a little disappointed that even in response to Dr. Price's question, there was certainly not any new information shared with us today.

Fifth: I had hoped today that we would hear a strong commitment on the part of the Department to early development of deployment of dual purpose casks. Possibly an RFP would be in the works, possibly in relation to the Rancho SECO SMUD proposal. I didn't hear much discussion of the dual casks this morning.

Six: We had hoped to hear a clear statement of the Department's plans regarding risk assessment generally, and including but not limited to the long-awaited peer review and validation of RADTRAN. I didn't hear any discussion of risk assessment this morning. Perhaps there will be some this afternoon.

Seventh and eighth: I have the systemwide safety study and human factors listed as separate issues, without any priority attached to either of them. I am happy that there were some points today where I felt the Department is beginning to show some progress, although I think it is too early to judge where we are going. I think in particular we will be very interested in following the system study that

Mr. Benner is associated with. And we will be very interested in seeing how our own recommendations for addressing human factors and cask design are treated once we get some written responses.

I have no problem with the specific instances that Chris mentioned about human factors, but again, the key point here is that the human factors analysis has come into this discussion very late rather than, as we believe, coming in at the very beginning of the development of the entire system. So it is clear that we are not only talking about human factors that can be incorporated into the design, as they would say, and affect operations, but that we look at some of the issues that Dr. Chu addressed; that is, the need for human factors and QA issues to be addressed in the entire process, from the design through the fabrication through operation and maintenance of the system.

Point nine: I am hoping we are going to hear about the successful completion of the facility interface capability assessment of a near site transportation infrastructure studies, which I think are generally agreed to be two of the better transportation system data base efforts that the Department is involved in. Presumably those will be discussed this afternoon.

Point ten: I had hoped to hear a little more in

Susan's presentation about the early designation of the likely transportation routes to Yucca Mountain and/or an MRS site, which, of course, we await the efforts of the negotiator on, and the process that the Department will use for implementing Section 180(C) financial assistance.

I did see something that I thought was hopeful in Susan's presentation, which was a 1995 program date for implementation of 180(C). That certainly would be appropriate if we are talking about shipments to an MRS in 1998. Still, however, we have not had clarification on how the Department is going to deal with the identification of states along the transportation corridors to Yucca Mountain, nor have we heard much in detail about the manner in which technical and financial assistance will be provided.

I am somewhat disturbed about a new emphasis in Susan's presentation on following any precedents that are established by the Department of Transportation's implementation of the HMT USA. We see a need, certainly, to coordinate all of the training and planning programs, but we believe that congressional intent in a Nuclear Waste Policy Amendment Act, in Section 180(C), was clear to provide special technical and financial assistance for the shipments that will be made under the Civilian Nuclear Waste Program. And that should not necessarily be dictated by the

way the Department of Transportation implements HMT USA. Indeed, the problems in handling nonradiological hazardous materials are so great that I think that a good argument can be made for keeping those efforts separate.

And finally, the eleventh point regards the general issue of route specific access to Yucca Mountain. It has not been mentioned this morning that the Department has released a massive report on the Caliente rail option to Yucca Mountain. In July, as I have discussed this at the Panel's meeting in Denver, the state of Nevada is still in the process of digesting this large report. And as of last week, we have surveyed about 85 percent of the route on the ground, and we are in the process of developing some preliminary comments.

I think some discussion on the part of the Department's representatives this afternoon or tomorrow would be appropriate to see how they see this report fitting into their larger transportation program. Remember, the concerns we raised earlier was on this particular report. We felt it was a very good, high quality preliminary report on what appears to us to be a singularly bad choice of routes. And it is very important for us to understand how and when the Department is going to proceed to look at alternative rail routes. The Jean and Carlin options had

been identified, of course, in previous reports, but also whether the Department plans to consider other options such as an all-truck/no-rail option, whether they have considered a internodal heavy haul option. And, indeed, the way in which the activities which are being conducted out of headquarters and through the TRW management team are going to be coordinated with those site specific studies, which used to be conducted through the Yucca Mountain project office but which are, I now understand, somewhat up in the air pending the way that TRW comes in.

I appreciate your indulging me this time to comment both on some of the earlier issues and to perhaps identify some of the issues which I hope will get further resolution on this afternoon.

Thank you very much.

DR. PRICE: Thank you very much, Mr. Halstead. We will take under consideration your kind invitation for January and February.

In regard to some of the comments and questions made, I would like to ask Ron, is it really anticipated that you are going to be purchasing additional IF-300 casks? Is that generally the course of events that you think is going to take place?

MR. MILNER: Again, without getting into too much

detail prior to the RFP, the intent would be that we would either purchase some, whether IF-300 or other existing casks, and, in addition, enhance the existing casks. If a vendor were to offer an existing cask that he made modifications to, or possibly a whole new cask technology -- it is not a plan solely to procure existing casks that are on the market now, but that is one possibility out of three. We would more likely go with a combination.

DR. PRICE: Thank you.

I would like to ask Susan if she has, in interaction with the negotiator's office, any issues with regard to routing or anything like that? Is that going on in an active sort of way? Or anyone else who cares to respond.

MR. KOUTS: If I could respond for Susan, we have historically taken the position that we would identify routes three to five years prior to shipment and identify series of routes over which the initial shipments would occur. The Department has taken that position for several years. Since we don't have an MRS site and we have a site that we are presently characterizing for a repository, we don't feel at this time that we can identify any routes.

However, I think if a new MRS site is identified, certainly in the near term we would be focusing on a series

of routes for emergency response training and funding over those routes.

DR. PRICE: The nature of my question was to really determine if there is an actual dynamic relationship going on with the negotiator. Or has it reached that kind of stage yet?

MR. MILNER: I don't believe it has really reached that kind of stage yet.

DR. PRICE: Anyone else from the audience like to ask a question of any of the speakers?

(No response)

DR. PRICE: If not, it is 12:30. We are a half hour behind. My watch is probably a little faster than your's because it actually says 12:27. Let's take a lunch break and be back here at 1:30.

(Whereupon, at 12:30 p.m. the conference was adjourned for lunch, to reconvene at 1:30.)

AFTERNOON SESSION

(1:30 p.m.)

DR. PRICE: Take your seats, please.

This afternoon we begin with some operational

planning activities. I did have a question that I was asked to ask Mr. Kouts regarding that CVSA study, whether or not the CVSA study is for highway vehicles only, or is there any part of it that includes the rails?

MR. KOUTS: Susan, you can correct me if I'm wrong. Right now we are focusing on trucking. There are certain inspection procedures affecting the rail that certain states use. But I don't believe that we are addressing that at this time with the CVSA work. That would be something to be addressed in a separate effort.

DR. PRICE: Just continue, if you would.

MR. KOUTS: Okay. Thank you.

My presentation to kick off the afternoon session will be fairly brief. What I do want to do is give the Panel an overview of our activities and the operational planning area that we have under way, and then more or less introduce the logic of the presentations we will be having through the rest of the afternoon.

(New viewgraph)

One of our major efforts in the past has been to evaluate the implication of the standard contract in relation to the implementation of the transportation program. Wherever we have identified issues, we utilized the ACR resolution process, and you will be hearing more

about that a little bit later this afternoon from the first speaker. Our goal here is to make sure that we are integrating the waste acceptance process in our transportation planning efforts.

You have heard a little bit about the work we have been doing in our infrastructure area. We will be hearing a lot more about that this afternoon.

(New viewgraph)

We also have begun taking the information from the infrastructure studies and putting it to work, if you will, in building up specific plans for various sites that we expect to see early on in the system. We have begun our long-term logistical planning, which you will be hearing a little bit about later. We are also essentially in the process, as we said earlier, of identifying all the components and functions of the system as part of our systems work. And we are in the process also of establishing requirements for a cask maintenance facility once our system is operational.

(New viewgraph)

One other activity we have underway is to assess the various management options that we might have for operating the system, identify them. We will also try to do a pros and cons analysis of that. That work is underway

right now.

(New viewgraph)

Just to give you an idea of the logic of this afternoon's presentation, I think it is extremely important for the Panel to understand the contractual waste acceptance process that the Department is bound by in our standard contracts with utilities. The branch chief within the Transportation and Logistics Division, Alan Brownstein, will be discussing that in some detail. I think it should provide you some insight as to what the Department can do and can't do in a lot of areas, specifically modal mix, which has become a subject of discussion in the past.

In addition, we will be giving you a very updated picture of the infrastructure study, the facility increase capability assessment, the near site transportation infrastructure study, and also we have done some work putting that data together to give you some insight as to how the facilities look across the board.

I mentioned earlier that we are beginning to take the infrastructure information and putting it to good use. I should mention the infrastructure presentation will be given by Mike Conroy. He is a member of my staff and branch, transportation branch. As far as service planning documents, I mentioned a few minutes ago that we are taking

information out of the infrastructure studies and putting it into specific documents to address each of the reactor sites, especially those that we will see early on the in the waste acceptance process.

(New viewgraph)

This all culminates in logistical plan rationale, and Mike Conroy will be going over that for you. The Board also expressed, or the Panel, expressed interest in hearing an update on shipment tracking. As you are aware and as we briefed the Panel in the past, we haven't selected the technology; however, we felt that an updated view of TRANSCOM and its evolution, if you will, some of the operational considerations of it, would be useful.

I know, Dr. Price, that you and Dr. Chu were over in Europe and saw the Sellafield facility. In seeing their cask maintenance facility we also want to give you some perspective as to the work we have done in preparation for development of a cask maintenance facility for our system when it is operational. That is the logic of the presentations. If you don't have any questions, we can start off.

I would like to introduce Alan Brownstein, who, as I mentioned, is chief of our Logistics and Utility Interface Branch. He will be giving you a presentation on the

standard contract and the waste acceptance process as the Department and the utilities are implementing it.

MR. BROWNSTEIN: Thank you for inviting me to speak this morning. I appreciate your interest in this.

(New viewgraph)

As a way of background: Before we can transport and store and dispose of waste, the first thing that we need to do is accept the waste. We are really the first out of the box in waste management systems. We are establishing through the contractor, which I will discuss today, the protocols and how the Department is going to interface with the waste owners.

The waste acceptance process was in broad terms identified in the Nuclear Waste Policy Act, which required essentially separate bounds. DOE is responsible for accepting title of the fuel transport and disposing of it; and the utilities are responsible for storage prior to the Department accepting entitlement of the fuel, including the selection of their on-site storage technologies if necessary. The NWPA spelled this out and required that the Department enter into a contractual relationship with the owners and generators of spent nuclear fuel.

(New viewgraph)

That was done within six months after the act was

passed. The Department developed the Standard Disposal Contract. It was proposed in February of 1983, and all owners and generators were required to sign that contract by June 30th of '83. That contract established essentially all the legal requirements and operational responsibilities for the interface between us and the owners. In broad terms, the contract covers major administrative matters; the fees in terms of payment; and the waste acceptance criteria, processes, and procedures, which we are going to focus on today.

(New viewgraph)

Again, just to give you an idea of who we have a relationship with, we have signed 80 contracts with 66 different owners. One of the things I would like to point out is that not all of the waste owners are utilities. The bulk are, but there are ten non-utilities that have signed contracts. These 80 contracts cover 151 facilities; 122 are commercial now and others are either planned nuclear facilities or other storage sites.

It is also important, I think, to point out that the group that we are dealing with, the utilities, is not a monolithic group. Each is a separate, individual, corporate entity with its own separate management, its own individual regulatory climate, its own financial conditions, its own

operating environment, and its own storage considerations. And we do have the individual contracts.

When we talk about waste owner, we talk about utilities. It is not one owner, it is not one group; it really is 66.

(New viewgraph)

What I would like to try to do is run through some of the major components of the waste acceptance process that are detailed in the contract. The first thing that the contract requires, and the utilities -- I will refer to utilities and waste owners interchangeably at this point. The first thing they are required to do, starting in '83, was to provide us data. I discussed with the Panel back in August the RWA 59 form, which is utilities' data submittals under the contract to us. This is where they tell us everything about their fuel characteristics, reactor characteristics, site characteristics, and so forth. That has been ongoing since '83. The form has gone through a number of revisions. We expect to be putting out a new version of the form shortly, which will allow us to get even more specific data on more items than in the past. In particular, we are going to be collecting more information about utilities' canister fuel in the report.

So the waste owner had provided and continues to provide information on the fuel. One of the things that

the contract recognized early on was that whenever waste acceptance began, the Department would not be able to on a single day accept everybody's fuel all at once. So the contractor established a method for determining what order the Department would allocate the acceptance capacity.

The contract, using the data submitted in the RWA 59 data, established a priority base on oldest fuel first, which is determined on an industrywide basis. Essentially what that does is that establishes the waste owner's place in the queue. I need to point out that the place in the queue, based on this interpretation in the contract, does not necessarily mean that that is the fuel it will get for delivery. That is only the placement in the queue. In other words, what I am saying is that the specific assembly generating the right in the queue is not being submitted as they have to deliver. Now, we communicate that information to the waste owners, to the Acceptance Priority Ranking.

(New viewgraph)

What I have done here is just taken a piece out of one page of the Acceptance Priority Ranking just to give you an idea of how we communicate this information. We list the contract calls, waste owners, purchasers; we list who the purchaser is, what plant the fuel came from. And in some cases, where the fuel is now is not the plant that generated

it, so we ask the storage location, the type of fuel, the discharge date, and we have here listed a month and year. The fact is that if we establish this ranking, we go down to the day. We indicate the number of assemblies, MTU and value. On the right we have a cumulative total of the discharged fuel. So that is really the first key milestone, if you will, in the waste acceptance process, is you establish the acceptance priority.

(New viewgraph)

The queue doesn't take on meaning until we place on that a waste acceptance rate. We take the information that is based in the APR, we apply to that a system acceptance rate, which we are required to do through something called the Annual Capacity Report. We project the expected acceptance capacity for ten years.

(New viewgraph)

When we put that information together, what I have put up here is -- there is a full page in the handout; I have just taken a little picture here. This is a summary of how we combine the waste acceptance rate with the acceptance priority rate for a given acceptance rate. In this case we have taken a look at 300, 400, 500 and 50 MTU rate of acceptance. You can see here that, based on that acceptance rate, using the oldest fuel first concept that is listed in

the priority ranking, you can get a quick picture of who has the allocation rights for what year and how much. That really is the guts of the waste acceptance process.

(New viewgraph)

We have done both of these now. We are now at the beginning stages of the next major phase in the waste acceptance process. Starting in January of '92, a few months away, for the first time the waste owners will submit to us something called delivery commitment schedules. This will be the waste owners' first opportunity to really inform DOE what their intent is for distributing their allocation that we have set out.

They will have an opportunity to indicate, for example, the range of spent nuclear fuel that they intend to deliver to us; they will tell us the specific site from which they will deliver that fuel -- certainly that becomes important when we are dealing with the utility with multiple sites -- and they will provide us information that will contribute to our understanding about the size of casks that we will need to develop to satisfy that particular need. Again, that starts in January.

Now, there are two things that the waste owners can do with a delivery commitment schedule. The first thing is that they have a contractual right to exchange; after we

have approved the delivery schedule, they can exchange that with other waste owners. That exchange process is subject to our approval, but it is a right of the contractholders.

The second thing, if they choose not to, is that the DCSs will form the basis of the final delivery schedules, which have to be submitted 12 months before the expected delivery date. As we go down on this list, the FDS gives them an opportunity to provide a little bit more specific information as we get into the interface, the logistical planning of when they need to be on their site.

(New viewgraph)

The way the contract stands now, the waste owner then tells us 60 days prior to acceptance the specific fuel they intend to deliver. That is a little misconceiving in the sense that because of the data they have submitted all the way through, at the beginning of the program we know an awful lot about each assembler through the 859. And as they provide information to us on the DCS and FDS, we have a pretty good idea of what fuel we are talking about.

Once we go through that, then DOE is required to provide the cask, equipment, training and procedures. The waste owner loads the cask, and it is only at that time, once the cask is loaded at the gate, that we take title to the fuel; then it becomes ours. Up until this time, it is

theirs, and again, as Chris just indicated, we are really guests of theirs up to this time on the site. This whole process, the contractual process that I am talking about, and what you are going to hear from Ron Pope, will indicate how within the gate as guests we intend to coordinate our specific activities.

(New viewgraph)

I put this up just to give you an idea of how the contract lays out all the operational responsibilities. This is for cask purposes. We are required under the contract to provide a cask suitable for use, all the equipment, procedures, documentation, and training to the waste owner. The waste owner is responsible for preparation, packaging, inspections, and loading activities, although we have an opportunity under the contract to observe that, something we will do. They have to describe the fuel, and they are responsible for the maintenance of the casks, which we will give them in advance.

(New viewgraph)

That is a quick summary. I will be happy to answer questions on the waste acceptance process, but I think what I would like to do now is turn to build on something that I said earlier. We developed this contract in a very, very short period of time in a very early stage

of the program. We recognized a number of years ago that the contract provided insufficient detail to implement all of the steps from both sides that we needed to. And it is understandable because it was developed early on in a short period of time for a very long-life program.

The way I view it is that as the system matures, certainly as the system matures the contract needs to mature to catch up. The interface between the waste owners and us is trying to complete that interface, if you will, as more and more details of the program develop. So we developed an issue resolution process so that we can find a torum, a way to talk through some of the concerns, some of the issues in the contract. We have been doing this since 1987.

I think it is important to point out that the real challenge in this process -- because we have rights and responsibilities as well as the waste owners, we are trying to always get a balance between producing the most efficient, safe, and effective system that we can while maintaining the waste owners' flexibility and equity considerations. That is always an underlying balance between all these issues, and that becomes very important as utilities touch their fuel prior to us accepting entitlement of that fuel.

(New viewgraph)

We think this is, and it is proven that this is a good way to do things. We needed to find a way other than the courts to sit down and talk about our concerns and their concerns. Since '87 it has been a good forum on which the utilities and the other waste owners can try to educate us on some of their concerns, their side of the story, and that we can do the same with them. It has been amazing that there are a number of concerns that we take for granted now in our program that the utilities, having a totally different mindset, just may not have been aware of. The process has worked pretty well.

(New viewgraph)

To give you an idea of some of the issues that we have been covering, the contract provides the utilities to sort of go around the priority ranking that I talked about for shutdown reactors and for emergencies. What the contract says is that the Department may grant priority, other than the process that I have described to you, for shutdown reactors and emergencies. So one of the issues that we have been discussing is how will DOE implement its authority to grant priorities? That has been an act of discussion between us.

Also the contract gives the utilities the unilateral right to adjust their allocations plus or minus

20 percent and by plus or minus two months. This and the next issue, what we are looking at -- just to give you an idea of how some of these conversations have gone -- is that one of the considerations that is being evaluated is to look at possibly eliminating this unilateral right that utilities have and the DCS adjustment, and when we know what the final cask designs look like, we consider increasing the allocations and the final delivery schedule to get the full cask load, and then just decrement their allocations in the next line. Again, for efficiency reasons, we have taken a look at that.

We want to add some more specificity in the contract in terms of what we mean by failed fuel. Again, giving you a perspective on that, there are about 55,000 spent nuclear fuel centers out there today. According to the data that we have got from you from the utilities, there are about 3,500 that are failed assemblies. But when you really look at what the meaning of failed is, the overwhelming majority of those are operational failures, or pinhole failures, that don't affect handling and transportation. That is really what we are concerned about here, is the handling and transportation problem assemblies. From the 55,000, when you really get down to it, there are about 50 now. And because the utilities need to take

certain other steps if the fuel has failed in the contractual waste acceptance process, we think it would be better to get some more clarity and specificity in terms of what we really do mean there. So those are the types of issues that we have been discussing.

(New viewgraph)

Recently the waste owners have taken a number of positions. They have communicated to us formally their consensus positions on these. I would like to emphasize the word "consensus" here. I indicated before that the waste owners were not a monolithic group; they are not, and these are not unanimous positions. They are, in fact, consensus positions. We are looking at those, evaluating those, and we expect, after we go through our own evaluations within our division and move to the other parts of OCRWM, we hope to be in a position sometime early next year in some form to start providing our views on the issues.

(New viewgraph)

So in a way of summary, the utilities pay us to take the fuel. They are paying us to develop a waste management system to service their needs. The contract details the responsibilities, and because of that, it is not a question that DOE can go in and arbitrarily impose changes. Until we own the fuel, again, we are guests on

their side of the fence.

The process that I showed you really started in '83. It has been underway. The process is geared towards many years into the future, so it is a long-lived process and it is rather complex. Those areas where there are some disconnects and there are some uncertainties, the waste owners and the Department, I think, have been pretty successful in getting together and trying to work things out.

So that is sort of a brief overview of the contractual waste process. I would be happy to answer your questions.

DR. CHU: I have a question about January 31st, 1998. The law provides that the Department, in exchange for the fees, shall begin disposal by January 31st, 1998. How is that incorporated? How is that being handled in the contracts?

MR. BROWNSTEIN: The contract mimics rather closely the Section 302 language of the NWPA. I point out that under Section 302.5 you have taken 302.5(b) and indicated the January 31st date; 5(a) indicates that that waste acceptance is to be initiated upon facility operations.

DR. CHU: Right. The law says facility

operations.

MR. BROWNSTEIN: The law says repository operations. The contractor has put in documents and has broadened that facilities' operation to account for an MRS. So the Department has interpreted that waste acceptance needs to have the facility operating before it begins.

DR. CHU: The contract does not say the Department will accept by January 31, 1998 regardless of what happens?

MR. BROWNSTEIN: No. The language is joined. Under 302.5(a) and (b) the language is joined in the contract. I don't have the exact words, but it says something like, "upon commencement of facility operations, not later than January 31 1998." It is a joining phrase. I think we need to be careful about separating out those two phrases in isolation.

DR. CHU: I am not interested in separating. I just want to understand what it says. So it is coupled with the commencement of operations, not regardless?

MR. BROWNSTEIN: Right, in both places.

DR. PRICE: Oldest Fuel First establishes priority through the acceptance priority ranking. So you have a whole number of sites with different priorities and the plan is that DOE visits each one in order of priority, I understand it; is that correct?

MR. BROWNSTEIN: John, if we can flip back to the summary of that allocation slide.

The number of sites the Department will have to visit in a particular year is dependent upon the waste acceptance rates. For instance, if we had a waste acceptance rate of 300 -- understand this is just a synopsis -- in this case we would have to visit three sites. There is more than that in the full slide. Now, these waste owners each have an opportunity to exchange that with other owners, and that could increase the number of sites.

DR. PRICE: And if a site is visited in one year, then they are at the bottom of the queue; is that right, for the next cycle?

MR. BROWNSTEIN: No. The queuing is based on a strict Oldest Fuel First on an industrywide basis, so wherever their discharges are relative to their brothers, if you will. In some cases they will have allocations in each year. I think we have examples of that up here on the Commonwealth, primarily because Commonwealth owns a number of facilities -- a number of reactors, but all the fuel belongs to Commonwealth. So there they have an allocation in each year.

DR. PRICE: So this priority is established and then it is going to stand for a long time? That priority

really stands?

MR. SANDERS: Yes.

DR. PRICE: Is it a fact that they don't deliver their oldest fuel first? In actuality, it really has no real bearing on any changes in priorities or anything like that?

MR. BROWNSTEIN: That is exactly right. The queue that we have established in the ADR will be changed in the future only to add additional discharges, but it will remain stable up through -- what we put out this year will not change unless somebody else reinserts -- if we are going to permanently discharge. There are two like that. Again, what they deliver -- the process that I have described to you, it is sort of a negotiating process, if you will, until we get down to when their allocation comes up, placement in the queue comes up: What specific fuel do they want to give us and what will we take? That is a process of communication in the contract, details.

DR. CHU: But they can change their places in the queue?

MR. BROWNSTEIN: Subject to our approval, yes.

DR. CHU: Commonwealth could trade with Connecticut Yankee?

MR. BROWNSTEIN: Yes.

MR. KOUTS: What I would like to emphasize for the Panel, also, is something that Alan didn't emphasize, which is that essentially if the facility or the reactor operator selects the cask type and in reality he selects the shipping mode, we cannot unilaterally tell him -- or tell that site, if you will -- how it should load it. If they are rail capable and want to ship by truck, then that is their preference and we have to abide by that preference and provide them casks that they select.

What you are going to be hearing next is the assessment of the infrastructure we have done inside and outside the fence. The Department has control of transportation outside of the fence. We have options outside. But it is basically the call of the utility within the fences as to how they want their site to deal with the shipping operations. So please keep that in mind.

When basically discussions of modal mix comes up, there is the feeling the Department has the power, if you will, to select what modal mixes from the system should be. We do have the ability to affect how we can operate the system outside the fence, but not inside the fence. That is a very important point to consider when we begin these discussions about what the capabilities of these sites are.

DR. CHU: So if the study can show that Utility X

can handle a rail shipment both because of the existence of the spur and the crane and everything -- in fact, maybe even a rail shipment makes sense, but the Utility X may prefer, for reasons of its own, to chose truck, and the contract will, as I understand, prevent you from doing anything?

MR. KOUTS: Right. What we could do, if we chose to do so, would be to take that truck shipment and take it to the nearest rail head and put it on a rail car, if we chose that method of conveyance for movement.

DR. CHU: But the utilities' obligation only would be that it will put a truck cask on top of that truck body and give it to you; is that right?

MR. KOUTS: That is correct. I think that is an important point that I don't think has been emphasized in other discussions. I don't think that point is widely understood by people who believe that the Department has, again, greater control of the modal mix than we have.

I will emphasize on this that we plan to work with utilities, we plan to identify for them and with them, hopefully in a partnership role, how most efficiently to ship off of each site. Mike will talk about our initial infrastructure study. Ron Pope will be talking about taking that information and looking at the site as a package, if you will, inside and outside, so we understand how that site

could shift if it wanted to and what the capabilities of the site are. But, again, the ultimate choice inside the fence, the site, is with the utility, the utilities' choice.

I would like now to introduce Michael Conroy, also of the Transportation Branch of the headquarters.

MR. CONROY: Thank you, Chris. I am going to talk about impacts of the infrastructure studies that you have heard reference to earlier, and some preliminary results. Chris has already told you one of the bottom lines I wanted to get to. He has told you what I am going to tell you. In my next slide, I will tell you what I am going to tell you.

(New viewgraph)

I want to go over three main areas: the facility interface capability assessment, which is often referred to as FICA; the NSTI study, which stands for near site transportation infrastructure study; and also some preliminary results -- I would like to emphasize the word "preliminary" there -- for analysis of the FICA and NSTI data.

(New viewgraph)

First off, the FICA study, facility interface capability assessment.

(New viewgraph)

The FICA project had the objective to gather data

needed to assess the cask handling and shipping capability at the commercial facilities where DOE will be accepting spent nuclear fuel. Alan alluded to a 122 commercial facilities that are covered by contracts, and those are the facilities they were looking at. The goal of the project, then, is to enhance the compatibility of that interface with those facilities with the DOE waste management system.

(New viewgraph)

The approach taken in the FICA study was to first review the existing data bases of information to determine what data was available and what data needed to be collected. They then undertook to visit all 122 facilities at 76 different sites around the country at which DOE will be accepting spent fuel.

(New viewgraph)

For the purposes of the FICA study, four conceptual FICA casks were defined: legal-weight truck, an overweight truck, 100 ton rail/barge, and 125 ton rail/barge cask. Those casks I would have to characterize as being broadly representative of the other casks that were being considered at the time. For the legal-weight truck and 100 ton rail/barge cask, they took the bounding dimensions from the preliminary design reports that we had underway under Initiative I cask designs efforts. In the overweight truck

and 125 ton rail/barge, they used some parameters that had been available in early considerations of those. The parameters of interest were basically cask length, weight and diameter. Again, they show conservative composites of the casking considered and used maximum bounding dimensions from those preliminary parameters.

DR. PRICE: So the legal-weight truck was what, 2,800?

MR. CONROY: Thereabouts. I don't have exact numbers. It turns out that you end up then with the -- the legal-weight truck cask terms that were used were actually a little bit larger than we have in the current VA design, so it is conservative.

(New viewgraph)

Assessments were then done using those cask parameters and laying those cask parameters against the facility data that was collected and done for three different cases: (1) for the current capability or planning base, (2) another if administrative or licensing changes were to be implemented, such as a change in water depth requirements or new cask drop analysis, things of that nature, and (3) a third set of assessments if physical modifications or administrative changes were implemented for the plan, physical modifications including such things as

installation of an engineer plate to spread the cask weight over a larger floor area to meet the floor load limits, modifications to the anti-tipover devices. That does not consider things as major such as crane replacement or removal of building thresholds and structural supports. The feasibility of such modifications and changes were based on the judgment of the project staff and were not meant to reflect that they were approved by the utilities.

(New viewgraph)

The FICA summary report is being finalized and should be out shortly. What I have here is the bottom line numbers, if you will, from the summary report for the three cases that I just outlined, the planning base, if administrative changes were implemented, and if administrative and physical modifications were implemented.

This is based on the number of facilities. I will emphasize that so you don't get confused on numbers that I will show you later on, NSTI; that is based on number of sites. So this is numbers out of 122 commercial facilities. As you can see, the numbers go up as you consider the impact of changes being made, either administratively or to physical, and the numbers, as you would expect, rise for the legal-weight truck and go down as the casks gets larger.

DR. CHU: Excuse me, Mike. Does that imply that there are some facilities where you can't move anything out?

MR. CONROY: Looking at these numbers, if you were to look at the third column --

DR. CHU: A de facto repository, so to speak.

MR. CONROY: No. What it implies, if you look at the right-most column, out of 122 facilities there are 121. In the assessment, in the FICA report, there was one site that -- four of the FICA cask parameters you would have difficulties up to the level of modifications considered in this study, which I outlined earlier, which did not get into larger structural changes, but there would be one site where you would have some difficulty.

DR. CHU: So if you made no changes, then there would be 50 facilities where you would --

MR. CONROY: That is the number that you have in the planning base; that is correct. The reason for that is largely due to the need for making administrative changes. You see the number go up substantially in the middle column.

DR. CHU: But there is still 18.

MR. CONROY: There is still 18 in that case, and there is still one in the third case. Again, I want to emphasize that is based on the conservative analysis used in the FICA parameters, which are different from Initiative I

parameters, or different than what we may get out of the Phase I typecast that Mr. Milner talked about this morning. But you are correct in your addition there in terms of what that shows. As I mentioned, some of those administrative changes would be needed in some of those items.

(New viewgraph)

Moving on, that hopefully will be explained more fully when we get the FICA report out. The FICA data is to be used in the waste acceptance process that Alan has just outlined for you in terms of delivery commitment schedules, review and approval, review and approval of final delivery schedules, and exchange requests. We are using the FICA data and a large amount of data collecting on the facilities, which Chris characterized as "inside the fence" data, from the FICA study. We are using that in developing site specific service planning documents for each of the facilities. Ron Pope will be going into that in much more detail shortly, so I won't go into that.

Information is also being used in the cask design program in terms of developing interface requirements and in developing cask gamma procedures for military equipment needs. Cask modal mix is one area that people have been interested in, and I will get to that a little later, and also in terms of identifying any future cask needs.

(New viewgraph)

Done in parallel somewhat with the FICA study is the NSTI study, near site transportation infrastructure study. They were both done by the same contractor, NAC, and its final summary report is also in final preparation as we speak, and it should be available shortly.

The purpose of the NSTI study was basically to compliment the FICA study, which looks inside a fence, to look outside the fence and to evaluate potential railroad and barge access for the 75 reactor sites and one storage site, that being Morris, for all of the 122 facilities at those 76 sites. Again, as in the case of the FICA study, each of the sites was visited to do this evaluation. The purpose was to collect data that was pertinent to spent fuel transportation in terms of infrastructure limitations and any local travel restrictions. It tends to provide assessment of the current capabilities of each mode throughout, and potential for upgrade to the transportation infrastructure in this case. I would like to emphasize that the study itself does not emphasize which mode or route should be used, doesn't make judgments as to whether particular upgrades should be updated.

(New viewgraph)

Sources of information for the NSTI study: U.S.

Corps of Engineers, particularly with regard to the barge access; the RW-859 forms, the fuel data survey forms that Alan spoke of earlier; AASHTO, American Association of State Highway and Transportation Officials, data sources; detailed state and county maps. USGS 7 1/2 minute quadrangle maps were used. Information was obtained from the state and the county engineers on how things such as traffic densities, accident frequencies, any seasonal restrictions and any future plan changes they could identify through the routes. Discussions were held with utility traffic managers, and in many instances they have had a lot of shipment to and from their sites and were able to provide a lot of information; and as I said, actual site surveys were conducted.

(New viewgraph)

The routes for and particular facilities that were assessed in the NSTI study in terms of road, the primary route that would be suitable for legal-weight truck cask going from the gate of the facility to the nearest interstate interchanges were studied. The focus here was on minimum distance route. They also looked at an alternate route that might be suitable for a legal-weight truck cask transport from the gate to the nearest interstate. Neither one of these routes should be construed as being an official designated route by the Department, but they were those that

seemed logical to the project team in terms of collecting data.

They also looked at potential for heavy-haul transport from 125 to 225 ton gross vehicle weight and tried to identify routes from the gate to the nearest rail spur, nearest line-haul rail head -- that is in instances where there is not direct rail service -- and also looked at heavy-haul through the gate where there is potential barge access to points.

Rail was looked at in terms of direct rail access. And also, where it is not direct, where there are nearby spurs they also looked at those routes.

Then there is existing and potential for development of internodal transfer points. If we want to look at -- heavy-haul to rail and barge were looked at and identified in our data collection effort.

(New viewgraph)

The items that were imported on the data survey of the roads are shown here. Each of the road routes were driven by the project team and they recorded mileage, lane width, number of lanes, lanes separation, shoulder width, road conditions, surface composition, subsurface composition, noted bridges, narrow size and weight limits, posted weight limits on the roads, and vertical clearance

problems.

(New viewgraph)

On rail spurs -- the survey works from the site where they were transversed by public access roads and collected data on the ownership of the rail spur, its usage, and operational status, the general maintenance condition of it in terms of the condition of the ties and ballasts and the number of traps. Weight restrictions and clearance restrictions were also noted for the rail.

(New viewgraph)

As I mentioned, they also looked at internodal transfer points for road/rail, for clearance limitations, general site conditions, and existing crane capabilities and potentials for upgrades.

(New viewgraph)

Barge sites were also looked at, both on site and near to the sites. Clearance limitations, water depth, dimensions were recorded, dock conditions, operations, operational status of the installed equipment, and, again, potential for upgrades and whether they felt there was a potential for roll-on/roll-off access to barge.

(New viewgraph)

That describes to you some of the data that was collected. In terms of results, what I will present now is

preliminary findings from the summary report, which, as I mentioned, is still in draft form. Most of the individual site assessments have been completed. They have all been completed in initial draft form. Most of those have been integrated with the individual utilities for their comments, although there are a couple of those that are still outstanding. So there is some potential for some of these numbers to shift a little bit as those numbers are finalized.

These findings that I am going to present here are the infrastructure outside-the-fence findings. So we need to keep that in mind in terms of looking at the FICA numbers and NSTI numbers. With regard to the findings on legal-weight truck shipment, the finding is that there is a primary route A which could accommodate legal-weight shipments in all 76 of the sites with an average length of about 25 miles. The route Bs that they looked at for alternatives could accommodate legal-weight shipments at 70 of the sites. There are six for some, but one identified as the primary route. Three additional sites could be added to that list if upgrades were implemented. Then there were three that there did not seem to be a suitable route through at all, the route being in distance slightly longer, an average length of 30 miles.

(New viewgraph)

Overweight shipments: What they looked at here was the possibility of about 65 ton gross vehicle weight. The finding here is that route A -- which again was most times a minimum distance route to the nearest interstate -- could accommodate the overweight shipment at 69 of the 76 sites. Five additional sites could be added to that category if upgrades were implemented. Then there were two sites that were not considered feasible for an overweight truck.

Looking at route B as a back-up, or an alternative for route A, the numbers drop slightly to 62 sites with 8 additional. And as I mentioned earlier, there were three that had no feasible route B, and then three additional route Bs that had weight limits that would preclude overweight shipments.

(New viewgraph)

Turning to rail, the NSTI findings.

(New viewgraph)

Of the 76 sites surveyed, 53 were found to have on-site rail capability, 49 of those extending to the cask receiving area. The other 23 sites then either never had rail service or it was considered no longer viable within the limitations of the upgrades understood in this study.

The upgrades that they considered here had a limitation in terms of the physical cost, in terms of $200,000. So that is how they came up with the number of 53, and 23 that did not look feasible. Of the 53, 36 of those are currently usable, and 24 of those 36 extend to the cask receiving area. The remaining 17 of those 53 would require some upgrading before use, with an average cask to upgrade of $75,000. That would involve items such as clearing asphalt from the track or replacing sections of the track. Then 21 of the 23 sites that were judged to not have rail service were judged to have the capability for heavy-haul transport to an off-site rail facility nearby. The average route length to that transfer point is about 16 miles.

(New viewgraph)

Turning to the findings on barge, 17 of the 76 sites were found to have barge capability on site with operational facilities on navigable waterways. An additional 24 were judged to have the potential for being upgraded to being capable for barge access. At 35 sites, barge was not judged to be practicable within the limits of the NSTI study.

(New viewgraph)

Putting that altogether, you get a chart that looks something like this. And again, this is based on 76

sites, not on 122 facilities where you have multiple facilities on a site or on adjacent sites. The numbers are cut down for NCI purposes 122 to 76. As I mentioned, the major conclusion is that from a transportation infrastructure point of view, all the sites would be able to ship a legal-weight truck. Now, if you think back to the FICA, that tells you in terms of limiting factors within the gate rather than outside of the gate as being the control experience.

One conclusion that is difficult to draw from looking at this, but what is contained in the report, is that in all cases, the near site transportation infrastructure would be able to ship a rail/barge cask by at least one load; by that I mean either by rail or barge or by heavy-haul transport to an internodal transfer point. I see numbers here for route A and B and for the onsite and offsite rail/barge hauls.

Those are the basic summary finding of the NSTI report.

(New viewgraph)

What I would like to move on to now is the preliminary look at putting some of this data together and what that means in term of modal mix, because that is a question that people are always interested in in terms of

what a modal mix will do. I don't think I am going to answer that question today, but I will give you some perspective as to what we have learned through today.

It is difficult looking at the bar graph I just had out in terms of ferreting out which of the sites have multiple access. We know they all have road access. If they have rail, do they also have barge? Are they counting the barge number? Or is it solely barge? It is difficult to put all that together. So what we did was a preliminary assessment using the site specific data collected from the FICA and NSTI studies trying to come up with an assessment of what the shipping capabilities are for each of the sites.

(New viewgraph)

For this particular analysis we looked at the Initiative I shipping casks only, so there are some exceptions to the rules that could be handled with other existing casks or other casks. We considered all modes, and again, as Chris already mentioned, I would like to emphasize -- and I will hit this point a couple of times in the discussion here -- that the utilities will ultimately be selecting the shipping mode. They will be putting a proposed shipping mode and a delivery schedule, and the shipping mode will also appear on their final delivery schedules. So we hope to work with them through the process

that Alan has described in terms of coming to a common understanding of that, but ultimately the decision is in the hands, as Dr. Chu discussed earlier, of the utility.

(New viewgraph)

For this assessment we looked at, again, current capability and looked at current cask handling and shipping capability using the FICA and NSTI data for the Initiative I cask. Now, that is a slight difference then, FICA, which looked at the FICA cask parameter. We actually took another look at the data using Initiative I cask parameters here. There is also some consideration given to looking at limited technical specification changes, mostly related to water depth.

The other level of capability that we looked at was under small modifications with minor on-site modifications or reanalysis to the test specs, or minor operating licensing revision with a cost limit of $50,000. These cost numbers, as I should mention with the other numbers I indicated with FICA upgrades, do not include the cost of the utility reanalysis that might be needed to support tech spec changes or licensing changes. That would be a little difficult for us to assess the cost estimate, and that is one of the factors the utility had to take into account in terms of deciding whether to do some of these

upgrades.

(New viewgraph)

We also looked at larger than small modifications, but for the purposes of this presentation I will call them moderate modifications. I don't know if it is right to refer to something between 50K and 500K as moderate or large, but for the purposes of this discussion -- we have another category of "large" beyond this which I am not ignoring, and that is why this is called moderate.

Again, here we are looking at modifications basically where it would involve modifications to the operating license and broader technical specifications and modifications. But again, know for this level here that it was not assumed to get into a level of operation license changes that would require a public hearing process. So that was one of the dividing lines in terms of calling it moderate or beyond moderate.

(New viewgraph)

Again, we looked at all potential shipping modes. One of the things had hasn't been done too closely in the past is consideration of internodal transport. People have tended to ask us what our rail/truck split is. We took an attempt here to look at heavy-haul as well. In trying to sort through all of the data, it becomes difficult to come

up with a single number of modal mix because of the fact that, again, utilities will be responsible for choosing the shipping mode, but also because it is difficult to assess on a global basis what particular situation might be at a site as to whether it is on the verge of being a truck or rail site, as to where it might fall.

For this analysis, we assumed that rail would be the preferred mode of shipment in terms of coming up with some numbers, that going along with our philosophy that where we could go rail, we would like to go rail. Certainly certain utilities would have their own reasons and preferences for going truck instead of rail. If rail was not available, we then looked at heavy-haul to a nearby rail site, looking at the NSTI rail site data. That not being available, the next preference was heavy-haul to a barge site. If none of those modes seemed feasible for a rail cask, then to legal-weight truck. Both on-site and off-site heavy-haul capabilities were considered. The first number I will show you -- and then I have another set of numbers looking at this on-site. Again, I will emphasize that I am not trying to support shipping modes in any order. These numbers are to give you some idea of how the numbers play out.

(New viewgraph)

Using those definitions I just described on current and small modifications and moderate modifications and giving the preference, as I just described, to rail followed by heavy-haul rail and barge to legal-weight truck, these are the results of our preliminary assessment of the FICA, NSTI data. That will tell us that under current capabilities we have 29 sites directly served by rail, 34 sites where we could heavy-haul a rail cask to a nearby rail transfer point, 6 sites where we could heavy-haul from a reactor facility to a nearby barge site, for a total of 69 sites that could be potentially served by BR-100 rail casks.

Again, those numbers could change a little bit if I looked at adding IF-300, as has been discussed several times today, which would bring the number up a little bit if I was looking at that. But for this particular analysis, it is just the BR-100. That left us, then, with 37 sites where we would ship by legal-weight truck, and under that definition I gave of current capabilities, 15 would currently have no capabilities, for a total of 121. Now, if you recall, Alan showed it was 122 facilities. We did not include Fort St. Virain as a reactor. We are just looking at the Initiative I casks, so we subtracted that from the data base and looked at the other 121 facilities.

Again, as you saw the previous charts, if you

start looking at modifications, the capabilities go up. Direct rail goes from 29 to 53 up to 73. Heavy-haul rail goes from 34 to 40 to 23. Barge goes from 6 and goes up to 10. If we had looked at heavy-haul to barge as a preference over heavy-haul to rail, the barge numbers would be slightly higher. They are lower here because we assumed that if you could have the haul to rail, you would do that, in preference to heavy-haul to barge. Again, particular additions may dictate a specific site that we would use, but that is what these numbers are based on.

On a legal-weight truck, the numbers go down because what is happening as you look at the possibility for doing either your on-site or off-site modifications to either the facility or the transportation infrastructure, more become rail capable and so then there are less left in this screening that fall into the legal-weight truck line. The "no capability" drops then to one and then to zero.

DR. CHU: What is the meaning of the third column, again, "If Small Modifications Made"?

MR. CONROY: That would be doing everything that we have done to get to the second column, which was the small modifications, which would be on-site mods for reanalysis, minor operating license revisions, as well as the moderate modifications which were some additional

modifications or revision to operate the license.

DR. CHU: Moderate with respect to license? Not moderate with respect to the dollar used?

MR. CONROY: Also to the dollar. The "small" column had an assessed limit of 50,000 and 500,000 for the third column. Again, on top of that you would have to add the utility's costs for reanalysis, which might affect the feasibility of doing so.

So that gives you one potential set of numbers in terms of trying to look at what a modal mix might be in terms of -- you can see it is not a simple matter in terms of answering how many are rail served sites. It is highly dependent on what utilities and the Department come to conclusions on in terms of: Do we want to do heavy-haul on-site? Do we want to do heavy-haul off-site? Do we want to do some of these modifications or not?

So the number of rail served sites, I can give you a low number here of 29 to a high number of 106. The final answer would probably be between those two numbers, but I can't guarantee you it would fall below or above that range.

MR. KOUTS: What I think Mike also didn't touch on, but certainly when you begin talking about heavy-haul off-site, either to a rail or barge area, you are dealing with institutional considerations around the site. Those

could weigh also as to whether or not you would want to pursue a certain course. So between the 29 and 106, the institutional factors also take play besides just the technical ones.

MR. CONROY: And to look specifically at that issue, Chris -- look at the next slide.

(New viewgraph),

That indeed would be a factor. So we said: Well, what would happen if we said we didn't think that heavy-haul off-site might not be an attractive option? How do the numbers change if we just look at heavy-haul on-site? And the numbers for that change are shown on the next page.

You see then that the heavy-haul rail number current has dropped from 34 to 19, "if small modifications" is up from 40 to 17, and the moderate mods is dropping 23 to 5. Because when you subtract out the off-site rail, that then brings barge more into play. And looking at the on-site barge potential, those numbers go up from the previous one because we haven't filtered out those sites as being heavy-haul off-site rail. Some of those that would be heavy-haul off-site rail also have the capability for on-site heavy-haul to a barge.

The total then for the rail cask go down slightly in this analysis, and so correspondingly the truck numbers

go up. I notice 21 went up the column a little bit. But that is how the numbers come out in that assessment. Again, if you look at some of the other institutional factors and some of the particular needs of each of the utilities, those numbers would change.

(New viewgraph)

In summary, in terms of where we are now, both the FICA and NSTI summary reports are in final preparation and should be out this year. We need to do further analysis of the NSTI data and the FICA data. What I presented to you here today I would certainly characterize as a preliminary assessment of that data. To the extent we could, we have looked at each of the sites, but further analysis on that site-specific basis will cause some of those conclusions to change.

Emphasizing that we do need to look at things on a site specific basis, these numbers give you global oversight. But we do need to look at a site specific basis, and Ron Pope is going to be talking about our site specific transportation service planning documents that are incorporating the data that we have collected from the FICA and NSTI studies.

Another important activity will be the receipt of the delivery commitment schedules, which Alan referred to

earlier, that will begin to give us the utility input as to their proposed shipping. These are guesses in terms of how -- if you laid a preference structure like the one that I have concocted here for this analysis, you get one set of analysis. When you look at what the utilities actually prefer, you may get a separate set of numbers. We will start getting those proposed shipping loads and delivery schedules. Again, I emphasize, as Alan did, that we need to continue to interact with the utilities in development of our plans for transportation.

I'd be happy to answer any questions.

DR. PRICE: As I understand the way things could be, a utility determines the cask, which then determines the mode; is that correct? Or determines the mode and the cask?

MR. KOUTS: I think the simplest way to think of it is the utility tells us what kind of cask they want, whether it is rail cask or a truck cask. They may well handle the cask on-site in whatever manner they feel comfortable with. If they want to move it off by barge, then we will take it by barge. If they want to move it off by heavy-haul, or if it is a rail cask and they want us to move it off by rail and there is an on-site rail storage, we will end up doing it that way. Basically we have to deal with how the utility wants to move the cask off the site.

Then once we are off the site, then we have our options in front of us as to how we want to transport it to one of our facilities.

DR. PRICE: As I understand DOE's position they have no influence in this other than the good graces of common interest?

MR. KOUTS: Well, we feel we do have an interest. What I was going to say as a follow-on effort to Mike's presentations here, one of the things we want to do this coming year is to sit down with Alan through the ACR issue resolution process and get some insight from the utilities as to how they want to view infrastructure improvements on their sites, either in consideration of upgrading their capabilities on site or in consideration of the infrastructure around it.

I think we need to get some input from utilities from a policy perspective and then from there -- of course, there is an issue of money here and where the money comes from. That is an issue that has to be dealt with. But once that is done, and if the general policy of the utilities is determined and the Department is determined, then we will work individually with the sites and come up with something that will hopefully be the most efficient mode of shipment.

DR. PRICE: That hope is really the mark of my

comments because as I understand the way things are now, if a utility decided that in their interests a barge is the best way and they deliver it to a barge at their site, it is yours and then you have to determine how you get it off that barge because you have got to get it off the barge to get it to -- if it is Yucca Mountain, there are no barges you are going to pull up the desert in.

MR. KOUTS: That's true.

DR. PRICE: And so that adds facilities and handling and complexity to it if they should elect that. And wouldn't it not also be true that if it is in their convenience that they elect a barge, they could do so even if they had rail service to the facility?

MR. KOUTS: If that is the method they want to move it off their site, there is very little the Department could do. We could be waiting at the rail spur and the cask could be on the barge on the river.

I do want to portray here that we have a good working relationship with the utilities. I think there are efforts on both sides to try to move these materials in the most efficient and safe manner possible. What we are representing to you here is what the contract tells us and what we have done to assess the infrastructure. The next step is to sit down across the table and talk to the

utilities as a body, if you will, and then individually make sure that we are going to be shipping in the most efficient manner.

I am confident that we will work through any differences and come up with the best manner. There are dollars and cents involved, there are questions of who pays for it, and there are questions of the preference of the utilities in terms of how they operate their site. These are all things that we have to work with on a case-by-case basis. We are prepared to do that. And now with the infrastructure work initially completed, we will be in a position to begin those more detailed discussions, not only from a policy standpoint but also on a site-to-site basis.

DR. PRICE: Thank you.

MR. KOUTS: Dr. Price, do you want to take a break?

DR. PRICE: Let's do. Let's meet back at 3:00 o'clock.

(Brief recess)

DR. PRICE: Let's return again, please.

Our next speaker is Ronald Pope.

MR. POPE: Thank you.

The two previous speakers have done a very good job in setting the stage for what I will be talking about.

I would ask you to hark back in your thoughts to what Alan Brownstein and Michael Conroy have said about the requirements of the contract and then the results of the evaluations that have come out of the FICA and the NSTI efforts to date.

(New viewgraph)

When it comes to actually operating a cask system out of these facilities, projected to start in 1998, it is going to be a very complex operation. Just to give you some numbers that have come, again, from what you have just heard. There are 66 owners of facilities having some 80 contracts with the DOE for the services. That represents 122 facilities operating out of 76 sites. I don't have the exact number off the top of my head, but it is about 100 different cask loading stations that will have to the serviced by the cask fleet.

In addition, if you will think about the complexities that were highlighted by Alan Brownstein's talk that are introduced to the system as a result of the contract in terms of the flexibility that is available to the purchasers, the owners of the fuel, and that DOE will be servicing these according to the allocation of delivery rights and the final selection of fuel and so on, with the intervening possibility of the exchange of delivery rights,

the system will have to be very flexible. As a result, we are trying to put into place, or help DOE put into place, an ability to service that in an efficient manner.

Also harking back to what Alan pointed out, DOE will be the guest on-site, if you will. But DOE has the responsibility to provide the cask, cask system, the ancillary equipment, the training and procedures that will allow that spent fuel to move from the site. The waste owner loads the cask and then DOE accepts that cask at the fence boundary.

What we have been trying to do and what I will be talking about here is to start the development of a series of documents that will assist DOE in interfacing its cask system with each of these casks loading facilities. Initially we are aiming at developing what is known as a service, or planning, document for each of the cask loading facilities. Ultimately it is envisioned that these will transition in what we call site specific service plans, and then ultimately can entertain the plans as you schedule a specific movement of fuel using a site cask from a given site.

(New viewgraph)

The first stages of the development of the SPDs has been initiated and is well underway at this point. We

view the SPDs, services planning documents, as precursors to the site specific service plans. It is envisioned that these will bring together in a single document the transportation cask systems, the facility, the site, and the local transportation infrastructure information needed for the planning of shipment from a given site. These will be developed on a priority basis based on those facilities that we can expect to be serviced first, and based on the allocation of delivery rights.

(New viewgraph)

The SPDs will support the identification and the resolution of not only the technical, but the operational and the institutional issues that can arise as we try to bring cask systems into the different sites and in an unloaded state and then move them to a site in a loaded stated. It will also help in the interfacing of that cask on the site in terms of the actual loading process. As I said earlier, these will serve as precursors to the follow-on site specific service plans.

(New viewgraph)

The next viewgraph does nothing more than graphically depict the various sources of information that we are utilizing to feed the SPDs. And I might digress here to point out that our view of the SPD is it is a document

that will not formally be published and made available to the world for consumption; it is a working tool to be used between DOE, the people that will be operating the casks off-site, and those purchaser/employees who will be operating the casks on-site. So we have an interface document that resolves the problems that may be inherent in trying to operate the cask systems.

Therefore, we would plan to initially produce these SPDs and then use them as a tool to establish dialogue with the purchasers and let that then result in updates to the SPDs, and as you will see later, transition into the other document that will be used for actually running the operation.

(New viewgraph)

We are focusing on defining some of the terms you saw in Alan's presentation earlier, focusing on trying to define which cask or casks may be suitable for use at a given facility. We are looking at what are the cask handling requirements at the facility and how can that cask, or those casks, be transported off-site and to the nearest rail head or interstate highway, part of the national transportation network.

The SPDs will support the early planning operations, will help guide the acquisition of the cask

system and the cask fleet, the development of the procedures. I might point out that it is envisioned that initially you will have generic procedures on how to handle the casks on site. Those will then be handed off to the individual facility operators, and they in turn will then have to make them site specific, to adapt a generic set of procedures to their own specific needs and requirements.

As I have also already indicated, it is viewed that the SPDs can serve to initiate the dialogue that we feel is needed to make sure that we have resolved the problems that may be inherent in trying to operate these casks for each specific site.

(New viewgraph)

The plans are to try to have -- and at this point I can't say that I can guarantee that we will succeed -- but our plans are to try to have an SPD in its initial draft form available for DOE to use in talking with the utilities when they first have an approved delivery commitment schedule from that facility.

For each facility, as I have said, the SPD will give our best judgment of the type of casks and modes of service that are possible at that facility. In addition, it will identify the constraints that might exist on the use of those casks, identify the special equipment that will be

required for cask use, any other requirements that may exist, and also we will look at, and are looking at, the compatibility of the spent fuel from a geometric standpoint with the casks that are being considered.

(New viewgraph)

In addition to identifying those casks that are currently suitable for use, we are looking at what potentials there are and what improvements there are for the use of larger casks. All of this was talked to by Michael Conroy in the last presentation, but I would point out that the results of the evaluation he gave you was a global look at things; whereas, the SPD takes a team of people who have their hands dirty, they have actually been out and they are experienced in operating casks, they are experienced in working in the reactor environment, and they look at it for about a week with all of the available information and data they have at hand to develop an SPD. And that gives us a much clearer view of what is possible within that facility.

The SPDs are being compiled from the list of information that you see here at the bottom of this slide, including the FICA data, the FICA backup data, results of the NSTI study, RW-859 data, and educational background capacity reports, Federal Register. Periodically our people go out and actually refresh their memory or see other

operations or facilities where they don't have experience, and that is brought to bear within the preparation of the SPDs.

We keep track of whatever information is available from the industry, their own personal knowledge. As I say, we are using people who have had experience in operating casks and facilities, and where possible, we are actually involving industry sources to prepare this information.

What is our current status?

(New viewgraph)

Our current status is that over the past some months we have worked as a team to put together an acceptable format and method of developing these SPDs and the level of detail that should go into the document. By the end of next week we will have produced the first 20 of these SPDs and deliver them to DOE. The plans are then to continue the development using this process of additional SPDs at the rate of approximately two per month beginning in October of this year.

(New viewgraph)

DR. PRICE: What is the high priority?

MR. POPE: The high priority facilities that we have talked about there is based on those who can be expected to deliver schedules during the early years based

on the allocation of delivery rights. We have not tried to project how they might request exchanges. We have just strictly looked at the allocation, picked the top level ones.

MR. KOUTS: It comes right out of the APR.

(New viewgraph)

MR. POPE: The long-range plans I have already referred to; that is, these will ultimately lead to what we call site specific service plans, a document that will be the tool that the cask operators in the plant will know how to handle that given cask, or those casks, depending on what has been worked out there. They will be developed from the SPDs, the dialogue that we have had, the delivery of the schedules, and whatever data we have available on actual spent fuel and nonfuel assembly hardware that is scheduled to be delivered.

I can say nothing more than, really, than our goal is to provide a basis for agreeing between DOE and the purchaser about what cask should be used at that facility.

(New viewgraph)

The next viewgraph just gives a flowdown chart of what is envisioned, from the time the DCS has approved, at the top, down to the bottom here where we transition from SPDs to the site specific service plans, a one-time document

that says how we are going to function at that facility, and then the generation of the specific campaign plan that would define number of shipments per campaign during a given time period.

(New viewgraph)

In conclusion, then, site specific service plans will come out of the activities that we now have going on with SPDs. They will address the full range of issues that you see listed here, including the operational requirements, the schedules, defining the cask, and other equipment.

What are the personnel needs and how do we train the personnel? One of the items that is rather interesting, as Alan said, is that we are guests on the site, at the purchasers' facilities. We need to establish some type of protocol for the OCRWM personnel to be on-site in an expeditious manner. What is the routing from the facilities? You have heard the discussion earlier about the many options available in terms of legal-weight, overweight, heavy-haul transfer to rail barge, heavy-haul to rail, or direct rail. All of that needs to be sorted out on a site specific basis.

How do you comply with regulations and other requirements? What are the emergency response needs? It is our view that over the next four to six years this can all

be accommodated on a site specific basis with the development of the SPDs.

Any questions?

(No response)

MR. KOUTS: If we could move along, thank you, Ron.

I would like to reintroduce Michael Conroy, who is going to be talking about basically the process we will be going through for our logistical planning. Building on Ron's presentation, Mike will take you through the long-range and the near-term development efforts that we have taken.

MR. CONROY: Thank you, Chris.

Chris mentioned that I will be talking about logistical planning activities, and some of what I have to say will overlap a little bit with what Ron was saying. He was describing the vehicle in terms of the document that will be used for doing some of these activities.

(New viewgraph)

By logistical planning we are talking about those activities designed to provide for the movement of spent fuel or high level waste from vendor to sites to a specific facility. You can view that as being conducted in two phases: long-range, beginning approximately five years

prior to shipment; and campaign planning, which would begin one year prior to shipment. It differs from the operational planning that we have been conducting to date, which we have been describing a little bit this afternoon, in that it is site specific. We will start to get into that with the activities Ron has described.

(New viewgraph)

One can view long-range logistical planning as beginning with the submittal of a delivery commitment schedule to the Department, which we have touched on several times. The approved delivery commitment schedules will provide some key information to allow us to begin logistical planning on a long-range basis. It will identify specific reactors with facilities from which we will be expected to ship spent fuel -- purchasers will be identifying those -- as well as proposed delivery dates and shipping modes and the maximum number and type of assemblies to be shipped along with range of SNF discharge dates.

(New viewgraph)

As we then get that information and begin long-range logistical planning, the kinds of activities that we will be doing is developing detailed and site specific documents, and Ron has just described our initial efforts on that and how we will be proceeding. We will also need to be

coordinating with the development of planning acceptance schedules for the waste management facility to be an MRS or a repository.

We will need to develop, as required, site specific auxiliary handling equipment to go along with the particular cask for the particular sites. We will be coordinating with the institutional program in the identification of transportation corridors for the purposes of 180(C) assistance program, which Susan described this morning. And also another activity is we provide assistance as requested to the waste owners in the development of their site specific procedures for handling our casks. As Ron mentioned, we will be dealing with cask specific procedures, but the utilities will have to do their own site specific procedures.

(New viewgraph)

We will also be looking at developing planning shipment schedules by year based on the approved delivery schedules and site specific information, and from all that begin to develop actual modal and cask requirements as compared to the kind of longer range assumption-based activity I showed you a little while ago.

(New viewgraph)

Campaign planning is a shorter term function as

compared to long-range logistical planning. It would begin with the purchaser submittal of the final delivery schedule, which as Alan mentioned would be about 12 months prior to delivery. An approved final delivery schedule provides us additional key information to allow us to begin campaign planning. It will identify the shipping load that we will be using, specific delivery dates, and also provide other changes and updates in the information that had previously been provided in the delivery commitment schedules.

(New viewgraph)

As we then get into the logistical campaign planning, the kinds of activities we will be conducting will be planning for cask specific operational training for personnel at the utility and other sites, and handling the casks that will be used, preparation of safeguards plans, development of annual shipment and receipt schedules for the waste transportation system, and coordination with the facility schedules, and development of annual cask and carriage requirements to operate the transportation system.

(New viewgraph)

We will have to develop campaign equipment lists and field service personnel requirements to support those campaigns, and we will be conducting preshipment management planning.

(New viewgraph)

Under pre-campaign support activities, those encompass what you see on this slide, beginning with completion of hands-on training of waste owner personnel in specific cask operation, and then the DOE supplied equipment. That is a requirement under the terms of the standard contract, that the training will provide an opportunity to evaluate specific site operational requirements and may included dry runs and prototype casks and mock-ups of plant operational procedures that have been developed for those casks.

Finalization of site specific planning documents, the site specific service document. As Ron described, the SPDs and the SSPDs will be continuously updated providing the most current information and provide a basis for the coordination with the sites.

Site access training for field service personnel will enable us to have those personnel on-site, in some cases, if done properly, in an unescorted manner to observe loading operations. That would be on a site specific basis and would require training in security, emergency response, radiation work, site procedures.

Delivery and setup of site-specific auxiliary equipment supplied by the DOE would be the next step. We

may be required to provide certain equipment to make sure the interface with the cask system and the utility operations is appropriate, including such items as hook extenders, crash pads to comply with cask stop requirements, and other special handling equipment that might not be required for general cask operations at other sites. Equipment will need to be delivered, installed, and tested prior to use in the actual shipping operations.

(New viewgraph)

Also under pre-campaign support, we will be looking at final route selection in accordance with NRC security requirements and DOT guidance and in coordination with carriers. With regard to the rail routing, we will be keeping an eye on the DOT's activities in that area, and developing a written criteria in the absence of DOT regulations, if those are not developed.

We need to provide advanced written notification to the NRC ten days prior to shipment date, and that is in accordance with 10 CFR Part 72. And any changes to shipment itinerary would need to be provided to the NRC as well.

We would also need to provide advanced notification to state governors or designees seven days in advance of the shipment date. That could be in accordance with 10 CFR part 72 as well. It would need to have

notification postmarked seven days in advance or delivered four days in advance by messenger. Any other arrangements for additional physical security for in-transit would also have to be conducted as a pre-campaign support activity. Also involved would be looking at the use of escorts who are needed, in setting up the required capabilities for escorts to be able to communicate with the proper authorities, and developing plans for immobilization procedures and for other securities measures.

MR. KOUTS: Just before you leave that slide, Mike, in keeping with Susan's discussion earlier this morning, we did indicate that there is a departmental change to also notify tribal governments of the shipments. This reflects the present NRC regulations, which we are hopeful will be modified certainly by the time we ship. So if we are shipping through tribal lands, we will also be allowed under the regulations to also notify the tribal governments.

(New viewgraph)

MR. CONROY: That, then, is an outline of those activities that would be conducted prior to the initiation of a particular shipment campaign.

(New viewgraph)

We then get into, for a particular shipment within a campaign, the preshipment activities that would need to be

conducted, beginning with delivery of empty shipping casks that we would need to provide under the terms of the contract, observation of the utility or waste owner loading operations. Again, under the terms of the contract, as shipper, DOE has the responsibility to verify that the casks have been done properly prior to providing certification to the DOT, that the shipment meets all DOT requirements.

Review and verification of the supply documentation from a waste owner would be the next step. A number of documents will be provided, and the Department will have to arrange for the verification of those documents, then arrange for the actual outgoing carriage. Then the final step and the pre-shipment activities are to accept the cask F.O.B. for shipment from the waste owner into transit.

(New viewgraph)

Looking at actual shipment then, there is the preparation of a shipment documentation, which I just mentioned. The shipping papers would include a description of the material being shipped, driver and crew instructions, emergency response procedures, physical security procedures, radiation contamination surveys, additional placards and labels and other information that might be required by the receipt facility.

Another activity would be to inspect the conveyance and transport vehicle prior to departure. The Department will likely do that in addition to any inspections done by state or federal agencies. The transport crew will be briefed prior to departure to ensure that they understand their responsibilities and have the latest information at their disposal. Then the final step prior to an actual shipment is, once the shipment and crews can verify to be in compliance with DOT regulations, to release the shipment.

DR. PRICE: Could I ask who briefs the transport crew?

MR. CONROY: The particular personnel -- I haven't identified that on here. Most likely we will be dealing with a number of different organizations in terms of how we deal with the carriers. Chris mentioned this morning some of the options that we are going to look at in terms of how we operate the system. We will have a field operation support team at the site representing the Department in some -- exactly and contractually how it will work hasn't been determined yet, but there will be a responsible individual on-site to make sure that the crew is briefed.

DR. PRICE: So that would be a DOE contract person, or a DOE employee?

MR. CONROY: Right.

DR. PRICE: And would brief on-site before the truck left?

MR. CONROY: That's right.

(New viewgraph)

Then we release the shipment and then get into the real activities of moving a shipment, actual transportation, actual physical security in shipment, internodal operations as might be required, and response to any emergency situations, if necessary. Those are all pretty self-evident activities that we have undertaken.

(New viewgraph)

In support of the actual transport assembly, there will be transport management activities to manage and control the activities. We will have some form of operation control center acting as a single point of contact for in-transit shipments. The exact location and nature of that is still to be developed, but the functions that would be performed there would be to monitor traffic flow status, follow the progress of shipments to support emergency response communications. 49 CFR 172 requires a 24-hour telephone to provide emergency response information on each shipment. The operation center would be coordinating traffic communications to our calling checks, as required by

10 CFR 73, and would also cover traffic information and other nonsecurity items, such as the condition of the vehicle, crew, and the shipment.

The operation center would also be issuing traffic notices and dispatching orders, authorizing any route changes that might be needed based on road and weather conditions and assistance to the carrier for any in-transit repairs by communicating with repair vendors, and providing for safe havens if required for security purposes.

The operation center would also be providing updates to state governors and the NRC, and as Chris mentioned earlier, possibly tribes as well, based on current shipment schedules to keep them updated. Also the operation center would be collecting and filing the required transportation records. NRC requires specific laws for security purposes, and for our own purposes, referencing and files be maintained.

(New viewgraph)

At the other end of the shipment, then, we have the delivery operations where we will position the cask and transport it. For surveys, there is a requirement under 10 CFR Part 20 that the receiving site surveys should, once it arrives on site, be done within three hours. So that will be done at the MRS or the repository.

The shipping documentation will then be transferred to the receiving facility, and there would be a debriefing of the transport crew. During the debriefing, any information on the operation of the vehicle or other equipment, any instances that might have occurred during shipment or non-ordinary events will be recorded and maintained.

That, then, is a pretty quick walk-through from the stage where we are now in terms of operational planning into long-range logistical planning, shorter range campaign planning, and then what would actually happen during the shipment campaign.

DR. PRICE: One of the things we have raised in the past, and it was touched off a little bit by your debrief of the transfer crew -- very glad to see that in there, by the way -- it has to do with the data bases which will be maintained to support or to add to all of this that is going on. Do you have a clear picture of what those data bases would be?

MR. CONROY: I would say that we don't have a clear picture of that yet, but I think that it is an excellent suggestion you have made in the past, and we will be looking into that. That is the intent in making sure that those debriefings occur, that the files are kept at the

operation center and analyzed for any trend analysis to identify any problems that might be starting to occur, but we don't have at this moment detailed plans for that, no.

MR. KOUTS: I think this is also addressed, Dr. Price, in our implementation plan, the human factors area, where we mentioned this morning that that plan addresses this very subject. I think as the system evolves, we will be making sure that is in there, and we will be keeping the types of records that allow us to assess the transits Mike indicated, to make sure that we can identify a situation before it happens and how we can take preventive action. So you have sensitized us and we are making provisions to make sure that is part of it.

I would like to introduce our next speaker. Basically the Panel has had a continuing interest in tracking of radioactive material shipments and the plans for our program and how we are going to proceed. As I have mentioned in the past, as we have often briefed you, we are very much following closely what is being utilized for the WIPP shipments. We have asked, in this regard, Lydia Ellis of Analysas Corporation from Oak Ridge, Tennessee to give us a presentation and some up-dated information as to where TRANSCOM is and then some of the recent observational information that they have gathered in tracking of actual

shipments.

As soon as Lydia is wired up, she will give us that presentation.

MS. ELLIS: Good afternoon.

I would like to speak to you a little bit, as Chris just said, about TRANSCOM and impart to you just a little bit of background information first and then update you on several of TRANSCOM'S current activities.

TRANSCOM is the Department of Energy's transportation tracking and communication system. The primary objective of TRANSCOM is to provide a central monitoring and communication center for DOE shipments of spent fuel, high level waste, and other sensitive high visibility shipping campaigns as determined by DOE. Analysas Corporation maintains and operates TRANSCOM at the TRANSCOM Control Center, known as the TCC, which is located in Oak Ridge, Tennessee.

(New viewgraph)

The system operates using satellite communications, data base management, computer networks, and commercial telecommunication service.

Vehicles being tracked are equipped with QUALCOMM'S only track mobile communication units. Position updates are obtained through satellite translation, and

these updates are calculated in the form of latitude and longitude at QUALCOMM'S receiving station in San Diego, California. The receiving station immediately sends this information to the TCC through telecommunications links, and the TCC disseminates this information to authorized users as they log on to the system.

(New viewgraph)

Our tracking equipment was recently upgraded with an automatic satellite position reporting system. This system uses signals from two satellites and eliminates the use of the Loran-C. Plus we have eliminated any dead spots or areas where positions cannot be obtained accurately, and we do provide our users with accurate position readings.

(New viewgraph)

The equipment that is installed on the vehicles being tracked consists of three items. The first item is the outdoor unit, with a satellite antenna, and this is usually mounted on the top of the vehicle.

(New viewgraph)

The second item is the on-board terminal. This is like a small computer that is used by the vehicle operator to communicate with our operators at the TCC and other authorized facilities that communicate with the vehicle operator.

(New viewgraph)

The third piece of equipment is the communication unit. This unit powers the entire mobile communication system. It acts like a computer, a message handler, a radio and modem all in one. The communication unit is usually installed in the side box of the truck.

(New viewgraph)

Here we have a picture of a WIPP truck, and you can see the TRANSCOM equipment installed on the truck; actually, the satellite antenna. You can barely see the little white globe on the top of the tractor.

(New viewgraph)

Where we are tracking these vehicles, we are able to monitor the movement on maps, such as this U.S. This shows four vehicles being tracked, one in Tennessee, one in New Mexico, and one in Illinois and one in Idaho. These are represented by the different colored icons. The color of the icon also indicates the status of shipment: green indicates the situation is normal, yellow indicates that a minor problem has been encountered, and magenta indicates that a more serious problem has been encountered but is not affecting safety, and red means indicates that a safety emergency has occurred.

(New viewgraph)

In addition to the U.S. maps, we can also use steep maps. You can see interstates and highways. You can also pull up rails and tell county boundaries.

(New viewgraph)

We can go a step further and view county maps. This map shows the vehicle in Anderson County; you can see "Anderson" is written in the bottom of the right-hand corner. And the icon on the county and the state map provides more detailed information about the shipment. You can see, I believe, 02 inside the box there. That represents the vehicle identification number. The fact that the box is colored in with a solid color indicates that it is a full shipment. If it was an empty shipment it would merely be outlined in the color of the status. The white line at the bottom left of the icon is the position indicator. This is pointing to the road, highway, or rail that the shipment is traveling on.

(New viewgraph)

Users of the system are able to view the same maps to observe the shipments, and they also derive a variety of other benefits from the system. Users are provided with 24-hour access to the system, which supplies them with current shipment information. They can look at maps to see where a shipment is at any given time. They can also look

at a map to determine the shipment status, as well as this is locating the bill of lading, and they are provided with a complete bill of lading, which gives information such as the type of material being transported, the activity level, origin, destination, estimated time of arrival, and most of the details associated with the shipment.

Emergency guidance information is also provided, and this is taken directly from DOT's Emergency Response Guidebook, and emergency contacts are listed for each shipment also. The users are also provided with information in advance of the scheduled shipments. So this enabled them to provide for any emergency response preparations they would like to before the shipment actually travels through their jurisdictions.

The shipment report is available, listing current shipments in transit. And probably the most distinguishing feature of the system is a two-way communication capability. This allows the driver out there on the road to communicate with our operators at the TRANSCOM Control Center at all times, and, as well, other authorized users of the system are able to communicate directly with each other through the network.

All TRANSCOM users are authorized by DOE, and they are issued a set of software, a unique password, and user

name.

(New viewgraph)

Our current users include state and Indian governments as well as DOE users. We currently have seven states that have been trained on the software. These include the five states and first-rate utilities, as well as a couple of others. Also two tribes, the Shoshone-Bannock Tribe of Idaho and the Confederated Tribes of the Umatilla Indian Reservation, are also users. We have nine DOE shippers and receivers, five DOE emergency operations centers, two DOE operations offices, of course DOE headquarters, and we have one carrier right now that is a user, and this is Dawn Enterprises. This is the carrier that has the contract to transport all the WIPP shipments.

(New viewgraph)

Since operations began in September of 1988, TRANSCOM had tracked approximately 116 shipments. This includes 11 spent fuel shipments, 36 cesium, 1 uranium hexafluoride, 65 WIPP demonstration shipments, and the TRANSAX '90 exercise that was conducted in November of last year, as well as 2 rail test units, and the second rail test shipment was completed just last month.

(New viewgraph)

The decommissioned reactor vessel from Sioux

Falls, South Dakota to Richmond, Washington. The shipment was transported on a dedicated train either the size or visibility of the vessel. The vessel weighed 290 tons, was 34 feet long, and 18.4 feet high on the rail car. The activity level was 563 curries. The train traveled a total of 1,624 miles through the states of South Dakota, Minnesota, North Dakota, Montana, Idaho, and Washington. The company that owns the power plant where the vessel was removed had approved the travel on the train for the entire trip.

At times the crew's primary source communications failed, and TRANSCOM was their only source of communications that they had abroad the train. TRANSCOM was also used by the company to inform the crew of a potential problem with protesters. Luckily, the train arrived at the destination as scheduled without any sign of protesters. But during the shipment, we were able to perform two tests of the system. One tracking unit was installed on the train's business car and operated off the train's electrical current with a battery powered backup, and a second unit was installed on the vessel part sit-up along with a solar powered system that was designed by TRANSCOM personnel. This was our first test of solar power as a self-contained power source. I am delighted to say that both experiments worked out

exceedingly well, and we were able to receive position readings for the entire trip.

(New viewgraph)

Next on the agenda: Probably our most recent and current project we are working on is updating our software. Right now we are preparing to release a new version, 5.0 of the software, and we are in the planning stages right now of making this transition.

(New viewgraph)

Some of the features of this new software include the print options. We also can print out reports, such as the bill of lading, emergency guidance information, as well as other reports. Also, a unique feature of that is that you will find in the new software that the maps have a trail of the shipments, the movement of the shipments. On each icon you see the last three position readings following the icon, so this tells you which direction the shipment is actually moving, and it will also indicate if the shipment has stopped.

Also, we are able to set at varying intervals for receiving position updates. Currently when we set an interval, if we want to receive updates on a shipment every 15 minutes, we set this and that receives updates on all shipments that we are tracking for 15 minutes. The new

software will allow us, say, for example, if we had three shipments out there that we are tracking, we may want to receive updates every five minutes on the first shipment, every 15 minutes on the second, and every hour on the third. The new software will let us do this, instead of the individual report shipment.

Also, a comment section has been added, one of those being bill of lading, and this will enable us to provide additional shipment information to the users. If the vehicle has been delayed due to inclement weather conditions, it can tell users right here this information. They don't have to wonder why the truck is stopped.

Also, using a mouse is another feature that we have added with the software. A lot of users prefer to use a mouse with their computers. To date, the only way they could use the mouse is when looking at the maps. Now we have enabled them to have that choice of using it throughout the whole menu system.

Also, many steps in moving from one option to another have been eliminated, thus allowing faster access to the information. For example, if the user is viewing the maps and wants to go directly to the emergency information, he doesn't have to take several steps to get there. He can

hit one key and be there instantaneously.

(New viewgraph)

The new software is also designed with a more user-friendly configuration. The installation of the software has been simplified, and step-by-step instructions are displayed on the screen. Additional security measures, including password security, has been implemented in the new system. Colored enhancements have been made to make the display of information easier to read, and historical data base has also been added and will be maintained at the TCC to keep a record on past shipments. When viewing messages in the software, the most recent messages will be listed first in sequential order, and automatic message header has also been added to in-coming messages to indicate who sent the message.

(New viewgraph)

And for the first time our other government agencies users, which include the states and Indian tribes, will be able to retrieve messages for further viewing. Also, latitude and longitude reading will be listed with most recent reading listed first. Then finally, one of the features that particularly our emergency operations center are looking forward to having is global viewing of all the shipment information. DOE headquarters as well as the EOCs

will be able to see all the shipment information that is going across the country, instead of just in their particular region.

That is our primary function that we are working on right now, the transition of getting the new software out to everyone.

I will be happy to entertain any questions at this time.

DR. CHU: Does the Department intend to use this tracking system at present on, say, all of the Department's high level nuclear shipments? Like, let's say, foreign research fuel, just to take an example.

MS. ELLIS: There are not plans right now to use it on all shipments. The system was designed for, of course, the higher level spent fuel and the high level waste shipments. The DOE headquarters will make decision as to which shipments are tracked. There is not a precedent that all shipments be tracked.

DR. CHU: I didn't mean all shipments; I meant a certain number of curies on up.

MR. KOUTS: It is really a program call as to whether or not we want to use the TRANSCOM system. It is an individual call by the program that is making the movement. From our perspective, I think we are following TRANSCOM

very closely and we want to see it in operation for road shipments, as we have said for a long time, in a consistent manner. TRANSCOM has undergone quite an evolution in the last several years.

I guess I have a question for Lydia. You mentioned in your presentation that 116 shipments have been tracked. How many have been tracked with QUALCOM'S systems approach to the Loran-C system? Or can you get those numbers?

MS. ELLIS: QUALCOMM originally started with the Loran-C. We updated our new mix just at the end, in December of last year, so the shipments that we have tracked since January of this calendar year, have been tracked with ASPRS, the Automatic Satellite Position Reporting System. And I don't have the actual figure, Chris, but I know this whole fiscal year we have tracked about 70 shipments. So I would say the majority of those have been tracked with ASPRS.

DR. PRICE: I don't know whether to ask you or Mr. Kouts here, but what is the status of the security problem with respect to using TRANSCOM as viewed by NRC and DOE? At least I thought that was alluded to earlier, and what are the problems there? I am not sure I understand.

MR. KOUTS: It is not so much a security problem.

It is that our program is caught in a, if you will -- another way to say it is we are directed by the Nuclear Waste Policy Act to follow NRC regulations. The Department has basically taken a position that we will also pre-notify for departmental shipments; not necessarily NRC shipments, but departmental shipments. We will also notify Indian tribes. We are strongly supportive of that position. However, the NRC rules, the physical security requirements, are very specific and do not include the tribes. As a result, in order for us to also pre-notify tribes, we have to reach some arrangements with the NRC that this is acceptable to them from a physical security standpoint.

The problem is we are bound by the regulations because the Act told us to follow NRC regulations. The Department is not necessarily bound by those regulations because they are not bound by those regulations for departmental shipments, but our program is.

DR. PRICE: But is satellite tracking per se involved in this dispute, and in what way?

MR. KOUTS: It has to do with the dissemination of information related to these shipments, related to spent fuel shipments specifically. The NRC has very specific rules on who can have access to that information. TRANSCOM and the concept that a state would have access and track the

shipments, it is an issue itself, in our mind, with the NRC as to whether or not we can utilize this system and still comply with their regulations.

DR. PRICE: Has the question of scrambling been raised with respect to maintaining security for only those, then, who have the potential to decode?

MR. KOUTS: It is not just who gets the information but how the information is protected at the source, also. Basically the governor or his designee of each state is told about these shipments in advance. They are bound by NRC rules to keep this information close at hand. So if, indeed, there is a system that someone, perhaps an individual -- and there are a lot of them around -- who can get into systems, that can get past the security and so forth, that raises a question as to whether or not the system is secure from an NRC standpoint.

It is one of the issues with the NRC. I think our major one at this point is whether or not we can actually go forth and notify the tribes in advance. But the side issue of that also is: Would this system be acceptable to NRC in terms of notification? And would it also comply, assuming we had proper safeguards on it, with their information requirements to keep this information of shipments closely held? So there are a couple of issues associated with this.

We only face it, again, because we are dutybound by the Act to comply specifically with the NRC rules. I think we want to move very much toward utilizing satellite tracking, using these types of devices, such as TRANSCOM, to get information out there to the right people. We just have to make sure that the regulatory structure allows us to do that. We have a period of time now -- we are talking to the NRC formally about this issue. Hopefully we will be able to resolve this well in advance of the shipments so we can utilize this type of technology.

DR. PRICE: And what is the resolution that you are bragging about?

MS. ELLIS: The resolution is within a quarter of a mile. Now, this would cross the United States. Actually, the system probably gets better than that in most areas, but this is what the satellite service will guarantee across the U.S.

MR. KOUTS: We now, I guess, would like to provide to you our last presentation. Ron Pope is going to get up to the podium again and give you an update on our cask maintenance facility work. Hopefully, as I mentioned earlier, this will prompt your memory to when you visited Sellafield earlier this year and give you some insight as to where we are heading in terms of having our own cask

maintenance facility system up and fully operational.

MR. POPE: Thank you, Chris.

Back in 1987 and '88 a study was undertaken to develop a concept, what we call a feasibility study, for the cask maintenance facility.

(New viewgraph)

The purpose of that study was to scope out cost and schedule should such a facility be needed. In the meantime we have done a number of other sidebar type studies, and then we have done an update study this year looking at a couple of issues that I will address here in a minute.

First I would like to take us back and look at where we have been in the United States and why we think that a cask maintenance facility is needed. Historically in the United States the shipments of spent fuel have evolved, as I think we are all aware, with a very small cask fleet, small shipping programs. There has been no dedicated, full capability cask system maintenance facility available, and as a result of that, the cask system users, the reactors and the receiving sites, have generally provided the space and personnel and resources to provide the maintenance that is required.

(New viewgraph)

The maintenance has been provided basically at the reactors, at the destination sites, hot cells, and so on, such as Morris and West Valley, Sellafield facility, and so on, and, in some cases, at another third-party's facilities that were available on an as-needed basis.

(New viewgraph)

The current U.S. maintenance facilities -- and what I mean by that is basically the list I just gave you, and predominantly that is the reactors themselves -- have the necessary license to receive, store, handle, and ship the isotopes that are found in loaded and unloaded casks. They have the system for handling qualified personnel, the radiological controls, the lifting capability of utilities, and importantly, they have the pool, or the hot cell, for getting into the internal of the casks, exchanging baskets, performing maintenance on baskets if they are needed, and the other type of handling activities that are involved in the cask.

(New viewgraph)

However, when we tried to provide maintenance at these user facilities, the maintenance is constrained for a number of reasons. Generally it is a one-way-in/one-way-out type of operation; they have one location for performing the work. And probably most importantly there is a competition

for the resources that are available, and should that operating nuclear power plant have another need for their personnel and such, they will generally get priority over the maintenance of the cask.

The bottom word that I have listed here is "incentives." Right now, generally, the facilities that are providing that maintenance are those that are using the cask. And if they want to continue to use it, they have the incentive to work with the cask owner to provide the maintenance that is needed. Once the Federal Waste Management System starts operation, that incentive may not entirely be there. It is conceivable that the facility operators may say, "Look, DOE, that is your problem. You provide that service."

(New viewgraph)

The feasibility study was performed to define what the requirements were, to develop a concept that would then serve as a basis for scoping out cost and schedule and looking at various design alternatives and options. About 30 different issues were addressed in the feasibility study.

I might also indicate that the study was performed based on what I would call a set of generic requirements, based on our knowledge of the existing casks, problems associated with those casks, maintenance

requirements associated with them, and what we thought might be the requirements that come out of the Initiative I cask that we had described earlier to you, and other cask systems that may be designed at the behest of DOE in the future.

(New viewgraph)

The feasibility study also looked at what options were available to DOE in the interim as the system is starting up, should a cask maintenance facility not be available. It considered the impacts of various uncertainties. One of the big uncertainties that we faced was the number of casks designs that one might have to handle over the long term and how many times that fleet of casks may have to be required to visit the facility.

Also, recently we have addressed the issue of handling of low level waste that is generated as a result of maintaining the casks and how might DOE become involved with the host state where that state may have its own low level waste disposal facility, or may be a member of a compact that has such a facilities.

(New viewgraph)

I have given you here and on the next page a very brief list of some of the generic requirements that we considered. The cask maintenance facility is viewed as being the place where, of course, maintenance for casks, but

also ancillary equipment, the transporters, and, in some cases, the transport vehicles -- all this maintenance and servicing would have to occur there.

It would provide for the storage, changeout, and maintenance of the internals. For the BRW-100 that single cask body has the capability of accommodating both PWR and BWR fuel. As you take a cask from one campaign with one type of reactor to another, you have to have the capability of changing the baskets, storing the baskets that are not in use, and possibly cleaning them up. There are also some inserts that may be required to keep fuels of different lengths from, if you will, rattling around inside of the cask. We view the cask maintenance facility as the home for all this activity.

It is required for the cleaning and decontamination of the cask. You heard Tom Sanders earlier today talk about weeping and the problems associated with that. Historically that is a problem with casks. The cask maintenance facility is the place where the cleanup as a result of weeping problems will occur.

One of the major activities that we envision the cask maintenance facility performing for the Federal Waste Management System is the preparation of what we call campaign kits. Before a set of casks are scheduled to go

into a facility for operation, historically you put together the lifting yoke, the other ancillary equipment, the consumables, and all of the rest of the materials that are going to be required to operate that cask, or that set of casks, in that plan. We call that a campaign kit. This may be one or two semitruck loads worth of materials that has to be shipped to the plant in advance.

Again, the cask maintenance facility would serve as the facility that does this operation, brings the nonconsumables back in the proper packaging, cleans them up, and prepares them for use in another facility.

(New viewgraph)

It would provide the storage and maintenance of that ancillary equipment that goes into those campaign kits. It would provide the storage, monitoring, and shipping of "spares" and consumables. The question came up earlier: How frequently do you change the seals in these casks? Whatever the requirement for a given cask is, the cask maintenance facility as part of the campaign kit would provide those consumables.

(New viewgraph)

Very importantly, it could also serve as the records management center, providing the pedigree and the history on each of the casks and then ensure that we

maintain their certificates.

And finally -- and there is typographical error here -- it would provide for the cleaning of transporters and transport vehicles for shipping them off-site for inspections -- not inspectors -- maintenance, and repairs. It was viewed in our concept that we would not try to maintain the trailers and the rail cars on-site, that we would try to clean them up to the point that they could be maintained off-site at a regular public facility.

(New viewgraph)

As we developed the concept there were, as I said, about 30 different issues, and some of these are documented here. We had to scope out what type of casks, number of casks, number of designs, size, weight, all of those issues that we would expect to see serviced by this facility. We came up with something, about 12 to 18 different casks designs potentially would be seen by the facility.

We had to address the issue of how frequently they would come to the facility. Currently maintenance procedures in the United States require an annual inspection and maintenance on these casks to maintain a certificate. Also the cask could be coming back for major repairs, for basket changeout, changeout of spares, decontamination due to weeping problems, and so on. On the average we estimated

that each cask in the fleet would come into the facility at least twice a year.

We had to assume that there would be hiccups or burps in the operating schedule. We are not going to have a uniform flow of casks coming in. So we had to scope the facility to accommodate that fluctuation. Again, we talked about and built into our assumptions the need for internal structured change-out and storage. We had to address the issue of, would we receive casks loaded with spent fuel at the facility? Or would we assume that that would not be a requirement imposed on this facility? The assumption we made was that all casks received at this facility would be unloaded from the standpoint that all spent fuel assemblies would have been removed at some other facility.

I have already mentioned the disposition of the wastes generated by the facility. All of this, then, determined what was our assumption relative to the licensing of that facility.

(New viewgraph)

We assumed that it had been to be licensed by NRC and what type of license would be sought. Back in 1988, as I mentioned, we did a feasibility study. After looking at all the various issues, we chose to go with what we called the wet facility. Similar to the nuclear power plants with

a pool, the cask would be immersed in the pool for the exchange of the baskets, and baskets predominantly would be stored in that pool as well.

This year, as is noted at the bottom of this viewgraph, we have performed a follow-on study using the same set of assumptions and procedures, and looked at the alternative of going to a dry option, where the casks would be emitted up to a dry cell, the baskets pulled up into the dry cell, exchange the baskets and the maintenance of the baskets would occur in that dry cell.

As an aside, I would point out that I hesitate to call it a "dry" option because even in that cell we view that a lot of the operations that will occur on the baskets in the cell would be wet. We would be trying to wash down CRUD that may have built up on the baskets. So it is not a dry concept. It is a damp concept, if you will.

But we did look at what is the trade-off between having a pool versus having an isolation cell. In the interim, in the '89-'90 time frame, we had a very low level of activity looking at what information was coming out of the international arena, trying to assess, going back and looking at our concept and seeing what we could recommend as a result of that input of additional information.

(New viewgraph)

This viewgraph, I think I talked about this briefly at the first meeting of the Board in Albuquerque, I think, two years ago. This is the site plan of the facility with a process building and a separate vehicle inspection, and if need be, blasts over here, so we could blast off contamination that had occurred so it could be decontaminated to the point of taking it off the site.

Receiving facilities for rail car and truck trailer storage, visitor parking outside the fence, two entry portals, a major entry portal for the rail casks on the trailers, or rail cars, and at the bottom, down here, a personal portal into the process building itself, about 28 per site as we envisioned it there.

(New viewgraph)

This is the building layout for the wet facility as we envisioned it two years ago. The central area running from top to bottom would be a high bay area with 175-ton crane capable of lifting casks up to 150 tons. The buildings to your right would be a lower bay area containing the shop, offices, and so on. The structure to your left would be, as indicated here, the structure for the waste processing equipment, HVAC equipment, solid waste preparations. Then towards the bottom here is a pool, with an extension of the pool into the low bed area for the

actual storage of the baskets. At the top you would see two bays for rail car and truck cleaning. Then in the center the unloading bays, which would be services by the 175-ton crane.

(New viewgraph)

Finally, this is a cross-sectional view of the pool that we envision. The cask would be brought in, set down on a step in the high bay area so that if needed you could work on the top of the cask while it is shielded by the water. The workers would be protected, and radiation exposure would be to a minimum. The cask would be set into the deep well area. Baskets could then be moved out into the storage area, and in the central portion here we envision having a dry inspection penthouse where baskets could be pulled up and people appropriately clothed and protected could do hands-on operation of work on the baskets if they needed to.

That is where we stood at the end of 1988.

(New viewgraph)

As I said, we had low-level effort from '89 and '90. We listened to and then talked with people from Cagema and France and the BNFL in England. At the Spectrum '90 Symposium we actually arranged for a series of papers to be presented by these same people, with a facility focus on

their experience in cask maintenance. We had a number of personal communications not only with foreign people, but other people in the United States who have experience in maintaining casks.

Basically the finding from all this are summarized by the three statements at the bottom here: The cask turnarounds, the number of casks that led to the size of the fleet that we scoped out for the design, is lower in Europe, where they actually have experience in operating large fleets. In other words, we felt we may have been a little optimistic in how efficiently we would operate the fleet.

That caused us to ask ourselves: What would happen if the number of cask visits to the facility was higher than we had designed the facility for? What would be the impact on the facility or the operation of the facility? I will come back to that later.

Secondly, we find that the maintenance philosophy and schedules are different in Europe than they are in the United States. They basically operate their cask fleet on what I like to call the "car warranty philosophy," where they bring their casks in every so many trips or so many years for a major service and maintenance activity; whereas, our requirements currently are that we take the cask in once a year for maintaining our certification. So their casks

historically are seeing the cask maintenance facility fewer times than ours would under the current U.S. philosophy for service and maintenance.

Finally, Cagema specifically has provided a couple of papers now where they find as the casks gets older, of course, more defects arise and more time is spent in the cask maintenance facility bringing them back up to an acceptable level. We have the statistical data from them to help guide us to say that as our cask fleet gets older, we can expect more visits and longer visits as time goes on.

(New viewgraph)

One of the other things that came out of all of these discussions was our design engineer going back to the concept and deciding that where we had specific bays defined for specific activities, we could be more efficient if we put multipurpose bays in the facility and, in fact, it resulted in the idea that we could reduce the length of that high bay area by one complete segment, with a potential cask saving. That has not at this point been included in any of our work. It is an idea that has been documented. It is on the shelf for when the conceptual design of the facility starts.

(New viewgraph)

The study that we performed this year was to go

back to the floor plan design that we had for the cask maintenance facility that came out of '88 study. We asked ourselves what would happen if we took out the pool and tried to replace it with an isolation cell. What you see here is a schematic overhead view of what we envision the isolation cell would look like. The high bay area is here. The cask would be set down on trolleys and rolled underneath portals, and then the isolation cell is above that, projecting out into this area.

We would pull baskets up into the isolation cells, perform whatever decontamination, maintenance, and cleaning is required on them, have a separate basket inspection put on this side. For storage we then had to press wells in this area with lids on them that would be lifted up by a -- I can't remember the capability of the crane now, but we had a crane in here -- 40-ton bridge crane would lift the baskets and put them into these storage wells.

What complicates this, of course, is that we then have to have a lower pressure HVAC system to ensure that we don't ventilate into the rest of the plant. And because we have a crane in there, that crane has to be maintained. So it has to be backed into a crane maintenance area, cleaned, and then moved into an area where people can get hands-on maintenance capability. That adds to the complexity of the

facility.

That is the level of thought that has gone into this. I would emphasize that this is not a conceptual design. It is just a design sufficient to allow us to scope out what the impacts of changes of this nature in the design would be. That led us to conclude that our earlier assessment and conclusion to go to a wet facility based on technical grounds is further justified in an economic basis. To go to this type of concept would increase the cost of the cask maintenance facility by about 15 to 20 percent. It would increase the operation costs of the facility by approximately five percent a year.

(New viewgraph)

Finally, on the last viewgraph I come back to the issue I raised earlier: What happens if we have more cask visits per year? What happens if we can't operate the fleet as optimistically or as efficiently as we had initially assumed? What we did was take each of the stations in the facility and look at what we had assumed in term of the number of shifts per week and the time that casks would spend there for the different operations.

A fleet of 75 casks visiting twice would be 150 visits per year. That was our base case back in 1988. That is what you see in the first column of cask visits to the

CMF per year. We said if we are not that efficient, it could go to 250 cask visits per year, or 300, or maybe even 400. What we see here is that for the loading and unloading bay where the casks are actually loaded or unloaded off the transport vehicles, we only assumed five shift per week in that operation. That said that if we went from 150 to 250 cask visits, we have overcommitted that bay. But we really haven't because we can go to ten shifts per week and divide that number by two, or we can go to 15 shifts per week and divide this 222 by three and we still have full capability just by adding staff.

We did a similar exercise to the exterior decontamination of the casks, the vehicle receipt inspection, and basket change. The only other area where we appeared to have a potential overcommitment of facility was on the exterior decon, where it could be up to 124 percent with more visits. But, again, we could go up to 21 shifts per week and solve that problem should that prove to be reality.

We feel that the basic size of the facility is reasonable. The concept is reasonable. There is still a lot of work to be done in terms of getting specific requirements and then proceeding with the design of the facility once the site is selected.

Thank you.

DR. PRICE: Does the reducing of the high bay area length affect your queue at all?

MR. POPE: No. We have not done any time and motion studies here at all in detail. Basically, all that would do would be to make sure that this would result in the multipurpose stations being used at a higher percentage of the time than we had previously envisioned. So we would have specific use stations with low utilization. The multipurpose station would now have a higher utilization.

DR. PRICE: Is there much discussion about co-location with the MRS for its facility?

MR. MILNER: Currently you really see one of the better locations for the CMS happening at the MRS site.

MR. POPE: I would say that the study we performed was, first of all, the stand-alone Greenfield site, and that is what all of our costs and schedule was based on. We had to go out and start from scratch with the Greenfield site. We then went back and said, if we could co-locate inside the fence, but with a separate facility, and share common utilities, common security, and so on, what would save?

We found that for total capital costs, and in some operating costs, there would be a reduction 10 to 15 percent on both sides by co-locating. It also makes sense because

you are not going to have to load the baskets and take it outside, transport it someplace. You can do it all on the side same.

DR. CHU: That is, if you had an MRS, in the sense that if the system does not have one, then there may be some other appropriate location for having the site.

MR. MILNER: Perhaps the repository.

DR. CHU: Right. A central destination site is what you are thinking of.

MR. KOUTS: A site that sees all the casks.

DR. CHU: If you had transportable storage sites for the casks, then you would put them out of business because you would use it only once.

MR. KOUTS: I don't know how many questions you might have asked about cask maintenance when you were at Sellafield. I knew when we took our trip last year, I remember asking the operators of the French facility at La Hague were they happy with their facility. Their general feeling was, we should have made it bigger. The British reaction was, we didn't necessarily -- they didn't need it bigger, but they would have laid it out differently.

DR. PRICE: How did the size of La Hague compare with Sellafield?

MR. KOUTS: It was a little smaller.

DR. PRICE: Because Sellafield seems to me to be very large.

MR. KOUTS: It is. It is large. The French facility was a little bit more compact, as I remember. The British facility was laid out fairly spaciously. I think their comment was the flow through the facility -- they could have made the flow better by rearranging it, and if they had to do it all over again, they would have laid it out differently, but not really change the size.

MR. POPE: I would point out that the designers that have worked at the concept at the lab have talked with both the BNFL and Cagema people and have used their ideas in trying to lay out this floor plan.

DR. CHU: A different question: Is there any thought of sharing such a facility for maintaining casks from different programs within the Department of Energy?

MR. KOUTS: I haven't been involved in any discussions in that regard. I think that our perspective is that the fleet of casks that we will need will justify -- assuming we get the shipping rates that had been projected historically -- that we really need one, that the ability for us to maintain these casks using leased facilities or trying to get time at reactor sites would cause major problems. So we feel that it is well worth the investment

to build a facility and have it dedicated to that purpose.

But we haven't been approached by any other DOE program, at least to my knowledge, wanting to participate and utilize it. That could certainly be something that comes in the future, assuming we do build it and there are requirements for other casks, but I am not aware of any discussions in that regard.

DR. PRICE: I would like to ask now if there are any comments from the floor or questions that you would like to bring forth for any of our speakers this an afternoon.

I think there was someone at the microphone before I finished my comments.

MR. HALSTEAD: I'm Bob Halstead, state of Nevada. I will try to keep this brief, as we are running late. I had some comments on four separate points, first regarding a couple of points that came up in Tom Sanders' presentations this morning on seal studies. Tom was good enough to clarify a couple of these points for me at lunch. And while they are not major, I think they are worth mentioning for the record.

The first is that when he was summarizing his preliminary conclusions regarding source term there was a statement that was made "calculated failure frequencies are less than one rod per rail cask accident event, for the

example cases that were evaluated." I think it is important to note for the record that the cask which was assumed in those examples was the IF-300.

Our position is that those findings would not necessarily be directly transferred over the Yucca Mountain analysis, although from what we heard this morning, my goodness, we might actually be using IF-300s to deliver spent fuel to the repository at Yucca Mountain. But I think that point needs to be made.

Also, we would make the point that the hypothetical regulatory accident, which is the basis of the forces which would result in that damage to fuel rods, does not necessarily represent what we believe would be a maximum credible severe accident.

A second point that came out of Tom's discussion had to do with some of the remaining questions that he has about seal performance, particularly the long-term seal performance. And I don't believe that he raised this point this morning. I guess to be blunt about it, while we remain strong supporters of the dual purpose cask concept, I think it is important to state that some of Tom's more recent finding, along with some of his earlier analysis, suggests that more study of seal performance, particularly over time, is one important accept of the dual purpose cask question,

not so much in terms of the performance during storage but in terms of the performance of seals on these casks when they were then transported after some long period of storage.

The second specific point has to do with Mike Conroy's presentation on logistical planning. I believe that based on the lessons learned from planning for the WIPP shipments and based on lessons learned from recent large scale utility shipping campaigns, the lead times which were assumed in Mike's presentation are simply unrealistic. Without belaboring the point, I think that the lessons learned suggest that seven to ten years, rather than the five years that Mike stated, are probably in our opinion going to be necessary for the long-term planning. Then when you turn to specific reactors shifting campaigns for the initial shipping campaign for any reactor, we would suggest that two to three years will be required, rather than the one year that Mike stated. The one year, however, might well be sufficient for subsequent campaigns.

The third point, a minor one, in Ron Pope's discussion of cask maintenance facility, perhaps I missed this, but if the facility were not co-located with an MRS facility or a repository, I assume this would be an NRC licensed facility. Again, some may see it as a minor point,

but, again, it is worth raising for the record.

Finally, the forth point. Gee, we heard some nice presentations by Mike and others on the FICA study, the NSTI study, and by Ron Pope on the site-specific planning documents, the SPDs. I simply ask you to contrast the very careful and detailed work which has gone into evaluating site and route-specific transportation issues on the origins of these shipments which might occur to a repository, and contrast that with the planning that is going on regarding the destination.

Forgive me for belaboring the point about the necessity to pay more attention to transportation access issues at Yucca Mountain, and particularly rail access issues, but the bottom line is that if rail access at Yucca Mountain is important, and we believe it is important, considering the very long corridors involved, the difficult terrain, the environmental sensitivity, if DOE is really serious about staying on track for the repository opening on or about 2010 at Yucca Mountain, they must now begin doing detailed feasibility studies comparable to the one they recently release on the Caliente route on at least, in our opinion, at least two additional rail access routes.

As much as I have spoken positively about the Caliente rail report, keep in mind that it is a preliminary

feasibility report on a very long 400-mile corridor that crosses many complex environments. We will need to have a similar level of detail on at least two additional routes, simply to make routing decisions to enter EIS scoping purposes.

With that I conclude, and thank you, as always, Dr. Price, for opportunity to offer these comments.

DR. PRICE: You are welcome, and you avoided identifying the two others. You are just being generic about the two other routes that should have detailed feasibility -- or is it two of the other three that have been identified.

MR. HALSTEAD: Well, I suggest two options. The Department picked the Jean and Carlin options along with Caliente as their suite of three from the original ten. I think now they probably should wait a couple of months until the state does it own preliminary assessment of those ten routes. It may well be that the Jean and Carlin ones still look like the two best alternatives. Then again, it may be that a couple of others will show up.

I guess when I said they should start immediately, I didn't mean they have to do it tomorrow, but I certainly think within the next year this is a task that they should take up. And as I understand it, that was the original

plan, that as soon as the Caliente report was done they would move to begin work on at least one additional one within in the next fiscal year.

MR. FISHER: My name is John Fisher. I am with Virginia Power.

I would like to make a point that I do not believe the utilities would chose mode or cask willy-nilly, as may have been implied, but would cooperate with DOE based on real constraints. I had hoped that DOE had used some lessons learned also in the transportation operations plans from the Surry INEL shipments, especially with regard to order and steps.

If, in regards to the near future -- a question for Ron Milner -- a dual purpose or universal cask is licensed, would this then fall under current technologies?

MR. MILNER: Yes, I think is it would.

MR. HALSTEAD: Thank you.

I hope DOE will use utility comments and work with utilities to resolve cask operational issues on their site. We plan to cooperate.

Dr. Chu took my last point, which was that a maintenance facility may not be needed if a universal dual purpose is developed.

DR. CHU: I have a job on the side as a shill.

(Laughter)

MR. HALSTEAD: Thank you. o

DR. PRICE: Any other comments or questions from the audience?

If not, I would like to thank the Department of Energy once again for providing us with a very full day of very informative presentations, and those who made the presentations -- some of them on call more than once -- we are very grateful for your appearance, your willingness to keep us informed, and we thank you very much.

If there are no other comments, we will consider ourselves adjourned for the day. I don't understand how we did it, but we are seven minutes ahead of schedule.

(Whereupon, at 4:38 p.m, the conference was adjourned.)