UNITED STATES NUCLEAR WASTE TECHNICAL REVIEW BOARD

SUMMER BOARD MEETING

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I N D E X

P R O C E E D I N G S

DR. CANTLON: Good morning. If you'll take your seats, we'll get this second day of our meeting of the Nuclear Waste Technical Review Board underway. For those who are attending for the first time, my name is John Cantlon, and I chair the Nuclear Waste Technical Review Board.

Yesterday our principal theme was the transportation or movement of radionuclides in a geological setting. Today, our major theme is also about transport, but this time we're going to be talking about the transport of containers of spent fuel.

But before we do that, we will first get an update from the Office of the Nuclear Waste Negotiator. That office was established by Congress to seek a volunteer host for a repository, or a monitored retrievable storage facility for commercial spent fuel. If our group of scientists, engineers and research managers think our task is a daunting one, contemplate, if you will, the challenge of finding a bona fide volunteer for the siting of any high-level nuclear waste facility.

Over the last few years, the Board has been briefed from time to time on the status of the negotiating process. Today marks the first time, though, that we've had the pleasure of welcoming the new negotiator, former Congressman

Richard Stallings. Mr. Stallings was nominated by President Clinton and confirmed as the Nuclear Waste Negotiator by the United States Senate on November the 10th, 1993. He served in Congress for eight years, representing Idaho's Second Congressional District, which includes the Idaho National Engineering Laboratory near Idaho Falls. He will provide us with an update on where the volunteer process stands today.

Mr. Stallings, it's a pleasure to invite you here.

MR. STALLINGS: Thank you very much, it's a real honor for me to be here and to take some of your time.

As was stated in the introduction, it is a daunting task indeed to find a volunteer host for nuclear waste. What I thought I'd do is take just a moment and give you a little of my own background. In some sense, I have some unique qualities for this job.

I served eight years in the Congress, having defeated a seven-term Republican who had four indictments against him. In a very, very conservative district, election night, after all the baggage that he was carrying, I prevailed by 66 votes out of over 200,000 cast. He called for a recount, and my margin was up significantly to 130 votes. And so with that I felt I had a real mandate to serve. But as I think about it, it worked out well, because both of us got to serve--I went to Congress and he to jail. And so the nation, I think, benefitted.

The point I make is that the part of Idaho that I represented was heavily involved in nuclear issues. And a significant part of that, of course, dealt with waste products. The INEL has a long history of really being a pioneer in the nuclear industry, leading the way in numbers of technologies. And although I'm not a scientist, I spent a great deal of time involved with the lab and got a pretty fair understanding of what we're about.

And I've got to say that I've been a little amused since accepting this position by the perceptions. As a member of Congress, I was lobbied hard and often by groups wanting rather sophisticated projects, in many instances nuclear projects, such as the new production reactor and the Special Isotope Separator, and there was little consideration of the by-products, the waste stream from those facilities. I had a number of governors contact me and say, "You're positioned on the Science Committee, would you please let the Committee know that our state is very interested in this project?" And no one ever mentioned the waste stream that would come from those machines. And my own state of Idaho was a leader in seeking after those kinds of projects.

And now the times have changed and we're dealing with those waste products, and all of a sudden the perception is out there, "Not in my backyard. We're not interested in that kind of facility or that kind of siting." In fact, I've

had a couple of political leaders tell me that they didn't want the national laboratories in their states to be nuclear waste facilities. And I've been amused, because that's what they are. In fact, most of them are in that category. And for political leaders to ignore that fact I find to be somewhat amusing.

When the president asked me to take on this responsibility, I was honored and also, again, somewhat perplexed because of the number of factors involved. First of all, the tremendous misconceptions and misperceptions in our society about nuclear things. Most of Americans get their views on this product from experiences in war or experiences in places like Chernobyl or Three-Mile Island, and unfortunately, those perceptions have not been very positive. In fact, I am critical of the nuclear industry for not doing a better job of making the case of the beneficial uses and the beneficial applications. And so we are dealing with all kinds of misconceptions out there.

My second problem is time. As you're aware, under the law, this office expires in January of '95, which means when I accepted the position in November--or it was finally confirmed in November of '93, I had just over a year to try to get the job done. Well, I spent five months as a consultant to the Secretary looking at the past program and trying to identify ways to change the nature of this

voluntary siting process to make it work.

I reviewed my predecessor's efforts, and I hope that I am not interpreted as being critical of him, because I would suspect whoever took this job in the first place might have done the same thing. But Mr. Leroy's program essentially boiled down to a "Trash-for-Cash" operation, that an approach was made to governors, to state entities, to tribal groups, and the bottom line was, "If you will take this nuclear waste, we will give you a ton of money, and you can have the money in any shape and form and amounts that you want, but please, won't you show some interest in this process?" And I was reminded of that New York garbage scow that went up and down the coast, and in fact went as far as South America, looking for a place to dump the trash from New York City, and no one would take it. And finally it was brought back to New York, where it was disposed of.

Having been in the political arena for eight years plus, I recognize the problems that political leaders have with that kind of operation. And the press immediately jumps on those kinds of proposals as being blackmail and bribery, and the perception that I hear the nation is trying to foist nuclear trash on a poor state, particularly a Western state, just is not acceptable. And then when Congress imposed the preliminary repository on Nevada, it sort of added to the frustrations and the suspicions of people with which we were

dealing.

And so my first task was to refocus the debate, to change the nature of the debate, to move away from the "Trash-for-Cash" proposition, and talk in terms of economic development, to refer to this product, this spent fuel, as more of a resource than a waste that no one really wants. And so we have done a number of things to try and give credibility to that notion.

I held a roundtable in Washington in early February. We brought some people from across the country to talk about some potential beneficial uses. And I've made it very clear from the outset that I'm not going to suggest reprocessing. That is totally contrary to this administration and the previous administration's proposals, and so reprocessing has never been an option.

Secondly, I took the whole notion of a permanent repository off the table as far as my office was concerned. We have a designated repository, designated by-law, in Yucca Mountain. So I focused totally on interim storage.

Thirdly, I concluded within my own mind that that kind of storage was necessary. It was in the nation's interest to have interim storage. It would solve a multitude of problems. And so we then began a search for a voluntary host, in which we addressed an economic development opportunity that would provide long-term jobs and that would

serve the nation's interests. And I've got to tell you that we have had some success.

Now, I inherited from my predecessor four Native American groups. In the interim, one of them, the Mescaleros, have opted to look at privatization, to establish an independent interim storage facility on their lands in New Mexico. We worked with them for a short time, but I was very up front and said any agreement that we negotiate has to have the blessings of Congress. And given the political opposition in the state of New Mexico, the likelihood of us being able to negotiate a satisfactory agreement and then have it pass with the very solid opposition of the two New Mexican senators and their governor is very unlikely. And so it was by really mutual agreement that they would consider the private route. I've encouraged them, I've suggested that this might be an option that ought to be considered.

Two other tribes, the Tonkowas of Oklahoma and the Shoshone Paiutes of southern Oregon are still considering the options, but they are trying to build political support in their own states. And I admire both of those groups, because they have really gone out of their way to try to cultivate political support. In the case of the tribe in Oregon, the Fort McDermitt Shoshones, they do have community support in both the counties, both on the Oregon and Nevada side of the line. They have support from some of the political

stakeholders, but there is still opposition from the Governor's Office. Senator Hatfield has expressed some opposition. So our message to them has been, "Continue to work with your state leaders. If you can build some support, we'll be happy to work with you."

This leaves the fourth tribe, the Goshutes. We are in the process of negotiating a cooperative agreement.

Now, just very briefly, under the previous administration, there were three levels of grants that were available to potential hosts. All four of the tribes received the first two levels. That amounted to about $300,000 total.

The third level, or the next level, was what they called the 2-B grants. They were about $1.8 million. And in last year's Energy Appropriation Bill, Senator Bingaman added an amendment that ended that grant; it was no longer available. And so I went to the Department of Energy and said, "Why don't you transfer some of those dollars to my office so that instead of giving open-ended grants to potential hosts we establish cooperative agreements, smaller dollar, with end results and specific goals and objectives developed therein." The Department of Energy was very cooperative. It took Dr. Dreyfus some doing, but some money was transferred.

We are now in the process of negotiating a

cooperative agreement with the Goshutes. We've also been in contact with the University of Utah, and one of the western Utah counties has expressed some interest. So there is some possible movement in that area. I've visited with the congressional delegation, and there's support expressed from that group. The governor has expressed some opposition, but he has also acknowledged a willingness to talk. And so we are optimistic that the Goshute lands in western Utah provide a real possibility for us. And if you've seen the press, there's been a couple of accounts in the national media about our work with the Goshute tribe of western Utah.

But we've expanded beyond the Native American groups to two other groups that show some promise. The last year or so, the climate has changed in terms of the national laboratories. With the end of the Cold War and the reductions of funding for operations at the national labs, there's some concern perhaps without a mission, without a long-term project, that we could see closures of some of these labs like we have seen closures of military bases.

So I've had conversations with some political leaders in a number of states that house national laboratories, and as we've laid out our program of economic development and research and some additional types of economic development opportunities, there has been support and some interest from those states.

And finally, we have been in contact with the base closure group. We've met on a couple of occasions with the under secretary about the possibilities of working with some, not all, of the bases. Obviously we're not interested in places like the Presidio in San Francisco. We're not interested in some of the bases that are in major population areas. But my staff has since met with the Air Force, the Navy and the Army liaisons in this realignment and base closure community, and there is an expression of interest and the possibilities that some of those facilities might be well suited.

So it's one thing to talk about introducing something new into a state, but when you have a state that is losing a significant economic driver like a base, then potential facility like we're talking about seems to make a great deal of sense.

My druthers would be a place that has had some experience dealing with nuclear materials. In many instances, bases that have housed B-52's and had nuclear arsenals meet that criteria. National laboratories that have had a long experience with nuclear materials meet that criteria.

I was asked to leave a little time for questions, so let me conclude with this thought, that the problem needs to be solved. Being part of Congress, I got frustrated over

the unwillingness of that institution to deal with long-term problems, to create debt, to create programs that were never adequately funded or not adequately taken care of, just to see the results of that be passed on to the next generation. This is a problem that we have the science and the technology to solve. It is a problem that must be addressed. There is a crisis developing as a number of the commercial utilities are finding it difficult to continue to have on-site storage. We saw that fight with northern states this year, and other states will be the scenes of that kind of battle.

I am very pleased that the president has tried to address this problem by appointing me. There was tremendous pressure on him not to fill this office, to leave it vacant with the assumption that if we didn't address this problem, then those with other agendas such as closing down the nuclear industry could have a field day. I visited with the leadership of both parties in both houses of Congress, and there is a commitment to work with this problem. So I'm committed to see this through. We hope that our progress is such that we'll have some announcements to make later on this fall. I'm optimistic that it can be solved.

And let me stop at this point with thanks for the invitation, and I'd be happy to respond to questions, to specifics, and we can go whichever direction you would like

me to go.

DR. CANTLON: Thank you, Mr. Stallings. Questions from the Board?

DR. BREWER: Yes, I do.

DR. CANTLON: Garry? Garry Brewer.

DR. BREWER: Brewer of the Board. In the final part of your commentary, are you alluding to the possible use of SAC bases and missile silos as interim storage sites?

MR. STALLINGS: Not necessary the silos, but we find a lot of those bases--or some of those bases have a lot of the infrastructure already in place, that if we look at just interim storage, it would not be difficult to build the kind of dry-cast storage facilities in one of the remote parts of those bases. I mean, you've got the fencing, you've got the security facilities already in place, adn you've also got a certain amount of local support. Obviously if that community has dealt with hydrogen bombs for the last 20 or 30 years, this would be very mild by comparison.

DR. BREWER: I mentioned the silos because they're designed to take direct hits from nuclear weapons, and probably a more secure place can't be found on the place of the earth.

MR. STALLINGS: I would certainly look to this group for some suggestions on that. We have talked very briefly in terms of the kinds of facilities that would be needed. I

find that DOE is really following two paths. One is the MPC path under the assumption that I'm not going to be successful. If I am successful, then I think that's going to change the equation a bit and we're going to have to rethink the kinds of storage facilities. If I go to a national lab, I think the storage facilities would be different than if we go to some kind of base.

DR. BREWER: Thank you.

DR. CANTLON: Yes, Clarence, Clarence Allen.

DR. ALLEN: Clarence Allen. You stated in your final sentence that you hope to be able to make an announcement on this issue later in the fall. Can you be any more specific on your degree of optimism?

MR. STALLINGS: I really can't get into--the last thing I need would be the governors to read about what we're doing in the newspaper. I've got two that are interested that we're carrying on some very, very preliminary negotiations right now, and I would rather not go any further than that other than to say they are interested. And my discussions with the Senate, essentially what they're asking for is not impossible.

DR. CANTLON: John Cantlon, Board. How optimistic are you, since you've got a January sunset, that you're going to bring this to actual closure? Because getting the agreement politically is going to be the tougher step, and particularly

the Congressional approval.

MR. STALLINGS: Yes. I have really two responsibilities. The first is to negotiate an agreement--in fact, the term "negotiator" is a little bit of a misnomer. I'm more of an advocate. And so my first responsibility is to try to develop a package that will be a win-win situation, both for the states that we're looking at and for the nation.

The second part of the process would be, then, to sell this in the United States Congress. Again, as I said earlier, I think with the building pressure, the fact that we have twenty some states now that have filed suit against DOE over this issue, that we would have sizeable delegations very eager to see some kind of solution. If we are successful, then I expect an extension. At least a year's extension would be in order so that I could see this through the Congress.

I have really not promoted this. When I took the position, my mother asked why anybody in their right mind would want the job. Just the title is kind of scary, you know, "the nuclear waste negotiator." But I think it's a title that's honest and depicts what I'm about.

And so the conversations with the Congress is that if we are moving, if we're making some progress, they would be interested in extension. The same with the White House. They feel that there's a certain win-win situation. Because

I think the alternatives are very simple. If we don't solve this problem through a negotiated settlement, there are two options. One would be leave the material on-site until Yucca's open, or what is affectionately called "Screw Nevada 3," which would take place next year. I think the latter two options are not really in the nation's best interest, and so I think a negotiated settlement really solves a lot of problems for a lot of people, and that's why I think that there would be support for a short-term extension.

DR. CANTLON: Since this is an election year and you need Congressional action, I presume, to get the sunset extended, what's the timing problem there?

MR. STALLINGS: Well, I've asked them to look at the options. The good thing is that it's not a funding issue.

DR. CANTLON: Yeah.

MR. STALLINGS: That there's enough carryover in the budgets. We've been very frugal and there's enough money left in the budget, so all I need is a simple authorization. Leaders on both sides have said that is not a difficult task. If I had to go in and ask for another million dollars in appropriated funds, that might be a little tougher, but given the fact that there's enough carryover that we can fund ourselves through most of next year, is really what I'm about. If this thing doesn't work, if it falls apart, then I'm going to suggest they close the office and look at one of

the other two options.

If we are successful, then I would think that this office not only has a role on this issue, but could do some things on other issues, because as you all know, we're really talking about political issues here. I mean, of all the sciences involved, political science right now is the one that we're dealing with. And I think I bring some skills, I have some respect for my colleagues, that I think that we can resolve a lot of the political sides.

Now, we're going to have to rely heavily on you folks to back up the transportation issues and the safety issues. But from my understanding, on the transportation, I've seen them bring spent fuel and different kinds of waste to Idaho for twenty years. I don't see that that is a great technical problem.

DR. CANTLON: Other questions from the Board?

(No response.)

DR. CANTLON: Staff? Leon, Leon Reiter.

DR. REITER: Leon Reiter, Staff. Mr. Stallings, you said that your emphasis has been rather "Trash-for-Cash" but to look at natural as a resource.

MR. STALLINGS: Yeah.

DR. REITER: But I think you also mentioned you're rejecting reprocessing.

MR. STALLINGS: Yes.

DR. REITER: Could you perhaps expand on how you view this as a resource?

MR. STALLINGS: Not being a scientist, this gets a little more difficult for me. I brought a scientist on staff, Bob Ljiimatainen, who was a staffer for the Science and Tech Committee when I served on that committee. We've also been working with a group of scientists from around the country looking at a variety of options. There are two or three projects underway currently that are examining different options.

One that I think has some promise is the creation of ozone without reprocessing. By some simple science, they have found that they can create ozone. Now, whether it's long enough lived or what the options are, the city of Los Angeles just spent millions of dollars buying and building a device that makes ozone for water purification. If this project of the INEL that they're working on now is successful, I mean we're looking at a technology that could be rather significant again without going into any reprocessing.

There seems to be some other kinds of projects that are under consideration. One of the points that I've made is that part of this package will be a significant research investment. We think there's a number of things that ought to be researched about spent fuel.

An additional possibility would be a project that the Argonne folks have developed called pyro-processing, that while it doesn't reprocess, it does do some things to the spent fuel that would simplify long-term storage. Instead of having to license a Yucca Mountain repository for 40 or 50 different products, the pyro-processing, as I understand it, essentially takes the different types of spent fuel and puts it into two different types of products, one a longer lived and one a shorter. Now, whether that is doable or not, I don't know. But the latest DOE EIS that just came out listed pyro-processing as a process that they would like to proceed and follow up on. So again, I'm giving you a layman's explanation, but the scientists that I've got advising me and working with me tell me that this is a very real opportunity.

DR. CANTLON: Other questions from the Staff?

(No response.)

DR. CANTLON: Questions from the audience?

(No response.)

DR. CANTLON: If not, then, we certainly thank you, Mr. Stallings. Appreciate it, and we wish you success, and we'd be happy to help you in any way we can.

MR. STALLINGS: Thank you very much, I really appreciate that. You know, once I took this job, the expectations of success were so low that even if I make a little headway I'll be great. So thank you.

DR. CANTLON: Thank you.

The remainder of today's meeting is devoted to the subject of transportation of spent fuel. This is an important subject, as we've just learned, and it has been the focus of quite a few meetings held by the Board's Panel on Transportation & Systems. Until his term expired on the Board on April 19th, Dr. Dennis Price was the Panel chair. Since April, Dr. Price has served the Panel and the Board as a consultant. In the interest of continuity, while we're waiting for his replacement from the White House, he has agreed to preside over this session. So let me turn the floor over now to Dr. Dennis Price.

DR. PRICE: Thank you, Dr. Cantlon. As you said previously, the topic of yesterday was the transport of radionuclides and related high-sounding things. The topic of today is not the transport of a cation, but the topic could be mispronounced, without affecting spelling, as transport at ion. High-sounding, but somehow I guess I don't like it, I'll take transportation.

Transportation is not an earth science, but it is down-to-earth, where the rubber meets the road and gravel fill supports the rails. If Kadie is a driver today, it will be from her train or 18-wheeler cab. If we talk of travel time today, it will not be measured in terms of 1,000 years, but the prevailing speed limit. Gas flow concerns will arise

when the spent fuel gauge reads "empty." We do not retard, we brake. The speaker probably says trucks, not flux. Pneumatic pathways refers to routes suitable for air-cushioned suspension systems and for tires with air.

Transportation of spent fuel, however, is an important part of nuclear waste management. And it has been the subject, as you said, of many meetings held by the Board's Panel on Transportation & Systems. We have been briefed by the DOE in the past on different parts of its transportation program, and we will be getting updates on some of these today. We have also held a number of public hearings on issues of concern about safety of spent fuel transportation. In fact, one of those public hearings was held in Denver, in this hotel, in August of 1991.

These panel activities not withstanding, this is the first time that the Board as a whole is meeting on this subject. It is appropriate, therefore, to set the stage with an overview of the context before proceeding to the specifics. We will begin this session with a presentation from the U.S. Department of Transportation, which is the primary safety regulatory agency, and we appreciate their courtesy in being here today. From there we move to the DOE transportation program, starting with an overview and progressing in detail about specific parts of the program. This will comprise a major portion of the session. The

presentations about the DOE program will be followed by perspectives from the railroad industry.

We have provided time for comments from the audience at the end of the day. And if necessary, I will serve as a time keeper for the speaker. I will signal you five minutes, three minutes, two minutes, one minute and stop. And if you would, please, if I signal at five minutes to go, please allow time for questions by trying to stop as soon after that five-minute signal as possible. That may not be necessary, I may not hold up a card all day long. We'll see how things go.

Our first speaker this morning is Richard Hannon, Director of the Office of Hazardous Materials Planning and Analysis with the U.S. Department of Transportation. That's DOT, not DOE. And we appreciate your being here this morning.

MR. HANNON: Good morning, and thank you. My name is, as Dennis has said, Richard Hannon, known as Dick Hannon. I am with the Department of Transportation, a large organization, as you will see. This will be an overview, fairly informal. I think Dennis set a tone that I feel most comfortable with. This is a serious subject, don't let any injections of humor detract from the seriousness with which we do address the issue.

In preparing for this session, I looked over some

remarks I prepared in 1984. And in many ways, I could have done the same presentation. I offer this as a question as much as a statement. We do have greater specificity in many things in our regulations. I think many of the parties that were participating in the debate on the transportation side in 1984 are still participating, and the level of discussion has always been high. We deal with lots of materials, lots of controversy, but I don't think there's an issue that has a higher level of involvement and concern by the general and the effective public.

So what I will be doing is providing, through an introduction, what I will be telling you, or attempting to, in an overview of transportation. There is not geo in anything I will be saying. I looked at the papers from yesterday, and I usually am a pack rat. I couldn't take any of them home because I couldn't understand the titles. Hopefully I will get across what we mean by transportation, address the federal roles and authorities, the safety regulatory program at the Department.

No discussion of federal-state relations would be complete without some addressing of preemption and routing issues. Discussion of our external relations, quick overview of a couple mandated studies, current nuclear issues at the Department, and hopefully show how the Department is involved with these issues. They will be the Foreign Research Reactor

Return Program and also the New York City issue, one of the longest running regulatory issues we've had at the Department. It's now in its eighteenth year.

This is a depiction of the Department and its operating elements. With a flick of an illustrator, we got rid of the many levels of assistant secretaries and secretarial offices. These are the operating elements. Many of you are probably familiar with, if you got here by air, you know about FAA. NHTSA does highway safety, air bags and so forth.

The Department has three main characterizations. It's a safety agency first and foremost; it's a promotional agency, like Federal Highway and the Saint Lawrence Seaway; and an operational agency. Many of the administrations provide all of these services.

I'd like to focus on the four operating elements within the Department that are concerned with the movement of high-level radioactive materials, spent fuel, if you will. There's a certain degree of graphic license. I am not a technical person, I am more of an economist now policy maker, and I don't know if all these things add up to anything, but I'll leave that to the artist.

All of these agencies have an enforcement responsibility. The Coast Guard is the water side of hazardous materials. It does promulgate and enforce the

regulations for bulk materials by water. The Research and Special Programs, of which I am a part, is the primary regulating agency within the Department for hazardous materials. We promulgate the regulations for non-bulk by water and all other modes--air, land, the rail and highway components. The Federal Highway and the Federal Rail Administrations are primarily enforcement or operational agencies. Federal Highway recently--recently in like atomic time--three years now has had the responsibility for the routing of hazardous and radioactive materials.

This is the reason for being at the Department right now. Secretary Peña, who's a former mayor of the city of Denver is very committed to the National Transportation Strategic Plan. This is an outgrowth of the National Performance Review--Vice President Gore, President Clinton and so forth. It's a reassessment of what is government about staying in touch or sometimes getting in touch with its customer. This was released in January of '94. It has seven basic goals.

One that is most related to this issue is Goal 4.4. It's to promote the safe and secure transportation. And the objectives as you can see--I won't read them all--but this is somewhat of a guidance that we're given to speak on. The reason for much of what we're doing is to also--we specifically at RSPA have a goal to reduce the deaths and

injuries of hazardous materials. It is not a high consequence business right now. The average over the last ten years have been on the order of eleven or twelve fatalities in the interstate transportation of hazardous materials.

I'll get into the federal roles and authorities, upper and lower. The upper two organizations are primarily the regulators, and in the case of spent fuel transportation, the Department of Energy is the regulator. I will speak about the basic legislation that gives us the authority to act.

In DOT's case, it's the Hazardous Materials Transportation Act. Under the HMTA, we regulate safety in transport of hazardous materials, including radioactive materials. This extends to certain packages and the regulating of the conduct of shippers and carriers in commerce. Commerce is the key word. So the clear distinction was made in the recent amendments act that we had in 1990 that the Department of Energy and its contractors are subject to the U.S. DOT regulations.

The only recognition of DOT in the Nuclear Waste Policy Act was Section 137, and it had two parts, one which has been corrected. I think it was probably a function of loose law writing. But it had to do with the spent fuel to interim storage would be in accordance with regulations and

requirements of commercial spent fuel. That's clearly been extended to any shipments under the program by DOE, not just to interim storage.

And the second part had to do with using the private sector to the fullest extent possible. I think with the number of commercial entities interested, that will be satisfied. But if it did reach an impasse, there is a fairly obscure part of the NWPA that has the Secretary of Energy asking the Secretary of Transportation to make a determination that the private sector is not fit, willing or able to provide transportation services for the DOE program. That's very unlikely. The key part, I think, is the fit, willing and able at reasonable cost. So I think it's to give a little leverage so that DOE's not held up unnecessarily.

You're probably most familiar with the responsibilities of DOE under the Act and the amendments. And the NRC has basically the same statutory basis, but different areas of emphasis.

To resolve or at least address overlapping regulatory responsibilities, the Department of Transportation has entered into Memorandum of Understanding with the Nuclear Regulatory Commission. This MOU was adopted in 1979 and is still actively in force.

The Department of Transportation, with regards to the international shipments, is the national competent

authority. But most domestic activities are a shared responsibility, with DOT having a responsibility for developing the overall safety standards for the mechanical condition of the carriers, the driver, the operating conditions, the communication of the hazard, the placarding and the classifying materials.

We also have the responsibility for the package. This is all the way up through the Type A package, which is the dividing line for the basic regulatory structure. Low-level radioactive wastes and Type A packages are not the kind of materials that the Board is principally concerned with. You're principally concerned with the activities that the Nuclear Regulatory Commission is responsible for.

As you can see, the Commission is responsible for the regulating receipt, the possession of the materials. To provide safety and transport, a spent fuel package must provide three functions, and the Nuclear Regulatory Commission is responsible for those standards. It has to do with the containment of the spent fuel, the shielding from radiation emitted by the spent fuel, adn the control of spent fuel to prevent criticality. So the NRC reviews the Type B package, which will be the package used for the movement of the spent fuel.

An additional activity that the NRC has has to do with safeguards. They review routes to see that they meet

the safeguard conditions imposed by the Commission. It's a security review. These reviews are done in conjunction with the Department of Transportation, which looks at routing from the safety aspects. So NRC won't approve a route from a safeguard standpoint unless it complies with the regulations as to safety regulations with routing.

Another Memorandum of Understanding we have entered into is with the Department of Energy. Fortunately, you can't make it out, but the logo there for DOE is the one for NRC. I don't know who to apologize most to, but in the printed version, it's correct, with DOE. This memorandum was entered into in 1985. It's never really been activated. It was as much a marriage of convenience as anything. It has grand words, and we've really not gotten to a point of conducting anything under it. So it has the form of an agreement to agree and an agreement to disagree. It's on paper, but it's not been activated.

The area that I will primarily address are those responsibilities that are carried out by the Department of Transportation. This is reflected in the Hazardous Materials Transportation Act. This was a clear statement by Congress of a uniform system of regulations for the moving of hazardous materials. This was first enacted in 1974. The clear statement of uniformity was reaffirmed in the 1990 amendments, which was called the Hazardous Materials

Transportation Uniform Safety Act, known and loved as HMTUSA.

The basic law was in effect for sixteen years. There was substantial amendment to it, but the basic thrusts remain, that the Secretary shall issue the regulations both for intrastate, interstate and foreign commerce. To date, the Department has been fairly limited in the imposition of its regulations to purely intrastate operations.

The question you've always wanted to know, what is a hazardous material? In effect, it's what the Secretary says is a hazardous material. Since he was well known and well liked out here, I'll give him due deference. But there's been, other than the traditional roles of public health and safety and the minimization of property damage, over the last few years, the question of the environment has been added to the equation to determine what is a material or substance that does pose an unreasonable risk.

This is a table showing incidents of hazardous materials. Incident is an unauthorized spill of a hazardous material into the environment. As you can see, there's something approaching 13,000 in the most recent calendar year, '93. These are shipments of hazardous materials, any quantity, in interstate transportation. And it's a listing in rank order, as you can see--flammables, corrosives, poisons and so forth. And fairly low on the list is radioactive materials.

This is not to minimize the importance. I think a larger percentage of my time is spent on this issue than on any other. Gasoline and flammables are what cause the problems in the country, but it's a well understood material by the general public. It's fairly well understood by the response community. And there's a clear understanding of the benefits by the public of what these materials can do for them. This is not necessarily the case for radioactive materials, but I'll leave that to other learned people to address and resolve.

But with radioactive materials, the eight incidents that were reported all had to do with radiopharmaceuticals. And there's significant movement of these materials, something in the order of three million shipments a year. And seven of the eight were by the air mode, which is not too attractive a mode for the movement of spent fuel.

The way we basically do things, being a safety regulatory agency, is to write rules. Our rules are codified in code of federal regulations under Title 49. It's 800-plus pages of the Hazardous Materials Regulations, a very comprehensive body of regulations. It's actually down from about 1,100 through a streamlining effort. I guess we don't do Conestoga wagons anymore. The HMR, the regulations, do set the framework. These are the rules that the shippers and carriers have to abide by. There are procedures for granting

exemptions and special conditions from these regulations, but the HMR is the body that must be complied with.

The rulemakings were primarily a prevention activity, and the rules of operating practice, which, if rationally conceived and consistently followed, will minimize the chances of system failures. We work hard at least to rationally conceive the regulations. It's always a question of debate. But it is an iterative process. The regs have been in effect for a long time for not just all hazardous materials, but specifically for the radioactive materials. I'll show on a later slide what the activity level has been for spent fuel and address a little bit these materials have basically been moving fairly incident free. There have been incidents, not to say there haven't been, but the exposure of the public has not occurred.

Principal components of our rulemaking process has four elements: to classify, control the packaging, the operations, and figure out how to communicate what the risk and hazards are. The classification has to do with whether it's flammable, poison, corrosive, that list I showed earlier of what types of incidents have occurred. The packaging, as I said, we do Type A, NRC does Type B with regards to radioactive materials. Operations has to do with how the materials are placed on vehicles, marked, secured and so forth. And the communication has to do with the shipping

papers, emergency response guidance, the notification.

Our notification requirement is a post-notification, which is counter to general belief by some states that there is a need for pre-notification. Pre-notification always has occurred, I believe--it's a word I feel uncomfortable using, always--but we don't see a regulatory need to require it. Studies that were done for us indicate that if we required pre-notification of shipments going through areas, it would be required for many more materials than just radioactive materials. And when it has occurred, it just basically ends up in somebody's desk drawer. So the benefits we don't see are there. In the earlier days, probably in 1984, when I gave these remarks, I think that the governor didn't want to know it was in the state. Now they want to know it's coming so they can find ways to maybe prohibit its movement.

But that's the basic approach we use for rulemaking.

To describe a little about how we deal with states and local organizations, it's a process called preemption. There's a very clear mandate in both the 1990 Act and the 1974 original Act which is a clear statement of when laws and regulations at state and local level are inconsistent with this national uniform system that they are preempted. There's been some clarification in the '90 Act, but the

thrust of it is still there. The presumption is a safe transportation will occur if there is compliance with federal regulations and enforcement.

So the three main elements of the preemption process: The first bullet I won't read. It basically recognizes a dual compliance test, also known as the Impossibility Test. The second bullet has to do with the obstacles, whether a state or local requirement presents an obstacle to comply with the federal regulations. And the third bullet was added in the 1990 amendments, which delineates covered subjects that on their face are inconsistent and therefore preempted.

It's probably the most contentious area we deal with in state relations, but probably two-thirds of the preemption cases that have been decided at the Department of radioactive materials as either the principal or the secondary element. So it has tested our process.

Prior to the 1990 amendments, these preemption decisions were advisory in nature. Courts, the judicial system, did give due deference to the Department's decisions, but they were nonbinding. In 1990, the Congress in the legislation made these legally binding, but still with legal review possible.

A specific area that has served for a great deal of controversy has to do with highway routing. Not so much yet

the routing or movement of fuel by other modes. No proceeding to date, or at least for a long time, has had a greater impact on the ability or the inability to move radioactive materials than HM-164. HM-164 is the docket number established at the Department to establish routing guidelines for highway. I think that's probably changed. Routing is probably not having the greatest impact on the ability or inability to move materials. Probably been replaced by NEPA and the environmental activities. But it's still a strong player.

The basic regulations were established, promulgated, January of 1981. January 19th, to be exact, was the last full day of the Carter Administration. As background, this was the first thing that we had reviewed by the incoming Reagan Administration. It did stand muster. It has stood muster all the way to the Supreme Court. And it is an area that does generate a lot of controversy. I think in the last ten years that the ability to measure effects has been an area that has improved. The metrics that were used then were not as sophisticated as the ones now. This may be an area that will be reviewed.

This is, as I mentioned earlier, a responsibility now of the Federal Highway Administration. There was a realignment out of the 1990 Act where modal activities are now being addressed by the mode involved intermodal

activities and the basic promulgation of regulation still remains with RSPA.

The basic criteria for highway movement is to reduce time in transport. And as you'll see now with other modal options, there's not a great wealth of regulations in effect. The state designation of alternative routes is an option that is available. It's an option that's been exercised by about eight or ten states. Colorado is one of the leaders in that area. But there's not much moving.

The highway mode has very specific regulations and routing guidelines and standards. Federal Rail, in the rail mode, doesn't have that same body of guidance. The basic guidance they have in regulation is no unnecessary delay. You know, wars and lawsuits are fought over words like that. But this is a policy statement that the Federal Rail Administration has in effect. It's been in effect since the Three-Mile Island shipments in the mid- to late 1980's.

So prior to a shipment, the Federal Rail inspectors will inspect the right-of-way, see that it complies with all existing federal regulations. They'll conduct reviews to see that the train crews are qualified and are complying with the operating requirements.

And prior to the first shipment and each subsequent shipment, they will also review the rolling stock, the locomotive, the cast car, various buffer cars, whether

there's a caboose or not.

This is an area in Three-Mile Island that, strange as it may seem, the buffer cars are there to provide some additional support in case there is a derailment. Let them take the shock first. There was a car marked as a hazardous material car used as the buffer car. In fact, it wasn't containing any hazardous material, but it did create a lot of controversy. So the basic buffer cars are to just be either sand or some fairly benign material, not a load of flammable or corrosives or poisons.

The cast cars are specifically inspected as to their ability to comply with the regulations. Also the shipping papers. We're not in the business of providing the radiologic inspections and examinations. That's usually done by the NRC, and usually the state agency's around. But the follow-up inspections for the signal system and the track is done at intervals not to exceed six months.

This table depicts the level of activity of domestic and international spent fuel shipments since 1979 to the current year to date. As you can see, there's been not a lot of activity. These numbers compare with numbers like 500,000 shipments a day for hazardous materials. So these are very unique shipments. There's a story that goes with each one. And at the end, I will illustrate one that's currently under way with the foreign fuel and the New York

City issues. So the numbers have never been very large. I think the peak year was 1984 with 209 highway movements. And as you can see, there have been five so far this year by highway and two by rail, so it doesn't appear to be a growth business.

These are commercial spent fuel shipments. These numbers come from the Nuclear Regulatory Commission. DOE may have other--the level of activity is higher than this, but these have to do with those that come under the regulation of NRC.

This is a portrayal of government industry relations, somewhat idealized. The people are all around the table. I strongly believe that this is how it gets done. The public is one person standing there to portray the public. That's our charter, is to be concerned with public safety. Lots of people have that charter, and sometimes the issue seems to be in conflict. But this is some of the players in the nuclear arena. It's not to be an exhaustive list, it's just to be representative.

Our community of interest is probably strongest with the enforcement community. We deal with the highway patrols, the DOT's, the state DOT's, so forth. We expend resources in training and providing outreach materials to them through forums like COHMED. It's a Cooperative of Hazardous Material Enforcement Development activity with the

states. And Federal Highway has a program called the Motor Carrier Safety Assistance Program, which has reasonable amounts of money, something on the order of $60 or $70 million a year, that goes to assist states in enforcing hazardous materials regulations.

The State and Local Emergency Preparedness Organization is a fairly recent activity that we've taken on. FEMA has the basic federal responsibility to coordinate the federal response. We have a grant program, which I'll illustrate in a minute, but that's to provide funding to the emergency response community to better plan and also train for emergency response to hazardous materials incidents.

The Emergency Preparedness Grants Program was established in the 1990 law. It is in effect now. The graphic shows 47 states. These are the ones that were given out in the first year. The second year funding has just been--the letters are, I think, in the mail, or should have been received. So the 47 states are now 50. In the first year, a couple states didn't participate, some were late, and one didn't think he needed the money. But apparently a state program didn't pan out, so they're now all participating in this program.

The money, 8.4 million, you divide 50 or 55 into a number like that, it doesn't come out very large. This is to be a highly leveraged, I think is the word, program. It's to

be an increment above the existing state and local funding. It is really to provide funding for the EPA Title 3 community right to know responsibilities that your friendly federal government imposed on state and locals but didn't send any money to, so this is an attempt to fund those state and local activities.

The monies collected in a federal registration program are collected at DOT. In fact, in my office. I used to have a full head of black hair, but having a registration program will age you terribly. But the money basically comes in and then sent back, with a small handling charge, to the states. There's a $300 fee. We have something on the order of 26,000 registrants, both shippers and carriers of hazardous material.

Under the 1990 Act, there were two mandated studies in the area of radioactive materials, both emphasizing public safety. I think the emphasis was very clear. It was to not consider economics. It was to really look at the safety aspects. The two studies are the Mode and Route Study and the Dedicated Train Study.

The emphasis for these studies came out of the Three-Mile Island shipping campaign of the late '80's, the movement of the debris from the reactor at Three-Mile Island. A lot of it was generated in St. Louis, which was the interchange point between Conrail and the Union Pacific

taking the materials to Idaho Falls.

Senator Danforth, senior member of the Senate Commerce Committee, was very interested in this issue. He was looking for another junction point, in essence. Part of the economic development history of this country was written by railroads. There aren't a lot of places where you can move things east and west. Basically, Chicago or St. Louis or something more southern. So St. Louis was the gateway to the west that was chosen. This was in--it's easy to calculate--1988, because Senator Danforth was up for reelection at the time.

But a study was done by the Department, and specifically my office, looking at the process that the Department of Energy used to select the mode and the route for the movement. And it essentially made sense. It minimized or reduced the time in transport. And the times involved, DOE did use a dedicated train.

The schedule that Conrail offered to move by general freight between Three-Mile Island near Harrisburg to St. Louis was on the order of twelve or thirteen days. It would have stopped, I think, at every local junction on the way. I think it got finally moved--it moved something like two or three days from Harrisburg to St. Louis, with lots of pressures brought on to keep the material moving. As I said earlier, the basic federal guidance is no unnecessary delay.

The difference between two or three days and twelve or thirteen days would have been a call we might have had to make. But the material did move expeditiously when it finally did move.

There were a couple incidents, a grade crossing accident in St. Louis. These shipments all have stories and anecdotes that go with them. I won't bore you with them today.

The Mode and Route Study is a study that my office is responsible for in the Research and Special Programs Administration. It is a study that under the law we had to start within twelve months. We're taking full advantage of the Congressional language. Usually they tell you when it has to be finished, not when you have to start it. We did, in fact, start this within the window. It's not yet been completed. It is a study that is different than the Dedicated Train Study. There is no rulemaking involved with the Mode and Route Study.

It's purpose is clearly stated there, to determine which factors, if any, should shippers and carriers use in selecting modes and routes. And public safety, we've extended that to include the environment.

And the study on the next slide, we've received comments to a draft report that was made available to--I think we attempted to send them directly to interested

parties, and also it's availability was announced in the Federal Register. We received eighteen comments from either industry groups, state, groups of state, like the Western Interstate Energy Board, and just plain interested people.

The public comments, I think without prejudicing the release of the report, because it's in final review, we're centered on the four bullets you see here, the perceived risks, the safety afforded by the cask, the weights for selection factors. The overall comment that the study was of questionable utility. These are my words, not others'.

The perceived risks, it was unique that state and local governments, and carriers agreed on this one. It's an issue that we felt was beyond the scope of the resources that Congress gave. We did more of a traditional risk assessment, not into the iffy, touchy, feely field of perceived risk. But to repeat, the state and local governments and carriers agreed that perceived risk is a significant factor in selecting a mode or route. We subscribe to that, we just weren't equipped to handle it in this study. This will not be the last study in this area.

The safety afforded by the cask was somewhat an annoying comment from the Department of Energy. They said basically that anything done in the area of mode and route selection was unnecessary. The reports basically came from

the former defense side. It did, to me, represent thinking of a decade ago.

I think there is general agreement, and Jim Carlson and the OCRWM program can address this more specifically. But I think there has been a dawning of enlightenment that mode and route selection is a factor that needs to be considered. And we will work with DOE and others, or if the Congress mandates us to do a study, it really gets into that next phase of perceived risk that we would obviously carry out the Congressional mandate. But for this study, with the $300,000 that was made available, with all the carrying charges that we have, it just was beyond the scope of this one.

Weights for selection was another one. We would like to be able to put weights on, but we're in no position to do that yet.

The questionable utility, we were criticized that the study really didn't focus on NWPA shipments. That was conscious, maybe cowardly, but it was conscious. We preferred a more generic approach, looking to our good friends at the office of Civilian Radioactive Waste Management to get into that when their routing criteria is discussed. But there are shipments underway, and it's hard to say when they're going to be NWPA shipments.

So we were looking at things for the near term.

The studies should serve as a building block for the next round of studies in the area.

So the status is, starting with the bottom first, we hope to have it available in the fall. That's something in the order of late September or October. It will not be a report to Congress, it will be a report that will be transmitted to Congress, as it will be made available to interested parties.

Now on to Dedicated Train. The Dedicated Train Study is the responsibility of the Federal Rail Administration. This study is being done in-house by our system center in Cambridge, Massachusetts, the Volpe National Transportation System Center. And again, the emphasis on safety. Cost in dollars is not a consideration.

And the purpose is to assess the comparative safety of transporting high-level radioactive materials by dedicated trains, which is a term that begs for definition, but it is a train basically dedicated to the movement just of the spent fuel. There are no other commodities being moved.

And this study will result in rulemaking, I believe. If the Federal Rail Administration believes that no rule changes are necessary, the burden is on them to state that and convince the Congress of that. There is very specific language in the 1990 law saying in effect this should lead to rulemaking.

Some of the comments that we got on the deficiencies in the Mode and Route Study will be addressed in the Dedicated Train Study. In particular, some comments by the Western States Energy Board looking at multicask trains.

So the release of both studies will probably be pretty close in time, and I think they should probably both be looked at together. It's still in the review process within the Federal Rail Administration. It has not been sent to other elements of the Department before it's sent to the Secretary, before it's sent to the Office of Management and Budget, before transmittal to the Congress. The initial draft of the report was submitted to FRA in February of '93, and they're still indicating September 30 date to Congress. This is a fairly optimistic date, I believe. These tend to move glacially in our review process.

We're almost there. The current nuclear issues, I've selected two. I will talk about the last bullet first, which is the New York City case. This issue has been around since 1976. It was the precursor to the highway routing rule. The city is now before the Department seeking a waiver of preemption, which is basically an admission that they're inconsistent with the national scheme of routing, but that their approach offers an equal or greater level of protection to the public without creating an undue burden on commerce.

They have suggested a route that would utilize a

ferry boat. I believe a dedicated ferry boat. I guess that will be the next study. A ferry boat across Long Island Sound to Bridgeport, Connecticut. And as you could imagine, Connecticut has some views on that.

One of the basic guidelines that we have in all of our regulations and preemptions and reviews is that the export of a risk is a no-no. These materials you shouldn't dump on your neighbor, in effect. But the routing scheme basically only works if the states work together. They're part of the reason why more hasn't moved.

But as I said, It's been eighteen years on and off with them. A decision should be made, hopefully, this fall. Hopefully it won't get tied up in various elections and so forth.

But the 1990 amendment gave the Department discretion to grant a waiver of preemption. So if the city's petition does show that it's fit, willing and able to use that ferry boat route and doesn't unnecessarily burden commerce, we still have discretion. It's discretion that we will look very carefully about exercising. It could well be tested in a court again, either by Connecticut or by New York City.

The second current issue that is illustrative of the roles we play. The first time I saw it, it looked like one of Hitler's battle plans, I think. It's a little too

ominous. But we do take graphic license now and then. The "urgent-relief acceptance of foreign research reactor spent nuclear fuel" is an issue that's on the table right now. Our staffs were meeting last week in Augusta, Georgia with the affected southern states.

This initial program, of which DOE has released an environmental assessment and a finding of no significant impact on, involves 409 spent fuel elements being returned from seven countries in Europe: Austria, Denmark, Germany, Greece, the Netherlands, Sweden and Switzerland. When this research field was made available to them over the last many years, a condition of sending the fuel was that we would accept the fuel and require its return to the United States. We have a little problem now of where to put it.

So that's DOE's problem, and for now, the SRS there is the Savannah River Site, which is the planned storage site for this fuel until its final resting place has been determined. The Department deals with the ocean side of that through the Coast Guard. Sunny Point, North Carolina, is probably not on most tourist maps, but it is the military ocean terminal at Sunny Point, called MOTSU. And it is the basic weapon shipment point for munitions going in and out of the southeast part of the United States. They have lots of experience moving fairly exotic, nasty materials. It's a state-of-the-art facility. What they didn't want, I think,

is another customer.

These materials would be brought in on commercial vessel. The casks that they're talking about using would, I think, be all foreign certified casks. They would be highly legal weight casks. And the 409 fuel elements would probably require fifteen cask loads. And they hope to assemble seven or eight casks so the shipping campaign could be completed with just two ocean-rail shipments.

Rail is the identified mode out of Sunny Point to Savannah River. That straight line from Sunny Point to Savannah River is somewhat deceptive. Railroads don't run that way. So it will go to Charleston, South Carolina, before it goes to Savannah River, which will pique some interest there, I imagine.

Highway is still an option, but the local people around Sunny Point and in North Carolina and a good bit of the Congressional delegation really want it to move by rail. They're very pleased with how well the build-up for Desert Storm and those activities were carried out, and they have a lot of confidence in the rail mode for the journey to the Savannah River Site.

That completes the prepared part. That's the end. Thank you for the opportunity to give a broad, sweeping overview, hopefully, of DOT's role. The Department, in conjunction with NRC, will be quite a bit of the regulator

for these movements in the transport. EPA and OSHA and the litany of other federal agencies will all have other roles, EPA especially, at the site, but that's an area you all are familiar with than I.

So I thank you for the opportunity. I'll try to answer any questions you might have.

DR. PRICE: Thank you very much, Dick. A couple of quick questions that I might ask you here, and then we'll ask some from the Board and the staff and so forth.

With respect to the definition of first shipments, in a prolonged campaign such as spent nuclear fuel might be over many, many years, how is a first shipment defined?

MR. HANNON: Well, historically, it's a term that's been used with Three-Mile Island shipments and the recent shipments that Carolina Power has. They have never been this long by rail. So the policy--I'm speaking for Federal Rail right now, but I'm sure the policy will be to perform the inspections necessary to maintain the integrity of the crew, the right-of-way and the various equipment that is used.

DR. PRICE: So there could be periodic inspections because--

MR. HANNON: There would be.

DR. PRICE: --of the long term?

MR. HANNON: Yeah, there would be. And as I indicated, right now, if a route is selected, the review is at least

every six months. We haven't had any real long-term campaigns other than Three-Mile Island where it did last over a year. So there were the recurrent reinspections. There's inspection of the equipment prior to every shipment.

DR. PRICE: And you mentioned time in transport as being one of the principal criteria. Would you like to comment on population risk and the use of GIS and other things that you see that might bear on more of a risk base and route-specific approach to things?

MR. HANNON: As you'll see in the Mode and Route Study, these are the factors, like risk assessment, type of population potentially exposed, and environmental wetlands, and specific environmental considerations, are all being considered. There are probably eight main factors that seem to coalesce. There was an advisory group that was convened both for the Mode and Route Study as well as the Dedicated Train Study, trying to get on the table in a single document what are the factors that really are important. And population, how and where it's located, even the time of day is going to be a factor of where people are at what time of the day and who they are.

The slam I had on DOE about how the cask is the answer, in many ways it is, but I don't want to not consider mode selection and route selection. And I think that's where these other factors will prevail.

DR. PRICE: And accident-specific data, for example, the avoidance of peculiarly sensitive intersections or areas of interstate where they have bad records and bad experience, is that in the Mode and Route Study as well?

MR. HANNON: Yes, yes, in both the studies. And in the Three-Mile Island study that was conducted, we looked at the --you know, sometimes they're gross numbers, what are accident histories of a mode or route, but it's something that can be refined. The difficulty we have is what weight do you give to which one and what are really the determinants? So it's an area for additional research.

DR. PRICE: So I take your answer--and I'm going to get to you in a minute, Clarence--to indicate that GIS and route-specific risk based is probably what is forthcoming.

MR. HANNON: Yes. In conjunction with another one of our goals, the Secretary's goals, is global positioning systems. And the goal of the Department is to make that the world standard for positioning. So there are activities in tracking and specifically knowing where materials are. We are encouraged to do this, but we have not, in rulemaking, required that.

There was a very comprehensive study by the National Academy of Sciences about two years ago now that did look at the tracking element of hazardous materials, knowing where things are. But when we deal with numbers like 500,000

shipments a day, which really could be 1.5 million when you look at the loads and offloads and so forth, it gets to be a very, very complex, and in some ways unnecessary, problem.

But there are certain materials, some of the poisons, rocket fuels in particular, where escorts--while we don't require it, we put in language in their exemption that in effect the only way they can satisfy is to escort the material and know where it is.

DR. PRICE: And do you have a feeling about escorts with respect to spent nuclear fuel, then?

MR. HANNON: I think the position so far is that they're in the way. We don't require escorts. We look at radioactive material almost like its another hazardous material, and we don't require escorts for other materials. That is the position now, and it could change. NRC requires escorts in certain areas, and we don't prohibit them, but we don't require them.

DR. PRICE: Dr. Allen of the Board.

DR. ALLEN: Yes, in your discussion of the Mode and Route Study, you made a statement that you wouldn't want to do anything that might be in conflict with--and I quote you directly--"our good friends at the Office of Civilian Radioactive Waste Management." Doesn't this relationship give some reason for the public to be skeptical of your role as a regulator?

MR. HANNON: I think it's pretty well spelled out in the MOU that yeah, we have clearly defined responsibilities, and the Congress has given the Department of Energy the responsibility to come up with a transportation plan. They've given us the broad authority to have in effect, have in place, a scheme of regulation. We will regulate them. In many ways, a Fed is a Fed, but we feel comfortable that there is a clear line between getting too friendly. That was somewhat of a backhand compliment to the people of DOE being given a test. It's very awesome. And we do know our lines of division.

DR. PRICE: Dr. Cantlon?

DR. CANTLON: One of the problems in this whole area of nuclear waste has been the perceptional problem, perceptions of risk. We have encouraged in the Board's activity that DOE use more external peer review of its decisions rather than its very competent in-house and long-term contractor things. Does DOT have a similar kind of external expert credentialing of its major decisions?

MR. HANNON: The process we go through is a very open, a very public process through rulemaking, with notices in the Federal Register, which is an open process. We have starting with an advanced notice of a proposed rule, which is just almost seeking information. Then we step to the notice of a proposed rule. And that's a clear indication of where the

Department is headed in a rule. And there are lots of comments along the way.

The HM-164 docket had something on the order of 1,800 comments. Eight public hearings. We do go on the road, and we do listen. We are required to address all comments. We don't have to accept them all, but we have to address them all in our deliberations. And the review process is, that's our peer review, is the public. It's not as much bringing in, you know, technical talent that way. We will use contractors, as we have used in some of the studies.

The Battelle Corporation led a team for the Mode and Route Study. As I indicated, the Dedicated Train was done more in-house and tapped external parties.

DR. CANTLON: But you make many decisions affecting safety that are not formal rulemaking decisions on what is a hazardous material, that sort of thing, and I guess I'm really trying to look down inside your process, short of the formal rule process, which is somewhat more open.

MR. HANNON: Well, the classification of a material is an open process. I mean, there's lots of debate now about sanitary food. And some of the materials that are fairly well used and recognized in normal commerce could be considered a hazardous material under some laws. So the whole body of regulation, from classifying, packaging, communicating the risk, is an open process, and the formal

peer review in an academic setting is something that we have not availed ourself much of. The National Academy of Science is a recent example, where they were charged to conduct a study and, through the NAS process, entered into a peer review. But it's not a process we normally use. We use the full open public discussion.

DR. CANTLON: Second question, Sweden and Japan, for instance, have relied almost entirely on marine routing for moving their nuclear materials. In this country, that's a virtually unused mode. So many of our reactors are in high-population corridors along the East Coast and so on. Has any thought been given to exploring the marine transportation of spent fuel to avoid some of those tough corridor problems?

MR. HANNON: Well, again, the Department feels there is a body of regulation in place to use it. The mode of choice is a decision that's made by the shipper. It's not done in isolation, obviously. But it's a shipper decision in conjunction with the carrier and the states and localities that it will go through.

Marine does seem to have--Japan has the option of sending it to England. Our options are Puerto Rico, the Mariannas and Hawaii. We don't have those same options in that sense. But marine has been used now with the movement of fairly--not spent fuel, but barely used fuel out of the shoring facility. It did use deep water barging out Long

Island Sound, down the ocean, up Delaware Bay and put on a railroad. So that may have been the path of least resistance.

We would have not required that. If we had been asked to rule, we probably would have said take it over, put it on a truck and minimize the time in transit. You'll be there in no time. But that was a shipper/carrier decision. There had been an arrangement made with the city, they thought. As soon as the papers got a hold of it, that option no longer became available. So, they wanted to move it, they made a choice. We would not have required it.

DR. PRICE: Dr. Langmuir, Board?

DR. LANGMUIR: I'd like to bring you back to Overhead 10, or if you can recall, the overhead titled "Hazardous Materials Incidents by Hazard Class." I want to make sure I understood correctly what you said. My understanding was, and please correct me, that you have essentially three million shipments a year of radioactive material?

MR. HANNON: Yes.

DR. LANGMUIR: And of that three million, we had eight incidents in '93. And of those, seven were pharmaceuticals by--

MR. HANNON: I think all--

DR. LANGMUIR: --by aircraft or--

MR. HANNON: I think all eight were

radiopharmaceuticals.

DR. LANGMUIR: Okay, all eight were radiopharmaceuticals.

MR. HANNON: Seven of the eight were by air. That list of about 13,000 incidents are those incidents reported. There's a reporting requirement. There's obviously some controversy, does everybody report? The answer is probably no, not everyone reports. But it's been a consistent measure over time of reporting.

DR. LANGMUIR: What percentage of transportation of these materials is by air versus by land, shipments by truck or by train?

MR. HANNON: Of the three million?

DR. LANGMUIR: Yeah.

MR. HANNON: I could provide that number.

DR. LANGMUIR: I'm just curious what our track record is.

MR. HANNON: A lot of it's by air, because it's radiopharmaceuticals with fairly short life--

DR. LANGMUIR: They're small shipments.

MR. HANNON: Yes.

DR. PRICE: Dennis Price. Don brings up an interesting point. What you show us here are actual numbers, but not adjusted for risk by exposure. And to understand risk, we need miles of exposure or something like that. How would

these radioactive material shipments compare with, for example, flammable, combustible liquid in terms of miles of exposure, adjusted risk? That's a tough question to throw at you on the spot, but maybe you could give us a ball park kind of feel for it.

DR. LANGMUIR: And my question was, have there been any fatalities associated with these?

MR. HANNON: No. In the movement of spent fuels in the 40-plus years of moving it, there has never been a death or serious injury attributed to the material.

DR. ALLEN: Does that include military shipments?

MR. HANNON: I believe so.

DR. PRICE: I want to follow up on what was just said about fatalities. With respect to the eleven or twelve fatalities you said in their recent history, how many of those were due to the release of the hazardous materials themselves as compared to the accident event?

MR. HANNON: Okay, point of clarification. These are all due to the hazardous materials. So if a gasoline truck runs into a bridge abutment and the driver dies of the trauma associated with hitting a bridge, that's not a hazardous material accident. We review all deaths--I have to. Great night reading. But I have to read the medical examiners' reports, the autopsies, to confirm whether it was a death due to the blunt force trauma of an accident or whether it was

due to asphyxiation or fire or something like that. So these deaths and injuries are due to the hazardous material, the release of the hazardous material.

And of this 13,000 number, the number in many ways that we ought to be considering is something in the order of 300 or 400. These are significant incidents. The 13,000 are essentially leaks. It's an unintentional release of a material to the environment. So if you looked at these, United Parcel Service accounts for about a quarter of all reported incidents, and they don't carry large amounts of materials. They carry a lot of it, but they don't carry large quantities. So these are basically packages that are broken in transport, dropped, crushed, whatever.

DR. PRICE: Other questions from the Board?

(No response.)

The staff?

DR. CHU: This is Woody Chu on the staff. I just have one question on the preemption item that you brought up. You mentioned that about two-thirds of all the inconsistency rulings were attributed to shipments of radioactive materials. Can you elaborate on some of the dimensions, i.e. like what is the split between the federal and state in terms of who prevailed and so on?

MR. HANNON: We have a good batting average. Most of the rulings have been the Department's position has

prevailed. And these have been challenged in court. But the mandate came back out of legislation that gave the broad authority to regulate in this area. And as I said, the DOT and the NRC have pretty well occupied the whole area of regulating radioactive materials in transportation.

Most of the issues that were associated with the inconsistencies probably centered around routing and the banning of movements. You can ban a hazardous material from some tunnels or from areas. You can't discriminate against radioactive materials. If you want to stop everything going there, that's legal, but if you say everything, all the poisons, all the flammables, all the corrosives can use a certain route, everybody except radioactive materials, that's considered inconsistent with the national scheme and preempted by federal regulation.

DR. CANTLON: Last question from Dr. Langmuir. He usually gets the last word.

DR. LANGMUIR: This is just a follow up on our discussion of the Overhead #10. Of the eight accidents involving radioactive material, were those all leaks, or some more significant than that, or were some of them not even leaks?

MR. HANNON: I think they were all minor leaks.

DR. LANGMUIR: All minor leaks.

MR. HANNON: Yes. There is something I can provide to

the Board. It was prepared by Sandia, which shows the history of incidents involving Type B packages since 1971 through 1992. These would not be all spent fuel packages, they would be radiographic sources and things like that.

There has been a Type B package that has failed. It was in 1988 in Texas, Dallas or Houston. It wasn't a failure of the package of itself, but it's a thing we see a lot of. It was a human failure to properly enclose the material. And there are those kinds of incidents. Nobody was injured, but it does create quite a bit of concern.

DR. PRICE: I think that's a good note to end on, since one of my hobby horses is human error with respect to this, and our Virginia Tech study indicated that that also is not mine, but a lot of other people's major concern in the transportation of spent fuel.

Thank you very much for coming and being with us this morning.

MR. HANNON: Okay, thank you.

DR. PRICE: We'll take a fifteen-minute break.)

(Whereupon, a break was taken.)

DR. PRICE: All right, ladies and gentlemen, the next speaker is Jim Carlson. He previously has been the Director of Transportation and Logistics for the Department of Energy. He is now the Director of Systems Engineering. But he comes to us today bringing some continuity by tapping on his

previous position. And, Jim, are you here? And we would like to have you begin.

MR. CARLSON: Thank you, Dr. Price. I'll start off by saying it's a pleasure to have an opportunity to brief the full Board on our transportation program. We've had several meetings with the Transportation & Systems Panel.

Just as Dr. Cantlon introduced Dr. Price in the interest of continuity, I'm appearing here today in the interest of continuity. My new job is not the Director of the--was the Transportation Logistics Division. It's now the Systems Engineering Division. So I assume I'll get to meet the panel in another area probably in the near future.

The other thing is I think both Dick Hannon's and Mr. Stallings' remarks on perception and the regulatory background are probably a good taking off place on what I was hoping to cover and what we plan to try to address today during the session on transportation.

I think I'll be providing a general overview of the transportation program. It's a very broad program. A little description of the program, and then some of my perspective on transportation safety and what the Civilian Radioactive Waste Program is doing in this area. Then talk about its relationship to the proposed program approach, the relationship to the safety goals that Sam Rousso mentioned yesterday are the program goals, strategic goals, the new

organization and how we do business.

To try to give a reasonable handle on the breadth of the transportation activities within the Civilian Radioactive Waste Program, we're to develop a transportation system to allow the safe and environmentally acceptable capability to transport is available. We are working to create a predictable institutional environment with potentially effective parties or groups who are interested in transportation to insure that we can move without a lot of litigation or problems on the route, to have the affected parties feel comfortable with the approach we're taking.

And we plan to do this on a schedule that will support when we need to do it. We're a little like the MRS facility, when there's a site identified, we're going to have to move very fast to get things in place. Until then, we're competing for resources with the other principal objectives of the program, particularly the characterization of Yucca Mountain. And the resources are being directed to get on with that activity. So we are more of a support within the program, and we do compete with regard to the other priorities.

Transportation of spent fuel has been going on in this country and throughout the world for the past 40 years. It has been an extremely safe endeavor. The record, I think, as Dick Hannon indicated, is that there have not been

any significant injuries or deaths associated with the radioactive nature of the cargo. There have been thousands of shipments.

The shipments are made in what are called Type B packages, which are packages that are certified for the movement of spent fuel and high-level waste, or materials above a specific curie content. The package designs are regulated by the NRC. The record has been very good. It is a very highly regulated endeavor.

Our specific activities within the program, we have to provide for the equipment to move the materials from their storage locations to the federal facilities. The shipping containers need to be compatible with the sites where we're picking up the materials with the materials that are to be shipped, which in this case we're focusing at this time on commercial spent fuel and the specific facilities.

The breakdown in responsibilities at the reactor sites: The reactor operator or owner, or as we call them, the purchaser under the contracts for the disposal of spent fuel, is responsibility for designating the shipping cask that they want us to provide them, the mode, whether it be rail compatible or a truck mode. And they are responsible for loading that container at their facility. The federal government is responsible for providing the procedures, any special equipment that's needed. I think if there's any on-

site maintenance that needs to be done, it is done by the utility. Large maintenance jobs, of course, belong to the federal government.

Another I think very important area of the program that--well, let me first say that we're going to get additional briefings on the equipment development activities. Bill Lake and a number of our key contractors who are supporting the equipment development are going to brief you on the casks that we have under development, the multipurpose canister shipping container, shipping package, the efforts in the area of burnup credit, which is a mechanism to take into account the fact that it is spent fuel that we're transporting in the design of the casks, later in the day.

Institutional issues, I think as everyone has said, perception and views on radioactive waste do affect the program. Dick Hannon expressed it very well. We have attempted since the beginning of this program--I think we had some very farsighted individuals early on--to establish a network of groups, regional groups, with state representatives who are associated with radioactive materials activities within their states, to help us develop our policy with regard to how we're going to operate the transportation system. We also have a number of other external mechanisms that we've been using to try to gain insights at the broader public concerns, and to try to influence the policy

development within the Department to address these issues. Susan Smith will talk more on that a little later today.

The actual operations of the system is another key area. I think it's an area that Dennis has expressed a lot of interest with his interest in system safety and human factors, is we need to make sure that we're operating the system safely, that we have all of the procedures in place that insure safe operation. We're going to need contracts with various service organizations.

The actual number of shipments is not as daunting as a number of people I think perceive. If we have large MPC shipping, we're looking at I think 300 to 500 cask loads per year. And if we're going by dedicated train, which by all indications will probably be the way we end up, that's probably 50 to 100 per year. So we're talking one or two a week of five-car trains moving to a receipt facility. It's not this awesome picture of a train of radioactive waste moving down every railroad. Truck shipments will probably be 150 or so per year if our high-efficiency casks are utilized.

The fourth area that I find generally useful as sort of a catchall in the transportation program has been the development of the analytical models to allow us to do the long-term planning and to support the NEPA process, the EIS process. This is an area where we have been doing some GIS work to put ourselves a little bit on the cutting edge of

having the tools available so we can address some of the newer factors that people would like to see us consider in how we do proceed in this program.

This one I sort of hesitate to put up after the comments on what DOE submitted in the Route and Mode Study, but it's been something--I've been three years in the transportation program, and basically what I've found is in the development of the international standards and the international consensus on how to move spent fuel and high-level materials, I think there's a recognition that you can do a lot to reduce the likelihood of accidents, but you cannot eliminate the possibility of your package being involved in an accident. So the regulatory philosophy has been to insure a very robust package design.

Dick Hannon touched on the three areas they look upon. You adequately shield it to maintain external radiation doses within the limits. I believe it's 200 MR surface and 10 MR at two meters from the surface, where the personnel boundary would be. You also need to insure that the materials are contained, you don't have a release of radioactive materials under accident conditions. And NRC has developed, or the International Atomic Energy Agency and NRC as the one who's responsible for this regulation in this nation, a requirement that your cask design be able to demonstrate that it can survive a sequence of hypothetical

design conditions. These include a nine-meter drop onto an unyielding surface, a drop onto a six-inch spike--I believe that's a four-meter drop--a fire and engulfing fire at 800°C for a half an hour, and submersion in I believe it's two meters of water. I'm not sure the time period on that. In this case, the material also has to be a ductile material and it has to survive this without moving into a plastic regime. These are the design requirements. There also is a great deal of additional strength incorporated within the design in order that it can survive a broad spectrum of potential conditions it might encounter.

And the last point is it does need to insure that the materials within the container remain subcritical under normal and accident conditions. So it is an extremely robust container, and this is what our designs need to meet.

We also proceed on a number of items which enhance safety or add to this. I think as an operating philosophy we would like to limit the number of shipments. This has good side effects. I mean, economics, it makes sense. Given the public sensitivity, political sensitivity, to the movement of this material, the fewer shipments you make, probably the easier it will be to operate the system.

So we've looked to increasing the efficiency of the packages. The current generation of shipping casks were developed to ship fuel for reprocessing. They were looking

at fuel that was maybe six months cool. So at a very high heat source, very high radiation source. Our contracts with the utilities talk about a minimum cooling time of five years.

So we're able to basically design with less shielding, use higher strength material, since the bulk of the container on the earlier designs, or a lot of it, was shielding material. We're able to meet our weight restrictions, which are either for highway travel tied to legal weight transport or for rail, basically what the bridges and the general infrastructure will handle. And they tend to be limited by the capacities of the cranes and the internal configurations at the reactor sites. We can maximize our capacities within those constraints.

We also have looked to ship by rail wherever feasible. As I said earlier, the mode selection is something that the utilities make under the contract, but it is a negotiation process. We expect to try and work with them to come up with the most efficient transportation system. Certainly I anticipate that if the MPC program is successful, we will see a lot of the utilities going to the MPC for storage, and they themselves will be addressing the issues of how we'll be able to move these large containers off-site for shipment to the repository.

The Nuclear Waste Policy Amendments Act required

the Department to put in place a program to provide funds and technical assistance to states for local governments and Indian tribes to insure safe routine transportation--or I guess it's for training--insure safe routine transportation and emergency preparedness. This is Section 180(c) that's referenced there.

We're working the emergency preparedness aspects. It's going to be tough to get through it in five minutes, but I'll try to go through it a little faster, since a lot of this will be covered. The states have the responsibility for taking care of their residents under emergencies. So they have a great deal of interest in emergency preparedness and in routing, since they can focus their efforts. So we've initiated efforts to develop through a very interactive process with state people and other affected parties both the 180(c) strategy and the 180(c) policy.

We are working on developing a routing policy to help us, specifically routing within the general guidelines of DOT's routes, so we can address what factors are determined to be important. And this, again, is a process that we're working with affected parties. We've developed an enhanced inspection program which will be talked about later today. We have a tractor/trailer development and testing program going on, which T.C. Smith will talk about. Driver qualification.

We also are looking at using tracking similar to what Dick Hannon was talking about, but our shipments are a lot fewer, so we can look at using TRANSCOM to give us a location of every shipment while it's on the road.

The Proposed Program Approach is primarily key impact on the transportation system as we're looking at the development of the MPC as a key transport component. Right now, as with the MRS program, until we have an MRS site, our focus is on shipping to the repository. Casks and canisters in the MPC system will be two sizes for rail, 75- and 125-ton.

The schedule for procuring these services again is tied to when the need is, and we will plan to make these decisions on routing and 180(c) early enough to allow the affected parties to do the kind of planning they need to.

This schedule, I think the transportation line indicates pretty much what I just said, will be focusing on the MPC work and getting the legal weight truck through certification in the next couple years. We have a continuing external interaction with the various groups that we've been working with. The actual operations planning will proceed, and getting the contracts in place before shipments.

Skip the next two in the interest of time. I won't relate the program to the strategic goals at this point.

The new organization, you met Sam Rousso yesterday

in the opening remarks. His deputy is Dwight Shelor, who has been here the last two days. I don't see Dwight right now. Oh, there he is, he's got his hand up in the back.

There will be three divisions in the waste acceptance. Alan Brownstein, who's been handling the contracts with the utilities for a number of years, will continue in that capacity in working the Waste Acceptance Division. Linda Desell, who should join us this afternoon, is actually over at a Transportation External Coordination Group in another part of Denver this morning, and will be joining us here this afternoon. She'll be looking at the need for compliance. The equipment development activities will be under the direct supervision of Jeff Williams, who has been doing the facilities work for the MRS activities.

And finally, the folks who are actually out there implementing the program. Up until the M&O came on board, we worked through two field offices. Currently, the program is implemented through the OCRWM M&O organization. We do have the national labs involved in various aspects. Los Alamos in the burnup credit area. Argonne National Lab supports our risk assessment and EIS work. Sandia provides us support in the burnup credit and general transportation issues. Oak Ridge in the burnup credit area and in the nuclear design of casks.

The cask designers are contracted currently with

the Department. Cooperative agreement groups, as other government organizations, we have funding for them directly through the Department. And we have WESTON, our technical support contractor, who actually should have dotted lines, I think, to every one of those functions.

I'm sorry to run so long, but I wanted to try to give you as much as I could. I'd be happy to answer questions in my remaining ten seconds.

DR. PRICE: Thank you. Are there any ten-second pressing questions? If not, I think we'll just proceed on.

MR. CARLSON: Okay.

DR. PRICE: Thank you very much, and our next speaker is Steven Gomberg of the Department of Energy.

MR. GOMBERG: Thank you. It's a pleasure to be here before the Board to give a presentation on the planning of the transportation program. As Jim told you, my title up there is no longer the current title. We should have had that stricken from the slides, but timing is everything.

What I want to do is primarily talk about the transportation plan and the planning and some of the details that are in the plan. And by way of an overview, I'll try to talk about, very shortly, a background on spent fuel transportation. Try not to duplicate what some of the other people have said. Then I'll discuss the preliminary transportation plan that we've issued and talk about some of

the specific topics that are covered in the plan, including contingency plans, our systems engineering approach to system development, equipment acquisition, operational system development and institutional activities.

In a nutshell, the mission of the OCRWM transportation program is to transport spent fuel from reactors or storage sites into RW facilities. If an MRS is available, we would ship fuel from the MRS to a repository. In any case, we would ship high-level waste from the producer sites directly to the repository, and if needed, we would potentially transport waste from the repository to some other storage location. For example, would be in the event that we needed to retrieve waste for some reason.

Now, some of our key principles in the development and transportation program are to protect public health and safety, to provide for public participation in our decision-making activities, to use private industry to the fullest extent possible, and to develop a cost-effective system.

Now, as Dick Hannon and others have talked about, spent fuel shipping is not new. It's been going on for many years now, and there's a great deal of experience within DOE and private industry in shipping spent fuel. We may have a slight subtlety on definition, what I consider the latest example of shipments were the 35 shipments of mildly reactor radiated spent fuel from the Shoreham plant to Limerick

without incident. That went by heavy haul, then by barge, then by rail up into the Limerick plant, and the rough time frame for that was February to June of this year.

Now, in addition, the Nuclear Waste Policy Act and the amendments put certain responsibilities on the Department for transportation. Those include the use of private industry. Those include NRC regulations and oversight, primarily for the certification of casks, and for funding and training assistance for public safety officials for safe routine transport and for emergency planning.

Now, before we issue the transportation plan, we have had some planning documents out on the street. Those date back from 1986. The Transportation Business Plan was issued in January of 1986. That discussed our plans for acquiring cask systems, and the cask fleet, and for setting up an operational system. In addition, there was a Transportation Institutional Plan issued in August of 1986, and that addressed the institutional network that we had developed and the processes for resolving some of the key transportation issues.

Okay, now, as an update to the Business and Institutional Plans, we issued a Transportation Plan, and this provides an overview of the transportation system as it's currently envisioned. It incorporates the Proposed Program Approach and the realignment of RW as Jim has

discussed. This will replace the Business Plan and the Institutional Plan. And we've issued a preliminary draft in June of this year at the Transportation Coordination Group meeting. We've asked for comments by October 1994. We hope that this will be a "living document." It will be periodically updated to reflect the planning of the transportation program.

One of the important aspects of the planning document is contingency planning. Currently, and I'll clarify this later when I show the schedule, we have the program as on schedule to provide for a limited transportation capability by the year 2000.

We've looked at other approaches in the event that we need to meet earlier dates than that, and those include using some existing NRC approved casks. The NAC-LWT is an example of that type of cask that could be used. Or issuing an RFP for current technology casks, those casks that exist right now that have some level of certification by the NRC. They may need some redesign or other activity to be usable by the broad range of fuel types that we expect within our program. We have put together a draft RFP, but that's on hold now, pending identification of a monitored retrieval storage site.

In addition, there is an existing operational structure within the Department, the DOE traffic management

system. It is very well developed. And there are other DOE resources that we could use for such things as routing, control, communications, emergency response capability and training.

Now, we use systems engineering to integrate the design and development of the operating transportation system to insure that all requirements that apply to transportation are met. The top-level document within the program is the Civilian Radioactive Waste Management System requirements document. That is issued, and that document basically allocates functions and requirements applicable to all of OCRWM, specifically to the transportation system.

The next level document is the transportation system requirements document that is also issued. And that provides the functions necessary for transporting spent fuel and allocates requirements to four transportation segments, which I'll talk about on the next slide.

Below the transportation system requirements documents would be--and these are not developed right now--the design requirement documents, which provide the detailed design engineering requirements for a specific segment or a specific piece of equipment or facility of the system.

Managing Interface is very important, and we would use interface control documents to identify the interface requirements both across the program developments--that would

be waste acceptance, transportation, storage and disposal--and between the four segments that comprise the transportation system.

And then finally, we would issue transportation design packages for the specific configuration item designs. We have one of those out right now for the General Atomics-4 and the General Atomics-9 cask.

Finally, to allow us to focus the design requirements on design documents and the operational requirements in operational documents, we're developing a Transportation System Operations Plan, and that pretty much provides the detailed concept of operations, and then identifies how those requirements on the operational side of the transportation system will be allocated and addressed through procedures, policies, whatever else we need to operate the system.

Now, I've been talking about the four segments. As a result of the functional analysis that was done to support the development of the transportation system requirements document, four segments were identified for the transportation system. The transportation cask subsystems is that segment that develops and fabricates the cask fleet, including any supporting equipment--transporters, cars, trailers, lifting equipment, and whatever else. The planning and control segment provides the day-to-day management of the

transportation system, the long-range planning, through campaign planning and execution of the campaign plans. The service and maintenance support segment is the personnel, facilities and equipment for providing cask maintenance, inspection and repairs, among other things. Field operations segment are those personnel facilities and equipments that provide support to the utilities and other storage facilities for receipt, handling, loading, shipping, preparation and transportation casks.

Now, driving the current planning assumptions, primarily through the Proposed Program Approach, I've identified five general assumptions that have driven our plans. Basically, the system is comprised of equipment, facilities and organizations required to ship spent fuel, and the primary emphasis is supporting the Proposed Program Approach milestones that were established.

All surface modes will be considered: rail, barge and highway, or intermodal transportation, which is a combination of one or more of those. The majority of spent fuel right now we plan will be shipped by rail in multipurpose canisters, but there are about nineteen, and I understand that number is changing every day, it may be less. About nineteen reactors that would be able to handle the smaller truck casks. And so that's the primary work horses of our fleet would be those two casks. In addition, high-

level waste would be shipped exclusively by rail. And those are currently from three producer sites, Savannah River, West Valley and Hanford, and we would pick up more as appropriate.

I wanted to focus on four things in the schedule. And this schedule, now, is developed for the Proposed Program Approach. But I wanted to show how in the event of contingencies that there are some things that we could use to accelerate the processes. The first one I wanted to point out is that the way we put together these milestones is a little different from the segments I have discussed. These focus more on activities. We have the cask development activities, the operational system activities and the institutional activities.

As you can see, and it's probably pretty small, but generally the MPC, the development of a prototype and the ability to have a fabricatable design is in around the FY 1999 to 2000. Similarly, for the GA-4 and 9 casks, it's approximately in FY 1999 that we would be able to begin fabrication. And so that's why I use the 2000 dates in the contingency planning.

What we've done is basically, after we develop a prototype to determine that a cask design is fabricable, in a sense, in order to support the OCRWM facilities, which currently is a repository, you can see that the plan sort of defers the actual fleet fabrication for several years.

That's an example of a way that you can accelerate it to meet a contingency in the event that we need to ship sooner.

Also, I wanted to point out that the development of the operational transportation system and the institutional interactions did not begin in 1993 as is pointed here. They've been going on longer than most people have been in the transportation program.

And finally, under one of our biggest institutional areas is the NWPA Section 180(c) Training and Funding Technical Assistance Program. Based on the Proposed Program Approach, this schedule is set up to meet a date when we would start shipping. And then it's backed out based on a commitment we had made to try to provide three to five years of advanced funding before shipments begin.

So I just wanted to focus on those things, show you how some of the contingencies could be developed.

Okay, now, as part of the development activities, very quickly, I talked about the three types of activities, hardware development, the operating system development and the institutional program. The current hardware development activities right now are focused on MPC and the GA-4/9 casks. Bill Lake will talk about that and introduce a series of presentations.

The operating system, we have developed a very preliminary concept of operations. We've identified

operational requirements that would be allocated to those functions. And Ron Kelly will talk a little bit more about the transportation system operations plan later on today.

The institutional activities are a very important part of our program. We like to take a lot of credit for the work that we've been doing. The current focus right now is to integrate these activities with other DOE programs that are currently in the forefront for radioactive material shipment, and to learn what we can from their experiences. Susan Smith will talk about the institutional activities later on today.

Okay, the casks that are currently being developed, are planned for development, or are being developed by groups other than DOE, which could potentially be introduced into our system for transport. Primarily, in development we have the from-reactor casks, and right now the GA-4/9 and the MPC are the two from-reactor casks that we're working with. Specialty casks are plans. Those will be any casks needed to handle any fouled fuel, any long type fuel, the South Texas fuel, or any other type of fuel that couldn't fit within a standard cask. High-level waste casks are currently planned. Right now we envision a design that would have five canisters within a rail cask. Multi-purpose canister, also the transportation overpack of that is the focus within the transportation program. And the transportable storage cask,

which is not being developed by RW or DOE right now, but is potentially a cask that could be introduced into the system.

And finally, then, the development of transporters. Tractors, trailers, rail cars, other associated things that would be needed in order to move casks.

The operational system development combines the planning and control, service and maintenance and field operations segments, and it identifies the functions to be performed, the structure as to how those functions would be performed. Primarily we're looking at simple things like, is this all government operated? Is there a contractor operation? To what extent do we incorporate the provision to provide public involvement to the maximum extent? Private industry to the maximum extent possible? And in addition, provide some schedule and approaches as to how we would put it all together to have an effective operating system.

Finally, the institutional interactions are incorporated into the planning and control segment, and those obviously provide the activities necessary to promote understanding of the program and to get the public and the stakeholders involved in the decisions that we make that ultimately affect the operation of the transportation system.

Very briefly, although Susan is going to talk about, I think, just about all of these, these are what I put down as some of the key problematic transportation

institutional issues that we have been working on. Routing you've heard about earlier. The focus there is the HM-164 requirements do provide adequate control on risk for highway. There is no real risk methodology for developing rail criteria. And we would look at those sort of things. Susan will talk about that in a little more detail.

Section 180(c) is to provide safe transport, training and emergency planning, funding and technical assistance. The emphasis on that is on training, inspection/enforcement and on emergency response planning.

Risk management is one of the activities that we've been using as a result of stakeholder involvement to try to integrate all of the risk-related activities under the transportation program and to show how those would all be managed and developed in conjunction as a continuum as opposed to a one-time environmental assessment analysis or something along that line.

Full-scale cask testing is looking at whether we need to go beyond the currently accepted practices of designing by analysis or using scale-model tests. And that's been also an area of a lot of stakeholder interest.

Advance notification to Indian tribes, currently this is a DOE policy that we would provide notification to Indian tribes. It's pretty much silent in the NRC regulations. We've been working to try to clarify that, and

to try to integrate our DOE approaches to working with the Indian tribes under the DOE Tribal Order.

Inspection and enforcement, one of the things we're looking at is standardized inspection procedures for radiation to try to minimize the number of inspections, or to make sure that the inspections are standardized across all the states or Indian tribes who would perform inspections. And also we're looking at the tribal enforcement authority of our shipments.

Okay, with that, I'm finished, and let me open it up for any questions.

DR. PRICE: Thank you very much. In the area of tracking and control in the operations concept, I take it that that wasn't covered in anything you said, and I take it from what Mr. Carlson said that that is an issue that's up in the air right now as to whether or not to have continuous tracking of shipments?

MR. GOMBERG: Go ahead, Jim.

MR. CARLSON: No, I don't think it's up in the air. We will have continuous tracking. It's just the specifics haven't been pinned down. But it's been an area where we've been working on the TRANSCOM system. The area where it runs a little different than what DOT's been looking at is right now there are requirements to safeguard the location of the shipments. So our system will be a little different than the

broader ones.

DR. PRICE: Thank you, that's good clarification.

MR. GOMBERG: I was just going to say, TRANSCOM is a general name that we use for a tracking capability and a control capability. It provides the positioning capability, although not, from what I understand, as high resolution as GPS. And then the communications aspect, where you would relay the positioning of a cask to a central operations center of some sort to make decisions or to identify the status of the shipments in progress.

DR. PRICE: And do you have a date when you're going to release the transportation system's operational plan?

MR. GOMBERG: One of the reasons I'm a little hesitant to pick a date is because of the transition to the new organization. The plan has been put out as a preliminary draft right now. We've looked at it internally, and we suggested some improvements and changes that need to be made. So as the M&O contractor who's actually putting the document together is working on that, I suspect maybe within the next five to six months we'd probably have a version out that reflects what we want to say from the operational planning standpoint, and also is satisfactory to Jeff and Linda and the management in waste acceptance storage and transportation.

So, I guess, can I say can we keep you informed on

that, because I really don't know right now.

DR. PRICE: Please do.

MR. GOMBERG: Okay.

DR. PRICE: Any questions from the Board? Dan?

DR. FEHRINGER: Dan Fehringer, staff. Does your planning include transportation of any materials like naval reactor fuel or plutonium for dismantling weapons or greater than Class C waste, things of that sort?

MR. GOMBERG: I think that one of the things we're looking at right now is the timing and the acceptability of some of these additional wastes into the program, and we have not committed right now as to when or how we would accept these forms. So we're not doing any detailed transportation related planning right now in some of the exotic waste forms that may need to be disposed of in a Part 60 licensed repository. But we know those are potentially on the horizon, and when the time comes that those are accepted into the system, we would then work with the appropriate organizations. For instance, the naval reactor fuels have done a lot of transportation themselves, and we would work with them to decide who would develop what equipment and how we would integrate it into our system. But right now there's not a lot of detailed planning in the transportation area on those.

MR. CARLSON: Can I just add something? If I had gone

through my strategic goals, the second one is to participate actively in key to deliberations which affect DOE. And we do have a transportation role in participating in that activity, but as Steve says, we are not far along. It is a goal, but it hasn't reached fruition.

DR. PRICE: Any other questions? If not, thank you very much.

UNIDENTIFIED SPEAKER: Dennis?

DR. PRICE: Oh, wait, one more. I'm sorry, I didn't see you. Dwight Shelor?

MR. SHELOR: This is Dwight Shelor. Steve, if I can make a comment relative to your slide #10 on the schedule?

MR. GOMBERG: Yes?

MR. SHELOR: What I'd like to do is just point out that in the upper left-hand corner, adjacent to where it says MPC, we talk about the EIS. There is an error there that shows that activity starting in calendar year '93, where in fact, if you would refer back to Mr. Carlson's presentation, page number 10, that schedule is correct for the EIS and anticipating the NOI in calendar year '94.

DR. PRICE: Okay, I think we're having a little difficulty finding, Mr. Shelor, where you're talking about. Upper left-hand corner, I got that.

MR. GOMBERG: I think the simple answer is what this slide does not show that Jim's slide correctly shows is our

plan on issuing a Notice of Intent for the MPC/EIS being at the end of this calendar year.

DR. PRICE: Thank you. The NOI.

MR. GOMBERG: The Notice of Intent to prepare an EIS.

DR. PRICE: Thank you very much.

MR. GOMBERG: Okay, thank you.

DR. PRICE: Our next speaker, and I think we have returned to schedule, is Ronald Kelly with E.R. Johnson Associates of the M&O.

MR. KELLY: Thanks a lot. Good morning. Again, I am Ron Kelly, and I'm with the Transportation Department at the M&O. And during my presentation, I'm going to follow on from Steve Gomberg's presentation and I'm going to discuss how we anticipate the Civilian Radioactive Waste Management System will operate once it becomes fully operational.

These assumptions have been discussed in previous presentations. However, I wish to emphasize that our transportation system will be primarily focused on accepting fuel and the multipurpose canisters, and we will ship that fuel utilizing one of the two size rail casks. We'll also have available to us the legal weight truck casks if required.

And secondly, that our transportation work load will be determined years in advance based on the principle of oldest fuel first. And I will discuss the work load

determination in greater detail in a few minutes.

The purpose of this chart is to show the major CRWMS interfaces for transportation. On the left, the waste acceptance portion of the CRWMS determines the work load for transportation. They resolve the contractual issues between the government and the utilities on the specific amount of fuel to be moved and what year that fuel will be moved to the federal site. Close coordination will have to occur between the utilities, waste acceptance and transportation activities in the development of the final schedule. The storage activity within the CRWMS is responsible for receiving the spent fuel, unloading the casks, and then placing the fuel in the appropriate storage facility.

For ease of discussion, I have divided the operational transportation system into four primary elements, as shown in this chart. And this should not be matched with the system architecture that Steve had shown. This strictly reflects the position or the location which various activities will occur in the operational system.

Before I do that, I thought it would be beneficial to explain some key terminology that is very important in the planning of our shipping campaigns.

The Annual Capacity Report, or the ACR, is published each year by the Office of Civilian Radioactive Waste Management. And it looks out for a ten-year period and

specifies the spent fuel allocations in metric tons of uranium that a given utility is authorized to ship in a specific calendar year. The total amount of spent fuel to be accepted by the Civilian Radioactive Waste Management System in a given year is based on the acceptance capability of the total system.

The Delivery Commitment Schedule, or DCS, is a formal process where a utility declares that they are going to accept their spent fuel allocation for a specific year as stated in the ACR. The DCS's undergo a careful screening within the Office of Civilian Radioactive Waste Management and are formally approved or disapproved if appropriate. As you will see in a moment, the DCS is a long-range planning tool for the CRWMS.

However, the most important document that we have is the OCRWM approved Final Delivery Schedule, or FDS. During the period between the approval of the DCS, which is about 63 months prior to the shipping year, and the approval of the Final Delivery Schedule, about 12 to 24 months prior to the shipping year, the utilities are permitted the opportunity to trade allocations with other utilities. Once this process is completed and the FDS receives final OCRWM approval, then this document determines the specific work load for a given year.

The Campaign Plan will be referred to frequently

when discussing plan transportation operations. A Campaign Plan will be prepared for each spent fuel storage site that is scheduled to deliver fuel to the CRWMS in a calendar year. A single campaign may involve one pick-up of fuel or several over the course of that particular year. But the collection of these operations will be considered a single shipping campaign. The Campaign Plan will contain considerable detail about an upcoming campaign.

During the course of preparing this plan, specific information on schedules, routes, carriers to be used, points of contacts, training requirements, essentially the what, where, when, how and why questions will be addressed. Part of this planning process will include extensive coordination with all participants, and then dissemination of the completed plan.

A compilation of all the completed Campaign Plans for a given year is referred to as the Annual Campaign Plan. This plan is important because it provides a complete picture of the CRWMS transportation operations for a given year. A valuation of this plan will allow for identification of potential conflicts in routes, equipment use, carrier support, or other activities. The plan will also be the primary reference source when changes are required for individual shipping campaigns. And the impact of these changes must be evaluated carefully against the total plan

for that year.

The Site-Specific Servicing Plans, or SSSP's, will be developed over an extended period of time. A SSSP will be prepared for each utility spent fuel storage site and will include very detailed information that will be used to plan shipping campaigns and provide other source data for CRWMS planners. The SSSP will be a controlled document so that when changes in data are required, then the appropriate changes can be disseminated to all the holders of controlled copies of the document. The SSSP will be continuously updated over the life of the program.

This chart shows the relationship between the documents that I have just discussed. On the left side, in the center, you see the Annual Capacity Report feeds the specific allocation information to the utilities, whereupon they declare their intent to ship fuel by submission of the Delivery Commitment Schedule to the CRWMS. That document, once approved, also serves as the basis for development of draft campaign schedules, which are then rolled into the draft Annual Campaign Plan shown at the very top.

Once the Final Delivery Schedule is received and approved, then we can begin the development of the draft Campaign Plans for the individual utility sites, which are rolled into the final Annual Campaign Plan, which allows for the resolution of conflicts in the shipping schedules,

resulting in the publication of a final Campaign Plan, hopefully about six months prior to the actual shipment of fuel.

Shown in the bottom, I had mentioned previously that the development of a Site-Specific Servicing Plans, or SSSP's, is an extended process. We've effectively begun that process previously with the preparation of the two documents on the very left, the Near Site Transportation Infrastructure, which deals with the transport capabilities in and around a given utility site, and the Facility Interface Capability Assessment, which deals with the physical attributes of a given utility.

Those reports have allowed us to prepare Service Planning Documents, essentially one for each major utility storage site. And during our design efforts of this transportation system, these Service Planning Documents provide a valuable resource. In time, these documents will evolve into the Site-Specific Servicing Plans.

The next aspect of operations that I'd like to discuss are the activities performed at the utility storage sites. Under current planning, the MPC's, transportation casks, special tools, ancillary equipment and selected site unique equipment will be provided by the CRWMS to the utilities. The MPC's will be available starting in 1998. However, the delivery schedules for the transportation casks

to the utilities will begin shortly before the start of a shipping campaign and will be coordinated closely with the utilities and also be specified in the Campaign Plans themselves.

Along with the delivery of the transportation casks, we envision the delivery of that we're calling a campaign kit, which will be unique for a specific cask system and a spent fuel storage site. The campaign kit will contain special tools, spare parts, fixtures, procedures and other appropriate materials.

Once the MPC's and the transportation casks are delivered to the utility spent fuel storage sites, the utility will be responsible for performing the actual loading operation at the site to include the decontamination necessary to allow the casks to meet the standards for safe transport by either highway or rail.

The CRWMS will be responsible for providing technical data, handling procedures and on-site training for CRWMS equipment to the utility personnel as required. This will more likely occur at the start of a shipping campaign. Subsequent shipments from the same storage site will not require the same degree of support unless there is a major turnover in personnel or we're dealing with new equipment. CRWMS personnel will also be available to the utility to provide technical assistance during the handling and loading

of the casks.

The casks developed for this program are planned to be complete cask systems, including the cask, the transport vehicle, rail car or tractor/trailer and all the supporting equipment. The carrier services that will operate the tractor/trailer or the equipment that will provide the rail car will be provided and coordinated by the CRWMS. The routes for highway shipments will be selected in accordance with the routing policy and the applicable regulations and coordinated in advance with the appropriate state and tribal agencies.

The primary route and alternate development will be specified in the Campaign Plan. Susan Smith, in her presentation early this afternoon, will discuss the routing policy in a little bit more detail. Along with the specification of the routes, rest stops and safe havens will also be specified in the Campaign Plan.

We are still working the details for our anticipated rail service requirements. A considerable effort will go into this activity, since we anticipate the majority of the transport for this program will be by rail. Along with the issues to be analyzed will be the dedicated train, in-transit security for rail shipments, tracking and interchange requirements. T.C. Smith will be providing some additional details this afternoon for driver qualification,

and you will also receive a presentation from CBSA by Jim Daust on the highway inspection requirements that we anticipate to follow for CRWMS highway shipments.

At this stage of our planning, we expect that we will be utilizing barge transport for a selected few shipments, and also will use heavy haul transport for short legs of the trip between the utility sites and the federal storage facility. In most cases, the use of these two modes of transport and the requisite intermodal transfer operations will be to enable a larger cask to be utilized, and that the shipment will be transferred to rail as quickly as practical.

An operations center for transportation will be established. This center may ultimately become part of a larger facility that will support all CRWMS operations. But the specific activities required for transportation are listed on this slide. Specific operations center issues, capabilities and procedural requirements are still under study.

The functions listed on this slide are not all inclusive. However, they are representative, or they represent some key activities that must be performed as part of the total CRWMS transportation system operation. Over the life of this program, a substantial amount of money will have been invested in acquiring equipment. At any given time, this equipment will be distributed to various locations

throughout the United States. The intent of the inventory management activity will be to maintain proper accountability and control over this government property.

Along with the accountability requirements for this equipment, it will have to be maintained to a very high standard from the time the equipment is delivered from the manufacturer until it is decommissioned and disposed of. Specific details for siting a cask maintenance facility and current plans for performing maintenance throughout the CRWMS system are still under development.

Earlier, I emphasized the importance of campaign planning to insure a safe, efficient operation. Equally important is performing analysis of these campaigns once completed so that problems can be isolated and solutions be developed. We are calling this process the review and analysis of Campaign Completion Reports. Maximum advantage must be taken to learn from each shipping campaign whether it pertains to a specific utility site or it involves an issue that applies to the entire CRWMS system.

Throughout the operation of the CRWMS transportation system, plans will be prepared and updated to address unexpected major modifications or interruptions to normal operational conditions. One example would be the interruption of rail service such as experienced during the Midwest floods last year.

What I have briefly described today reflects the current thinking on how the CRWMS transportation system could operate. During the coming years, there will be more in depth studies in certain areas, and also the resolution of a number of policy issues. We will modify this plan accordingly, but our ultimate goal of creating a safe, efficient, cost-effective CRWMS transportation system will not change.

And I'm ready for your questions.

DR. PRICE: All right, thank you. I'm going to offer a couple of quick ones and then turn to the Board.

Are you in your operational plans of planning in the process of identifying, as soon as you know the routes, or even now, in-route emergency response locations and capabilities?

MR. KELLY: That's something we'll have to look at much more closely once we can focus in on the routes that we're going to follow.

DR. PRICE: But that's in your plans, you plan to do that?

MR. KELLY: We plan to do that, correct.

DR. PRICE: At some point. So you know given an incident or an undesirable event where the emergency resources are closest to that?

MR. KELLY: Yes.

DR. PRICE: And that will be part of your control.

DR. PRICE: We envision that sort of information would be at the fingertips of the personnel in the operations center. They would have instant recall of that sort of data.

DR. PRICE: Including equipment availabilities? That may be hard to get. That may take some resources to chase some of that down.

MR. KELLY: That's something we'll look into.

DR. PRICE: Okay.

MR. KELLY: You know, into that kind of detail.

DR. PRICE: Yes. Another question is, in your planning, do you intend to keep up to date on bridges inventory and things like that?

MR. KELLY: What we expect to have is prior to developing a Campaign Plan is some reasonable definition of what routes are acceptable from given locations, between the utility site and the destination. As we get closer to the actual shipping date, we would use those primary routes unless there's some reason to vary from that. But as we get closer, we feel that it would be important to do what I would call a last-minute review of that route to insure that there are no unexpected surprises like construction projects or other sorts of major maintenance to a bridge, as an example, that would cause a surprise during the actual movement. So that would require close coordination with the states that

would normally have that sort of information.

DR. PRICE: I think there's a national inventory of bridges and their status and so forth. That probably is information you'll want to put into the mix.

MR. KELLY: Yes. Let me ask if the Board has questions. Dr. Cantlon?

DR. CANTLON: A couple of questions. One, what level of utility interaction do you engage in in setting up the shipping campaign for a particular reactor?

MR. KELLY: Well, of course we haven't as yet, but what I would envision as it gets to the point where we have Final Delivery Schedules, we know where we have to ship from and what we have to ship, it's going to require a lot of close interaction with the utilities. Because obviously we just can't pick a date and assume that they're going to be ready. We're going to have to coordinate these dates based on their outage schedules. It will take a lot of intricate manipulation of this data to insure that we have enough resources to cover all our obligations. Again, the specifics of that, I can't go into much more detail, but certainly almost a one on one with the utility. I would also envision, particularly early on in this program, where we would have some formal coordination meeting among the various players for a specific shipping campaign so that before the Final Campaign Plan was completed and put out for distribution, a

lot of these issues would have been tabled and resolved.

DR. CANTLON: A follow-up question. When the agreements were worked out with the utilities and the idea of queuing and so on was based on oldest fuel first, nevertheless, you have now, as I understand it, a requirement only that the fuel must be at least five years cooled. On the other hand, there might be some real advantage to the total system to really get the coldest and oldest fuel first. Is there any thinking about modifying? Even though the utility may have the oldest fuel racked in the bottom and it may be a cost disincentive to them to give you the oldest fuel first, that may not be a system optimization approach.

MR. KELLY: Jim, could I defer to you on that?

MR. CARLSON: Yeah. The contracts with the utilities, as you said, were negotiated through a rulemaking quite a while ago. I think if we find a situation where there is an overall benefit to the program, either a technical safety benefit or a significant cost benefit to the rate payers and the nation as a whole, I think we'd probably try to reopen and negotiate with them to proceed what is in the best interest of the nation. So I would never rule that out. We do have an agreement right now, and certainly it is a contract, and they probably would want to exact certain concessions out of us for them to change the way they operate, but I wouldn't rule that out.

DR. CANTLON: Thank you.

DR. PRICE: Okay, Dr. Allen.

DR. ALLEN: Much of what we are hearing is somewhat similar to what we heard several years ago with regard to the planning for the transportation to WIPP. And I'm wondering whether we've learned anything from that exercise in terms of dealing with local highway departments, local towns and so forth, because of course that came awfully close to culmination.

MR. KELLY: Well, I can tell you that we've had a lot of close discussions with WIPP, and we've reviewed virtually all the literature that we were able to get our hands on dealing with the WIPP program. As an example, their experience with driver training, driver selection and maintenance of equipment and a whole multitude of aspects that relate to highway transport of materials, since that's their primary mode. We're certainly taking advantage of those experiences and not trying to reinvent the wheel. So the answer is yes. In terms of the application of 180(c), I'd have to defer on that. You know, how much of that experience we'll be able to utilize.

MR. GOMBERG: If I could add two things, actually. One of the reasons that we're having this other meeting that's been alluded to, the Transportation External Coordination Working Group meeting, in another part of town is exactly for

two reasons, to integrate the activities within the Department on all transportation-related shipments, and the people who support WIPP and the DOE spent fuels program and various other groups are represented. So we do have a lot of lessons learned.

The other is to provide a unified approach to resolving and identifying issues from stakeholders so that all the DOE programs know what we're doing, what we can learn from each other, what doesn't necessarily relate to each other's programs. And that's one of the key benefits of this working group. And WIPP is certainly a key player in that group.

DR. PRICE: I can't resist this. Speaking of integration, how did that come to be scheduled in the same time and place as this?

MR. GOMBERG: I could tell you off-line the reason.

DR. PRICE: Okay.

MR. GOMBERG: The other thing I wanted to point out to clarify, if I could, Ron's comment is we have had some limited interactions with utilities. We have the Form 859 that we specifically ask for information every year from the utilities. We've done some studies, the Facility Interface Capability Assessment and the Near Site Transportation Infrastructure Reports, and the whole idea of that was to look at the utility capabilities, look at the transportation

infrastructure to the nearest mainline highway, to the nearest highway or mainline rail. So we have had those ongoing. The further interactions would be, though, specifically in developing the campaigns and looking for those additional types of information that would support the operation and the integration of MPC's into the program.

DR. PRICE: Are those studies being updated, the FICA and the--

MR. GOMBERG: The latest term for the studies now are called the SPD's, the Service Planning Documents. And those basically take the NSTI and the FICA data, update them and consolidate them into one set of reports. And we have Oak Ridge doing some work for the M&O to update those and put those all together. I think they've issued about 50.

DR. PRICE: With respect to 180(c), has there been any improvement on the picture of being able to equip responders out in the field to be able to monitor and so forth? I'm talking about the equipment side rather than the training side.

MR. CARLSON: We haven't got a policy resolution on that. I think there's a tendency within the Department to go in that direction to provide a limited amount of equipment or allow the states to use a limited amount of the funds that are going into training or to support training. For equipment purchase, we have not at this point flushed it out

and pushed a policy decision forward. So from your question standpoint, probably there has not been progress in that area, but it is one that's on the table for the future.

DR. PRICE: It's lunch time. Are there any questions, further questions? Dan Metlay?

DR. METLAY: I'm not sure who should address this, perhaps Jim. What, if any, are the implications for the transportation system should there be a private MRS, or private interim storage facility?

MR. CARLSON: Not being an attorney, I'll sort of qualify my remarks, but certainly the way the Nuclear Waste Policy Act is set up, the use of the waste funds are for the federal facilities. I think if the kind of things that we're doing in the development of transportation were to be expected for a private facility, it would probably take some legislation.

DR. PRICE: With that great question, I think we'll--oh, there's one more great question in the offing.

DR. CHU: Yeah, just to follow up that last great question, then not only will it require legislation to do planning and transportation, but the 180(c) provisions as far as financial assistance to the states and so on, that, too, will have to be re- or newly legislated.

MR. CARLSON: Is that a question or a statement?

DR. CHU: I'm asking, since you say you're not a lawyer.

MR. CARLSON: That would certainly be my--if I were to try to lend a legal opinion or a reading of the law, I believe that that is also applied to OCRWM's system transportation.

DR. PRICE: Thank you. I think we'll be back at 1:00 for lunch. Appreciate very much your presentation this morning.

(Whereupon, a lunch break was taken.)

AFTERNOON SESSION

DR. PRICE: Let's get started, folks. We'll begin this afternoon with the topic of Transportation Institutional Program and an overview of it with Susan Smith of DOE.

It's all yours.

MS. SMITH: Good afternoon. My name is Susan Smith, and I work, or was working till yesterday, as the Transportation Institutional Program Manager. For the people that aren't familiar with the institutional program, I've been with OCRWM and DOE a total of about 10 years as a contractor and as a DOE person.

The institutional program is basically the people part of our program. You've been hearing a lot about the systems and the hardware part earlier today. The institutional program sort of tells the story of RW transportation. It receives information from groups outside of DOE and inside DOE and starts to provide support to the states and other groups to help succeed in having us ultimately ship whenever we have a place to ship to.

The Board asked for what the need of the institutional program was or is, and I just wanted to spend a little bit of time on that. Secretary O'Leary is committed to consulting with what the term we now call stakeholders,

and I'll go into a little bit about who the stakeholders are.

I've watched in the last ten years the program and the Department change a lot. They've gotten a lot more serious about coordination with stakeholders and to incorporate their comments and needs into program development. We have understood that the campaigns that have actually shipped used institutional interactions to succeed in shipping, and the programs that did not have a good institutional program did not ship.

We've learned from the TMI shipments, the Brookhaven shipments, the shipping port shipments, the overweight shipments from the Virginia Power Company, Taiwan shipments, the WIPP program, the cesium program, West Valley and Fort St. Vrain, it's to promote an understanding and to build confidence in DOE's capability, it's to facilitate identification and resolution of technical and institutional issues, and to provide an opportunity for input on our program development.

The actual "what is a stakeholder?" We've basically identified over the years as being Federal, State travel and Local governments, the utilities, the industry, technical organizations, special interest groups, the general public, and the media. I won't go into each one, but I think as this speech goes along, you'll know which groups I'm talking about.

When we talked about institutional issues over the years, we've identified basically these issues, and then anything else that has cropped up is basically a sub-issue of this. Today I'm going to talk about seven, or about seven of these that are kind of important, particularly right now. In the past, others have been more important.

The bridges inventory and the interstate thing that Dr. Price mentioned would sort of fall under infrastructure improvements, and right now it's a timing thing of what's more critical in the planning process for 1994, and right now, we're not working on that, but it's part of infrastructure improvements to track what's going on in the country as far as the highway interface and the rail abandonments and the railroad industry.

How the DOE works with these stakeholders is through various mechanisms. The four large groups that-- areas of mechanism that we consider the most important methods is; the cooperative agreements with national regional organizations, holding meetings, actual review and comment processes with external groups, and a public information program.

I'm going to go into a little detail about each of those areas.

In the cooperative agreement area, the seven cooperative agreement groups, which I think the technical,

the TRB's Transportation Board has been briefed on before, are the CVSA, Commercial Vehicle Safety Alliance; the CRCPD, the Conference Radiation Control Program Directors; the Council of State Governments; the National Conference of State Legislatures; the National Congress of American Indians; Southern States Energy Board; and the Western States Energy Board.

We are about to get the Northwest Council of State Governments group on board. That will cover the entire United States as far as State representatives, and the CVSA and CRCPD are all of the 50 states represented.

The cooperative agreement groups, our office provides about $1.3 million to these groups each year. The benefit is that they hold meetings with their constituents. It gives us an opportunity. Most of the people that you've heard talk today have been hitting the road over the last-- since 1986, giving presentations on where we are with our program, receiving the input from these cooperative agreement groups, and trying to integrate the comments into both the technical and the institutional side of the program.

Besides the cooperative agreement groups, which hold about two or three meetings a year for each cooperative agreement group, we have a series of other meetings that we hold each year, and I'm going to spend a little bit more time on the Technical External Working Group--Transportation

External Working Group that people have mentioned is down the road at this time. But I'll run through quickly what each of the things on this viewgraph are, which is the TEC Working Group; the TCG, which I believe Dr. Price was at in Las Vegas, and Woody, we've been having that meeting for several years; the Cooperative Agreement Groups, which I've told you about, national conferences. We work with other parts of DOE and DOT and FEMA to attend exercises and workshops in the emergency preparedness area.

We have several DOE internal transportation institutional meetings where the DOE gets together and exchanges information on what's going on, where WIPP, spent fuel, Cesium, RW, and the other programs exchange what policy is being set, what precedent is being set.

I sat on the Hazardous Materials Transportation Uniform Safety Act subcommittee for developing the grants program for Section 17. We work on the FRPCC subcommittees for exchanging, again, Federal information on how to in the transportation area and the emergency preparedness area so that we learn what FEMA is doing in the emergency preparedness area, what rulemakings and activities in DOT are underway so that we can better integrate our planning into the Federal system.

We've been working with FRA and DOT, as Dick gave you a presentation earlier today, to follow what trends are

going on in DOT, and I'll talk a little bit later about what we're working with with FRA, and, again, of course, with you all.

Now, I'd like to spend just a little bit of time talking about the TEC Working Group. I put up here the members of the TEC Working Group, and just so you have an idea of who's there.

The purpose of the TEC Working Group is that we have been told over the years that DOE is fragmented in its transportation planning. Different shipping campaigns respond differently to state and local and travel needs and industry needs, and depending on the number of shipments, the level of shipments, the time frame that we have to plan for these shipments, and the legislative rules that drive the programs, the states and groups are confused and have conflicting concepts of what they can expect from the Department.

A lot of these players are all the same players in the individual states, and what we asked is if they would be interested in having a meeting with all the DOE offices that do ship or plan to ship, and so that we can talk as one organization in one city at one time and explain at one time why we are handling things differently, and where it's just oversight correct it and where it's legislatively mandated or has a rational reason to clearly state it so that people

understand it and don't feel that it's arbitrarily being done, to hopefully increase some confidence in the Department.

We picked these membership organizations because they have either had some affiliation with prior shipping campaigns or that they were interested in upcoming shipping campaigns, they represented either a national or regional interest in the United States, and they had an interest or a way to come to the meeting.

The meeting is going on, as I said, down the street. It's been held every six months for the last couple of years. Yesterday, or a couple days ago before we came here, we did succeed in signing Secretary O'Leary's letter that endorsed this group as the number one transportation external working group meeting for the Department. We have 10 DOE offices that participate in this group, and we're real happy that people have received this group as the group to set policy. It's mostly a working group, as the title states. We put them to work, and we have breakout sessions, and we give them material that the 10 DOE offices feel that they need to either learn more about or provide comment to us, or there are things that they have asked specifically for us to give to them.

I just want to tell the Board and the audience that this is a great opportunity for people that are interested in

setting policy for the whole Department and not just RW specific campaigns.

We also internally have had to coordinate at a higher rate than we have ever had to before, which was sorely needed, because in order to plan these meetings, a lot of us are doing stuff that we have monthly meetings inside the Department to prepare for these meetings, and we have--I have experienced in the last two years a marked change in policy in some of the other DOE offices that don't quite have the institutional mandate that RW has in order to uniformly establish some policies within the Department. And I'm going to go into a couple of the examples further on.

In the area of providing comment, I just wanted to go over some of the areas that the external parties do actually have at this moment, provided some comments. Over the years, I could probably label off a lot more things that they've provided a comment on, but right now they are reviewing the draft routing strategy. They are helping us developing the notification procedures, and they're reviewing the draft transportation plan and working on the implementation of Section 180(c), providing comments on the cask program, and the longstanding issue of whether we would do full-scale testing.

Each of these areas I'd just like to cover briefly. In the routing area, one of the things that Ron Kelly was

stating is that I work in the routing area, and some people have been confused as to why the institutional group are developing a routing policy. The history behind that is that we strongly feel that the routing criteria methodology needs to be accepted by the states in order for us to succeed.

So right now, we are working with the states to develop a criteria and a methodology that they can live with and that they can accept. Once we've developed that, then we would hand it over to the operational staff, who would then put it in their operational procedures, and it would be taken from there on with the operational people.

The RW strategy, which we started a couple years ago to meet a commitment we made in '86, started out to be just an RW specific routing criteria methodology, and this is an example of what happened in the TEC Working Group. The rest of the DOE offices understood that if DOE started this routing--I mean, RW started this routing process, that it would be ultimately the routing criteria for all the other shipments. We've seen it happen too many times with other campaigns. So they asked that we alter the title and change the concept from a RW routing criteria to a DOE-wide routing criteria methodology. The benefit of that is that all the states can now expect us to ship in a consistent manner as far as designating the routes.

It slowed down the schedule a little bit because we

now have to work with the 10 offices and all the states instead of just working with people that are mostly interested in RW. The benefit of it is luckily we now have the time to do that. We will have a DOE guidance for routing, and then we would then look at it from an RW specific standpoint.

What we will do is we've developed a strawman routing criteria and methodology internally with our contractors, and what we plan to do is request stakeholder involvement in the development of this through a Federal Register Notice, through the TEC Working Group, through all the individual meetings that each of the 10 program offices work with, and through interdepartmental workshops.

Once we've identified who the stakeholders are that really want to focus on routing area, we would like to form an external model working groups that would help take the strawman routing criteria and actually rewrite to the way they would like to see it.

We spent a lot of time on who would be in that group. We have some ideas of the routing experts in the industry right at the moment, but the Federal Register Notice is being developed so that people that are interested can write in and say that they want to be part of this process.

The routing external working groups would then draft what they conceive as a highway routing criteria

methodology, a rail routing criteria methodology, and an intermodel routing criteria and methodology, and we would publish the draft material again in the Federal Register for public comment.

Once we have gone through the hoops of finalizing that process, it would be issued as DOE guidance for the Department. We would be briefing all along as we do this the traffic managers in the Department that would need to implement this, so that they can write it in their carrier contracts and tell the shippers and carriers that they will be using that's the process they want to use.

It would be at the minimum a DOE order or memorandum to the field offices and anybody planning shipments, and one of the options is that, especially in the area of rail, if it's the interest of the country, we may petition to the DOT to look into it as a possible rulemaking.

The most important thing is that the end result is that we would have a routing criteria that the rest of the country could live with, so that if we start designating routes and start working with them, that they don't ask the question as to why it's coming through their backyard.

In the area of pre-notification, Steve already covered mostly what we're working on, which is the discrepancy between the NRC regulations and the DOE policy to notify any Indian tribes, and also the fact that RW would

like to use TRANSCOM for satellite tracking. DOE does this now, but not for NRC shipments, so there is no conflict with their physical protection requirements. So we're in the process of negotiating that with NRC and hope to have that resolved very soon.

The Transportation Plan has already been covered, and we just have requested comments by October 1. There's been a general confusion or dissatisfaction with the plan. Informally, from what I've been hearing, it doesn't say enough. There's a lot more interest in something more meaty, and we're hoping that we'll get a lot of comments and can work with the TEC Working Group and the TCG to craft a plan that is more to what the groups are interested in.

In the area of Section 180(c), I just want to go over where we are. We issued a strategy back in '92, and if we had met '98, we should be getting to the point that we were giving funds out this year. We are not meeting '98 officially for the whole system, so we have had a little bit of time to prepare a more detailed grants program.

The TEC Working Group was originally started thinking that the sub-elements of Section 180(c) are so complicated that we could work with these groups so that we could develop a grants program that, again, would be so integrated with what they're wanting, that by the time we get to the Federal Register phase of what the grants eligibility

criteria would be, everyone has seen it, worked with it, helped craft it, and it isn't something that is going to be shot down because it wasn't adequately coordinated.

Some of the areas that we're working to implement. That is the FRA because we have changed our policy--well, not changed our policy, but with the MPC development, we need to work a lot more extensively on how we would work with rail inspection and rail emergency preparedness. We're working with the tribes on their authority to inspect our shipments. We have been conducting some workshops on emergency response for Indian Tribes because we're aware that they have limited resources, and we're continuing to fund the cooperative agreement so that we'll have an idea of what they need for 180(c) when we get further down the road.

The other thing that the external parties do and have done over the years is input on the cask designs. I won't go into a lot of that, except for that my job internally has been to tell the technical people on a regular schedule that they are to provide the designs, the final reports, the SARs, the SARPs. And they have been wonderful over the years since 1985 to be at meetings at least six times a year giving updates on the cask program to all these external parties.

And in the area of full-scale testing, I just want to finish up that this has been a comment for a lot of years.

We did announce that we have been coordinating internally on the issue of whether we could or would provide full-scale testing in the RW program, and we issued an announcement that we would start a seven-step process to resolve this issue.

Essentially what we would do is issue a Federal Register Notice asking for interested parties to participate in the crafting of a full-scale testing plan, contract with a third party to write the plan, and have them hold the workshops to design a full-scale testing plan that the country would accept so that we would not be dealing with the ratcheting effect, that we would get a plan that the country could live with, and then submit--the third party would submit it to the DOE, and we would look at our situation at the time and see if we can incorporate the full-scale testing that they have written.

And the last slide, I just wanted to say that we do have a small public information program. It was always designed to be much bigger if we were going to be at full-scale shipping, but given the schedule, we've limited our program somewhat to exhibits and developing videos and getting out to the public, informing them of the plans for transportation. And, of course, as we got closer to shipping, this would be a much bigger part of our program.

That's all, and if there's any questions, I'd be glad to answer them, or comments from the audience.

DR. PRICE: All right. Thank you very much, Susan.

MS. SMITH: Thank you.

DR. PRICE: With regard to the TEC list of participants, I notice that there's no area that I could see that the vendors themselves for, for example, the casks and equipment that might be used in the transportation of nuclear materials, have a representation, the vendors themselves. Is that something that is an oversight, or--

MS. SMITH: The charter for the group was designed for basically State, Tribal and Local groups that would be interfacing with us as far as plans and what they would need to know in order to ship--I mean, for us to ship. The meetings are open to the public. I know we have a fair amount of carriers that are interested in the program, as far as people developing the hardware. We have emphasized mostly topics like emergency preparedness, inspection, public information activities, and it hasn't been very focused on the actual design of the hardware. If that was to happen, we'd be more than glad to have anybody participate, and it's open to the public if they're interested in it.

DR. PRICE: And also, with respect to this program specifically, do you have an area in the area I just commented, which was industry, in this area, the local? With our particular area, local affected counties or jurisdictions, they're not particularly represented in the

TEC, are they?

MS. SMITH: I was expecting that question. The affected counties in the Nevada area are funded, you know, via Congress, to come to meetings that they want to come to, and at this meeting, I think we have seven of the ten local counties, affected counties, at the TEC, but as far as official membership, because the group represents all of the Department and not specifically Yucca Mountain, we have listed those members as people that we could fund because they represent a national or regional interest. But as I said, they've come, the counties have come. They have adequate funds to come, and they participate and are welcome as full participants. It's just in title only that they are not on the list, so we don't fund their travel.

DR. PRICE: The Transportation Coordination Group, that is some history that you referred to earlier, since the TEC is now identified as the number one representative group, does that indicate something with regard to the functioning and functions of the Transportation Coordination Group?

MS. SMITH: One of the big questions the TEC Working Group members wanted to be assured of is that the existing public meetings for each program continue as usual. WIPP has a series of meetings like ours for their basic constituents that are very interested in WIPP specific issues, et cetera. And the TEC Working Group has always been RW specific only.

We have no intention of changing that. The agenda on TCGs are RW specific.

The emphasis, as the Secretary stated, is that it's just for the Department wide. It covers all of the shipping campaigns, and so that's why it's the higher level of importance.

DR. PRICE: I thought I heard you say that the TEC was RW specific, the TEC?

MS. SMITH: No, if I said the wrong acronym.

DR. PRICE: That's to include all of the departmental.

MS. SMITH: Right, and the TCG, the one in Las Vegas, is the RW specific. I might have screwed up my acronyms.

DR. PRICE: Okay. Any other questions from members of the Board? How about staff?

Okay. Woody Chu?

DR. CHU: Yeah, Susan, on the full-scale testing, the seven-step process; since one of the difficulties is getting agreement from all the interested parties on what constitutes a test program, what's been the reaction to that?

MS. SMITH: I could ask one of the stakeholders. So far there has been empathy in the situation, that groups have been aware that over the years, there's different ideas of what full-scale testing is, and so there's an understanding that it's difficult for the Department to make the commitment

if they don't know what they're committing to specifically.

So I have not heard any complaints as of yet because the end result hopefully will be a resolution in the workshops as to what would be the best full-scale test that the Department then would be needing to commit to, and they would be more amenable to committing to it because it would be a concrete plan instead of just the phrase "full-scale testing," which could mean very many different things.

DR. PRICE: Dan Metlay?

DR. METLAY: Dan Metlay, Board staff. Both of your groups that you've talked about seem to enjoy a fairly good reputation in terms of their credibility and their activities. Are there any lessons that you've learned from running these groups that you feel the Department as a whole, or your colleagues in OCRWM might take something away from?

MS. SMITH: The number one thing I would say is that the requests have not been inappropriate, yet the Department sometimes views that there may be. Much like the external parties are rumored to have a fear of nuclear materials, I think the Department has a fear of external parties. And my experience has been that their requests are usually fairly sound. They're usually--the requests that stay for a lot of years usually have some validity, and that it's probably a good idea to do them. Since I'm departing from this

position, I can say these things. And that they're very workable people, they're very professional, and they're very committed to this program and to working with us. And I would say that the most important thing is they're not difficult to work with, and I have enjoyed working with them over the years.

DR. PRICE: All right. Thank you very much, Susan Smith. It's an area we're very interested in, particularly stakeholder involvement, and we want to continue to keep in touch with it. Thank you very much.

MS. SMITH: Thank you.

DR. PRICE: Our next presenter is Bill Lake, who brings continuity to the program because he is staying on in the area of transportation during the restructuring. And Bill will be speaking to us on the cask development program and giving us an overview, and then a general introduction of the other speakers.

MR. LAKE: Thank you, Dr. Price.

My introduction is going to be very brief. I just wanted to talk a little bit about the next four presentations, which are closely related. The first three address hardware that we're either in the process of designing and developing, have actually built and our testing, and one that we're in the process of looking to now, and that, of course, is the truck casks, the tractor trailer

testing, and the MPC, respectively.

And we'll also talk about one important technical issue that relates to transportation and other things, but that's burn-up credit.

The first presentation will be by Don Nolan, who manages the cask development activities for the M & O. Don will discuss the high-efficiency truck cask design, which, incidentally, increases cask capacity over existing legal weight truck casks by about a factor of four, and actually four-and-a-half when you look at the PWR fuels. And this is done through optimization. I know there's been a discussion that you're cutting corners, you're not doing things safely, but Don's presentation, among other things, will bring out how we achieve these high capacities, which translate into fewer shipments.

The second presentation will be by T.C. Smith, also of the M & O, and T.C. will describe an operative test program that's currently--I believe it may have already started, or at least--it started Monday. I've been out of town and missed that.

But one of the reasons we decided to look at this, again, we're pushing high capacities with this truck system. We're also optimizing and working very closely with weight limits. It kind of reminds me of the aerospace industry, which is where I started. You know, I didn't think in the

trucking industry you have to watch ounces and pounds, but we had to here. And what we've done is identified a high efficiency trailer that was designed, especially designed for this, and selected a high performance, light-weight tractor, but we still need to test them to make sure that these do the things that we expect them to do, both structurally and performance wise.

The third hardware discussion will be by Jim Clark, who is the M & O manager for the MPC project, and, of course, Jim will talk about the MPC. And one of the focuses, of course, if you know the MPC, is more or less a universal system or a component to a universal system. But Jim will focus on the transportation aspects of this.

And after the break, I'll give the presentation on burn-up credit activities that DOE has been involved in, with many others, for probably since about 1986. It's a long ongoing program, and it's a rather interesting issue. I'll try to keep the technical presentation interesting, giving enough information because I believe this is the first time this topic has really been discussed with the Board.

And I'd like to turn it over to Dr. Price now to introduce the individual speakers and keep them on time, including myself.

DR. PRICE: All right. Don Nolan?

MR. NOLAN: I am Don Nolan. I'm with the M & O. I'm in

the Transportation Department, and my area of responsibility is cask system development.

My presentation deals with the summary of high-efficiency truck cask systems, which at present consist of the General Atomics GA-4 and GA-9 legal weight truck casks.

A legal weight truck cask system consists of, basically, as shown on the viewgraph, there is, of course, a GA-4, a GA-9 cask, and it is mounted to a specially designed trailer for each of those casks, and then it would be hauled by the tractor.

As Bill mentioned, T.C. Smith will talk about the tractor and trailer, and I'm going to concentrate on the casks.

The legal weight limit is 80,000 pounds, and I've shown what the distribution of the weight would be to make up that 80,000 pounds.

The overall length of the tractor and trailer with the cask on it is about 57 1/2 feet.

The reasons these casks are being developed, Bill alluded to that, as he mentioned, the carrying capacity as compared to legal weight truck cask systems increases from one to four PWR assemblies and from two to nine BWR assemblies, and this, obviously, would reduce the number of shipments, the number of miles traveled and potential for accidents. In addition, it reduces the routine radiation

exposure to the public, which might occur during transportation, since these casks have the same dose rate limits in carrying four and nine assemblies compared to the legal weight which would carry one and two. So the overall exposure should be less.

My presentation is going to cover four areas, the design of the casks, a brief discussion of the analysis efforts involved, the certification and process activities that have gone on, and then the last area is the testing that has been performed and is planned to be performed to confirm analysis results and cask performance.

I want to try to give you a feeling for the extensive detail that's involved to provide a safe cask design and to obtain a license to transport fuel.

This is a GA-4 legal weight truck cask system. The cask has to have features and components to provide structural integrity to dissipate the heat from the spent fuel, of course, to contain the fuel and any products that would come out of it, provide for radiological protection, and maintain subcriticality and also to operate safely.

Starting from the inside, we have four PWR assemblies. These would be separated by a fuel support structure, which is in a cruciform shape. The fuel support structure provides support, structural integrity for the assemblies, keeps them separated to maintain subcriticality

and also dissipates the heat to the inner liner. And I have a schematic of the fuel support structure on a later slide.

We have an inner liner, which is about 3/8 of an inch thick. It's stainless steel XM-19, which has twice the strength of more common 304 stainless steel.

Then moving out, we have the depleted uranium shield. This is about two-and-three-fourths inches thick for the GA-4 and about two-and-a-half inches thick for the GA-9.

Then there's another shell, a body of stainless steel, and this is one-and-three-fourths inches thick. The liner and the outer body here are welded to a bottom forging and a top forging, so that completely encases the depleted uranium, and this provides, of course, the main structural support for the cask and absorbs the loadings that are applied to it.

On the top we have a bolted closure. This is bolted by 12 high-strength bolts. There are four trunnions at the top. They're all used for lifting, but two of them are used for tie-down, and there are two tie-down trunnions at the bottom of the cask, and these sit on the trunnion supports on the trailer.

Going out through the thickness again, the next layer after the body would be the polypropylene neutron shield, and that's about three and one-half inches thick, and that's enclosed by another stainless steel liner that's about

one-tenth of an inch thick.

On the ends are two impact limiters, and these are aluminum honeycomb filled, and you can see these lines represent the direction of the highest strength of the honeycomb, and for the 30-foot accident drops on the side, these would be oriented perpendicular to that impact surface. For corner drops, the honeycomb is arranged this way, and then for the end drops, it's arranged axially with the cask. And the impact limiters are held on by eight high-strength bolts.

As you can see, the GA-9 is basically similar in design, as I mentioned. The depleted uranium thickness is a little bit less. The length is about 10 inches longer. Other than that, they're almost identical.

These are two cross sections of the cask. The GA-4 with the four-cell fuel support structure is the cruciform, or the fuel support structure. The inner liner, depleted uranium layer, the outer body, and then the neutron shield material, and there are aluminum tubes that go from the outer--from the body to the enclosure around the neutron shield to help dissipate the heat.

Here's the nine-cell fuel support structure. Again, the design is basically the same.

This is a schematic of the fuel support structure for the GA-4, the poison or the neutron-absorbing material,

or the criticality control material. There are holes drilled almost the full depth of the plates. These holes are filled by B4C pellets that are like a half-inch long. Once they're all loaded, the pellets are loaded in there, there's a strip that would be welded on the outside to seal those so that they're not exposed to the pool water.

Those are a listing of the key design features, which I've kind of mentioned. The only one I didn't talk about were that there are access ports in the cask for draining the cask, venting and drying operations, which would occur during the loading and unloading phases.

The drain port is on the bottom. It originally came out the very bottom of the cask, but now it has been moved around to the side, but still near the bottom. The vent ports are in the lid, and, of course, during transportation, they're plugged and sealed.

These designs over the years have gone through a number of reviews by different groups, and there have been significant design changes as a result of those reviews.

I've just listed a few of the major ones there. The second set of lifting trunnions was added for redundant lifting in plants that would require that. The closure lids have been modified to provide cutouts for certain fuel so that the carrying capacity could be increased in a sense of the variety of fuel types that could be carried. For the GA-

4, it increases the length of the cavity about three inches, and for the GA-9, about two inches.

The other change that has been incorporated is a four-cell fuel support structure has been designed. So that can be put in the GA-9 to carry longer PWR assemblies and PWR assemblies with non-fuel assembly hardware.

The cask was originally painted on the outside. That has been eliminated. It was there to help improve heat rejection, but the concern for retention of contamination and the design to be more easily decontaminated and prevent perhaps maintenance problems in terms of paint chipping and continually keeping that in good shape. So it was removed.

The last one I've listed is a welded fuel support structure on the GA-4, and this was basically based on input from the NRC. It was previously guided. In other words, it had a key way in which the fuel support structure could slide into.

But after meetings with NRC, it was obvious that we couldn't really convince them that we were going to have enough interference or support by the key way. So it was decided to just weld it to the inner liner.

This is a table, and it just shows some of the overall dimensions and the weights of the casks. You can see that they're very close.

The GA-4 with impact limiters is about 19 feet

long, and the GA-9 is about 20 feet long. The cavity depths are shown there, and as I mentioned, with these cutouts for specific fuel, the cavity dimensions are increased. For transporting other than that specific fuel, there would be plugs or disks in those cutouts. And the cavity fuel cell cross section dimensions are the clear openings in the fuel support structure.

I just wanted to mention briefly how the high capacity was achieved by these casks. One important factor, of course, is that the fuel is cooled longer, ten years versus maybe two or even less years for the existing casks.

There are two separate designs, there are two separate bodies, so that you don't have to have an extra 10 inches for the PWR assemblies. So, of course, that helps in the weight.

Obviously, since the fuel is square, a square cross section would be more efficient and eliminates the unused spaces that you would get from a circular cross section. If you might have noticed in the pictures I've shown, the corners are rounded, though.

The depleted uranium gamma shield is more efficient in that the thickness can be reduced, and, therefore, all the material outside the DU will have less dimension and, therefore, less weight.

And as I mentioned, the body material is XM-19, and

being stronger for the same loading conditions, you can reduce the thickness.

The fuel support structure is unique in that the poison is contained within the structure rather than attaching plates to the outside of the fuel support structure, which is more typical of a cask design.

And then the last item I've listed is the aluminum honeycomb filled impact limiters, of course, reduce weight and save weight to add for the other components.

And now I'd like to briefly describe the analyses that go into--for the design of the cask. And as been mentioned earlier, casks are designed basically by analysis, and this is acceptable to NRC. However, there have been some testing done to test features such as the crushing of the aluminum honeycomb material and also testing the neutron shield material under a fire condition.

The five major areas or disciplines that are involved in cask analysis are structural, thermal, containment, shielding and criticality. These analyses are performed using sophisticated computer codes, a number of finite element models, either two dimensional or three dimensional. In this way, the analyst can perform highly detailed analyses of the cask, the entire cask, individual components or specific areas. One of those areas that were modeled were the complicated intersection of the trunnions

with the cask body, and the models that were developed had hundreds or thousands of elements and modes to perform that analysis.

The computer programs and models used are typical for cask analysis and are familiar to and accepted by NRC. The applied loads to the models result from the conditions which are defined by 10 CFR Part 71, which are the normal conditions of transport and the hypothetical accident conditions.

These convert into mechanical and thermal loads in terms of internal/external pressure, thermal gradients, acceleration, deceleration loads, lifting and tie-down loads. The loads which normally drive the design of the cask at least from a structural and thermal considerations are the 30-foot drop onto an unyielding surface, the puncture accident condition and the accident thermal environment or the fire. Then, of course, there are the radiological source terms of the spent fuel.

The analyses, then obviously produce results, and these results are in terms of stresses, deformations, temperatures, radiation dose levels. These results are then compared to allowable limits, and the allowable limits are established, obviously, by Part 71, which I mentioned on the previous page, but also a number of NRC regulatory guides. The regulatory guides also involve the ASME boiler and

pressure vessel codes, and in particular, Section 3 for nuclear components. And those codes are also used for the fabrication and examination of the fabrication part of the cask development. And then also, the ANSI standards are used.

The allowable limits provide significant safety margins against failure; for instance, structural failure against buckling or exceeding the strength of material and assuring that the operational temperature limits of certain features of the cask are not exceeded like the seals and the polypropylene neutron shield material.

We take the analysis methods and the models, the applied loads and the results, the allowable limits, and these are all summarized in a safety analysis report, which is then submitted for NRC review.

And that finishes the cask analysis part of it, and I'd like to just briefly go through the certification process activities that have been going on.

Any cask supplier or cask designer first has to have an NRC-approved QA program before any activity can start, and the NRC will audit the cask suppliers periodically to assure that they are performing their activities to that program.

Early on in the design phase, as soon as possible, a designer would go into the NRC and start to present the

design to them. On the GA-4/9s, many presentations have been made to NRC during the design analysis phase, and this will continue when the scale model is tested.

The last two meetings that were held were on June 2nd and July 13th of 1993. At that point, NRC said, we believe you're ready to submit this, and so we have been proceeding to get ready to do that. Obviously, the reason you go to NRC is to hope that you can resolve all the issues before you submit the SAR and you have no surprises when they come back with the first round of questions. They will perform their own thorough and exhaustive independent review.

And as I've mentioned earlier, these reviews have been done by other external groups, and they are completed. The safety analysis report for the GA-9 will be submitted in the end of July, and for the GA-4, the end of September. We expect or hope to get the first round of questions six to nine months after that. Although, as it's been mentioned before, NRC doesn't require scale model testing, it certainly helps facilitate the licensing process.

So a half-scale model is under fabrication. It's expected to be completed at the end of this year, by December, and then tests would be conducted early next year and have test results by March or April of '95. These test results would then be incorporated into the next revision of the safety analysis report.

And this approach has been worked out with NRC by General Atomics and DOE.

The last area I want to talk about is the cask testing phase which goes on during design and through fabrication. The first part of these would be component material or subsystem testing during the design phase, we'll mention a couple later; the design verification or regulatory testing to the Part 71 accident conditions with the scale model test; and then after fabrication, prior to acceptance, there would be acceptance testing, and then during use, there would be periodic maintenance testing.

The component material and subsystem testing, that's been done, a full-scale mockup of a section of the cask body, which included the outer body part, the neutron shield material, the aluminum tubes through the shield material, and then the outer enclosure. And this was done in response to reviewer comments to demonstrate the ability of this area of the cask, and this was done and the results were very satisfactory.

A full-scale mark-up of the lid closure area was also performed to demonstrate the sealing capabilities. Fire tests have been done on the neutron shield materials to be sure that their performance will be acceptable for the thermal, and as I mentioned, several tests on the aluminum honeycomb material has been done to get forced deformation

curves so that in predicting what's going to happen to the cask during these accident conditions, you will be assured that you can predict them correctly.

And as I mentioned, the cask testing on a half-scale model will consist of three sets, 30-foot drop and then a puncture, a side drop of 30 feet, and then the puncture into the damaged area will be performed. And then on the side slapdown, the slapdown is done at a small angle, from horizontal. The side, of course, is flat. The slapdown is at a slight angle, and typically, the secondary impact on that will be the worst in terms of deceleration loads because of the additional inertia that you get from the rotation.

And then there will be a center-of-gravity over the end corner, and then, again, a puncture into the damaged area.

Now, once the cask is built, and prior to accepting it, the cask is subjected to testing, such as pressure test, leak test and load testing. And then once it's in use, there will be periodic maintenance testing, such as leak testing and visual inspections.

And that's my presentation.

DR. PRICE: All right. Dr. Brewer?

DR. BREWER: Brewer, of the Board.

I have no idea. How many of these casks are being

planned, and roughly, what does each one cost? I'm curious.

MR. NOLAN: Presently, there's two prototypes, one of the GA-4 and one of the GA-9, and the cost estimate now is around three million.

DR. BREWER: Apiece?

MR. NOLAN: Apiece.

DR. BREWER: And what is the expected production run of these? You're making more than one each, right? How many are you going to make?

MR. NOLAN: Well, I guess that depends on where we're shipping and how many truck cask sites we have. That really hasn't been decided.

DR. BREWER: Okay.

DR. PRICE: Don Langmuir?

DR. LANGMUIR: Looking at your overhead 12, you divide by two calculation. It looked as if the casks weighed 26 or 27 tons overall. How much of that weight is fuel? What percentage of the overall weight is the fuel that's contained?

MR. NOLAN: Well, for a PWR, it's about three--let's see, 6,000 pounds, roughly.

MR. LAKE: The PWR, I think, is about 1,500 each.

MR. NOLAN: Apiece. So that's about 6,000 pounds. And the B's are close to the--I mean, the total weight of the 9 is close to the total weight of the 4.

DR. PRICE: Other questions from the Board?

Some of the experience with casks has indicated that the ports, drains, vents and so forth, including the covers, have been misused during normal activities. What steps in design have you taken to try to prevent such misuse?

MR. NOLAN: Well, some of the comments that have been mentioned, you know, that have been received before in terms of markings to show which way to turn the valve and so forth and the operational steps and procedures have been, or would be, clearly identified in the operations manual. To assure, you would, obviously, train a crew to make sure that they're doing it correctly before you would have fuel in there.

DR. PRICE: Where possible, you want to design out such things and not rely on procedures?

MR. NOLAN: That's true.

DR. PRICE: And have you engaged in an effort to see what you can design out?

MR. NOLAN: Yes. As a matter of fact, in the file design report, there's a chapter on how those things have been addressed.

DR. PRICE: You mentioned the lack of paint, and I take it from your comments that that is related to the weep phenomena?

MR. NOLAN: Yes, and also chipping and maintenance of keeping the paint in good condition.

DR. CANTLON: Dr. Cantlon, Board.

These are single-purpose casks that really require a hot cell for both loading and unloading, right?

MR. NOLAN: That require--I'm sorry?

DR. CANTLON: Require a hot cell for loading and unloading?

MR. NOLAN: No, you would do these in a pool, spent fuel pool. You could do them in a hot cell, too. I mean--

DR. CANTLON: Well, yeah, okay. Hot cell or a pool.

MR. NOLAN: Yes.

DR. CANTLON: What's the destiny? Where are these things being transported to? Where is the pool or hot cell on the other end?

MR. NOLAN: On the other end? Well, until we have an MRS or the repository, we don't have one.

DR. CANTLON: So these things would be useless unless there could be a hot cell or an unloading pool?

MR. NOLAN: Or a storage place, that's true.

DR. CANTLON: Well, are these designed for storage, as well as transport?

MR. NOLAN: No, these are just transport casks.

DR. CANTLON: Right.

DR. PRICE: Thank you. I think we've run out of time. We still have questions, but I think we've run out of time, and our next speaker is T.C. Smith.

MR. SMITH: I'd like to, first of all, thank you for the opportunity to talk to you today about the LWT, or the legal weight truck tractor/trailer testing. This testing is currently underway at the Allied Signal Automotive Proving Ground, located in New Carlisle, Indiana, which is about 20 miles from--in South Bend, thank you, the home of Notre Dame. Thanks a lot.

In terms of setting the stage for this briefing, I don't need to spend a lot of time on the first couple of bullets because we've beaten them to death. You know that the priority is to go to rail. We will have some highway shipments. The purpose of this test is to be sure that the tractor and the trailer that we employ is as safe, durable and reliable as we can make it.

Basically, the test is going to be broken down into these stages. Now, we'll talk about them all individually, but the focus of the first part of the test will be on the trailer durability. We will then transfer our focus to the tractor performance. We'll take into consideration human factors, and then we're going to take it on the road and see how well it does outside the test track environment.

Here's what I'll talk about during the briefing. Here's a picture of what it actually looks like. This is the actual LWT transport system minus the actual cask. This is a simulated, we call it our cement block. It weighs 55,000

pounds, has the same center of gravity characteristics as the GA-4/9 cask system. That is a freightliner cab-over-engine configured tractor. It's one that you could go right downtown Denver and order from your local freightliner dealer. All we did is when we purchased, or when we ordered this vehicle, we went through, and just as you would when you ordered a car, we went and ordered certain light-weight options. As an example, we only have a 100-gallon fuel tank on there. We have aluminum wheels. Anywhere we could save weight, without compromising the structural integrity or the safety of this vehicle, we did so.

You've heard the term legal weight. This is a legal weight system. That means that the cask, the trailer and the tractor cannot weigh more than 80,000 pounds, and that's mandated by the 1982 Surface Transportation Act, or we're actually about 780 pounds underweight. And that's ready to go, that's with fuel, that's with drivers, both male and female, and for planning purposes, we plan on keeping them under 200 pounds, which may be a struggle. And it also includes 240 pounds worth of communication and emergency gear, like chains and radios.

Here's what the actual test track looks like. This is the Allied Signal Test Track. It was originally a Studebaker facility. Basically, without spending a lot of time on it, this is the durability part of the track. This

is where your underlaying road is found. This is where the chatter bumps are found. This is where the large and small cobblestones--this is where we're going to beat the system to death up here. Then there's a three-mile oval track where we will do high-speed lane changes and where we will accumulate a lot of the mileage that we're required to get to 240,000 equivalent highway miles.

In terms of where we've been, basically we ordered the tractor and had it delivered with our specifications to Allied Signal Automotive Proving Ground last November. They accepted it for the purposes of conducting this test.

Our first real challenge was to go out and try to duplicate or try to determine what type of operational environment will our system be subjected to when it goes out on the road, moving back and forth from a repository to the utilities, or vice versa.

The Department of Energy did a study about two years ago that determined basically that 75 per cent of the roads that the vehicle and this trailer will operate on are going to be smooth interstate; 17 per cent are going to be rough interstate. Actually, if you've driven around Washington, D. C., it's probably the other way around. And 8 per cent of the roads will be secondary roads, both smooth and rough. We plan on hitting a bridge approach every five miles and running across a railroad crossing every 225 miles.

Well, that's fine, but how do you take that type of data and translate into a test track environment so that you can test this system in a test track environment?

Well, it took us about three weeks, us being AEPG, the engineers at Allied Signal, about three weeks to actually do this, coming up with the right number of combinations of trips around the durability track. But before they did that, they had to go out and actually find these roads and instrument up this trailer with string gauges and accelerometers, that they went and found this 75 per cent of the smooth highways, 17 per cent rough. They found them in three states by driving over almost 500 miles in 10 hours, and the states were Indiana, Illinois and Michigan.

Now, we know what that 75 per cent of the highway miles translates to into strain and input to accelerometers. Now we have to duplicate this on a test track by developing something we call a compression ratio. How many miles do we need to drive around this very demanding durability part of the test to equal 240,000 equivalent miles?

After many, many iterations of driving around the durability track to find the correct combination of events, those chatter bumps and the cobblestones and underlaying road, the engineers determined that the ratio was going to be 32 to 1. For every mile we drive on the test track, it's going to be equal to about 32 miles of equivalent stress and

strain on the highway.

That test, I'm happy to report, just started Monday, and so they've already started gathering some of this data. It's too early to predict anything yet, but the focus of the first part of the test is to determine the durability of the tractor--I'm sorry, the durability of the trailer, and that's exactly what we're doing right now. You can take the word "estimated" off your slide.

The test did, in fact, start this past Monday, that durability portion of the trailer test. It's going to last until we--we estimate it will last until September, at which time the tractor and the trailer--because let me tell you, they're going to take a tremendous beating out there. Some of you may remember a commercial on T.V. several years ago where a pick-up truck was down the railroad ties, and you see it bouncing all the way down the road? Well, that's what this is going through, only it's not one mile. It's going to be almost 7,500 miles of this kind of abuse, stress and strain into the tractor and the trailer to determine its durability.

After it goes through that, and assuming that it passes, the tractor and the trailer are going to be refurbished to Commercial Vehicle Safety Alliance inspection standards. Now, the focus of the test is going to go from the trailer to the tractor, where we're going to be concerned

about capturing the operational performance characteristics of this system. It will still have the simulated cask on it We're going to see how well does it break? How well does it pass? How well does it change lanes at 55 miles an hour, and what are any peculiar operating characteristics of this system?

Now that we know the trailer is durable, we know we have the operating characteristics of the tractor, we're now going to be very concerned about the human dimension here. The human factors we're going to be considering here because of the configuration that we have. When you talk about trucks, you've got two basic configurations. You've got the conventional engine out in front, which represents about 70 per cent of the truck population, and about 30 per cent of the trucks will be the cab-over-engine configuration.

I did a very scientific study as I took my daughter down to college one Sunday afternoon on Interstate 81 down to Radford, and I actually had my wife counting trucks. And she doesn't care to do that again. But that's where those figures came from.

But the bottom line is with this cab-over-engine configuration, we have some concern because of where the driver sits relative to the engine, there is an increased potential for more noise, more vibration, and we want to address the question of does this cause us any accelerated

fatigue for the driver?

Why are we worried about this? Because if we don't do safety right, we have failed. We know that as it comes to highway transportation, that the driver is the weak link. When it comes to drivers, we know that the three major causes of accidents are inexperience, lack of training and fatigue. We're not worried about inexperienced drivers because we're not going to hire inexperienced drivers. The drivers that we are going to hire are going to be at least as qualified as those who are operating in the WIPP program. Those young men and ladies have qualifications. They're at least 25 years old, so they're mature. They're going to have at least 100,000 miles of semi-trailer experience. They will be to every driving school we can send them to. They will be CVSA, Commercial Vehicle Safety Alliance, inspection qualified. These particular guys, some of them have even been to the Dale Carnegie course.

So we're not worried about--my point here is we're not worried about inexperience, and we're not worried about driver training because we're going to hire, we're going to train, and we're going to retain experienced drivers.

We are concerned about the fatigue factor. Now, this is not meant to be an all-inclusive list of every cause of fatigue, but rather the ones we find to be more significant. And we're going to focus in on the top two

because those are germane to the cab-over-engine configuration that we're testing.

And what we're going to do is we're going to have the test track drivers out at Allied Signal, and they are males and females. They are going to operate both the cab-over-engine, our tractor, and they're going to operate an engine-out-in-front conventional tractor. They're going to operate both of them for about 40 hours apiece, and we're going to test their reaction to various tests that are currently being developed to see how quickly they react and how accurately they react to this test we're going to give them in the vehicle.

In addition, we're going to measure the steering wheel input and amplitude. Those of you that have the pleasure of going to sleep while you're driving--none of you I'm sure have, but I have--you notice you drive down the road, you pick up subtleties in getting off course, and you make small corrections continually. Well, as you get fatigued, you don't pick up on those subtleties, and so when you do make corrections, they are usually large, and sometimes you overcorrect. Well, we're going to be able to measure that, and we're going to compare that reaction between our cab-over-engine configured vehicle and the conventional tractor and see if we have any significant difference.

A logical question is, well, what are you going to do if you see it? We're going to reduce the number of hours that the operator operates this vehicle once we put it in operation.

Now we know the trailer is durable. Now we know we have captured the operating characteristics of the tractor. Now we have looked at the human factors considerations and made any adjustments we may need to make there. Now we're going to take this system out of the test track environment, and we're going to put it on the road. We're going to put it on the road in what we call our Laps of America where we will actually visit 16 utility sites in 13 states, drive over 17,231 miles, and traverse 27 states.

We're going to find--we have picked these sites because they are the most demanding sites we could find in our first two years of delivery schedule. We've had some concern expressed to us about some of the particularly steep inclines that are found in the state of Nevada. We are doing an analysis right now to find 6 per cent grades on our trip, and I'm sure--on our trips to California. That's not going to be a problem. But I promise you, we're going to find at least a 6 per cent grade somewhere on our test.

Here's what we've learned so far. Pretty much is hardware related. We found that our tractor, the frame was too long. In certain instances, you can see up here, that

back part of the tractor frame was contacting the gooseneck of the trailer. We simply cut four-and-a-half inches off the tractor frame. It was all overhang, had no impact on the structural integrity of the tractor. Frankly, if I had thought about it, I would have had them weigh those parts, and we would have taken credit for the weight loss as well.

In addition, we now are going to a split fender. I know you've probably never looked at fenders like this before, but when you drive down the road, next time you drive down the interstate, take a look at the fenders on the tractors. Most of them are one piece. The only time you'll see a two-piece split fender is on a vehicle that carries some type of a liquid. Ours are going to have to be split fenders because the single fender we had on the tractor was also contacting the gooseneck of the trailer.

I'll show you a picture of it. This is what the two-piece fender looks like. This part's on the tractor, this part's on the trailer.

The next point I want to make on this slide is that one of the real challenges that we had was we found that as we tried to develop this compression ratio, and that's where we were trying to duplicate the road profile data on a test track, we found that as we stressed one part of the trailer to 100 per cent of what it was seeing out on the road, we sent the gooseneck, where we had the strained gauge in the

gooseneck, we sent that to 2 or 300 per cent of what it was seeing out on the road.

So that's why it took us two or three weeks to develop this compression ratio of 32 to 1, finding the right combination and the right speeds to enter these various events to give us a fair distribution of compression ratios and stress and strain through the entire trailer.

Let me show you just a brief look. This is the GA-9 trailer, and this is the location of the strained gauges. An example, a problem we had initially, was we were getting 100 per cent of the input on the road of the road input right here at accelerometer No. 7 on the test track, but strained gauge No. 6, or strained gauge No. 8 and 9 located up near the gooseneck of the trailer, we were finding it was going into overload.

And so we want to be fair by stressing everything at least 100 per cent, but we don't want to absolutely guarantee failure by sending other parts of the trailer into 4 and 5 and 600 per cent of its design strength.

Now, what we're going to do with all this information when we finish it, and with any luck that will be about this time next year, is validate that the tractor and the trailer design, and we had to verify this legal weight highway cask, the GA-4/9 that Don Nolan covered, is, in fact, safe, reliable and durable. We'll use those specifications,

then, to go out and procure a tractor and a trailer that will satisfy our highway transportation requirements.

Questions, comments, criticisms, corrections?

DR. PRICE: Thank you, T.C. Dr. Cantlon?

DR. CANTLON: Yeah, is the cab instrumentation and so on conventional, or is there some special look at user friendliness in the instrument design?

MR. SMITH: Thank you for the question. The instrumentation is pretty much the standard freightliner. As I said, this is an off-the-shelf freightliner vehicle. But if we find, because we're going to give the operators both a test track and in the over-the-road operational assessment, a chance to fill out questionnaires, and if they don't like something, something doesn't make sense, we're going to ask the freightliner to change it when they build it for us, or whoever it is that builds this.

Dr. Price mentioned earlier that this TRANSCOM system that we will have in the cab for the test, we're going to monitor this TRANSCOM system in the M & O in Vienna, where I'll be able to show you when this vehicle is on the road within 1,000 feet of where it is at all times. We're going to go to people who are currently using the TRANSCOM system, find out where they put it in their cab, and we're going to at least start off with putting it there and make sure that is a good place from the driver's perspective to reduce the

amount of fatigue or distraction from the road.

DR. PRICE: With respect to that question on instrumentation in the cabs, not only the TRANSCOM, but additional radios no doubt, and there's been some discussion in the past, but I haven't heard much of it lately about instrumentation for monitoring the conditions inside the cask from the cab itself. Is there anything going on in terms of that discussion of additional instrumentation in the cab?

MR. LAKE: Bill Lake. No, we aren't looking at that at this point.

DR. PRICE: Do you anticipate future discussion in those areas? It has something to do with MPC design, obviously, and also with designs in process?

8 MR. LAKE: Yeah. No, we haven't really been addressing that.

DR. PRICE: You don't feel that it's important for the driver to be able to monitor the conditions inside the cask?

MR. LAKE: I'm not sure. I think we'd have to look at it, but I'm not sure the driver would know what to do if there were adverse conditions in the cask, and it's a passive device that we're designing presumably not to have problems, but I think it's something we'd have to look into.

DR. PRICE: I don't think it would be too hard to tell him what to do if some things start going wrong.

MR. LAKE: Yeah.

DR. PRICE: Also, in addition, the conditions, some cabs have real live monitoring--I'm searching for the term, but I can't get it--real time monitoring of certain conditions of the truck itself in addition to temperature and that, brake conditions and other things.

MR. SMITH: We will have, Dr. Price--we will have an on-board computer on the vehicle. As a matter of fact, it's already on the vehicle, that will capture for us--it's not really designed to read out to the driver, but rather to give us a historical feel for how fast he's driving. If there's ever an accident, it's like a black box in an aircraft, we'll be able to reconstruct how fast he was driving, when he applied the brakes, how hard he applied the brakes. He'll be able to log in and log off electronically on that. So we'll be able to accurately monitor his hours of service. But that doesn't read back real time information with respect to the condition of his brakes.

Remember now, this driver is going to be Commercial Vehicle Safety Alliance inspector qualified, and he's going to give us essentially a very brief CVSA inspection every day before he starts off on the first run of the day. We're going to monitor the maintenance conditions of this tractor and trailer very carefully.

DR. PRICE: In addition, there are presently devices being considered and developed and researched on them for the

detection of fatigue and sleepiness in drivers, and that might be something you'll want to keep alert to because if you decide not to include such devices, if they are ultimately developed, then you'd have to be able to defend that, defend that in this kind of a case. And, also, as we've discussed in the past, there are devices that are also under consideration and some literature in the area of driver readiness. And, I think you're pursuing the driver readiness side of things.

Other questions from the members of the Board?

DR. ALLEN: Just a comment. If you use this in some states like California and they go at the speed limit, they're going to block traffic for miles and miles. Everybody wants to go much faster than the speed limit.

MR. SMITH: And, we will be taking this to California as part of our over-the-road operational assessment, as well.

DR. PRICE: One general concern is we are entering into an era of intelligent vehicle and highway systems which will also impact your cab and also impact your operations a great deal. That may develop because if we're talking about campaigns in the year 2020, these may very well be in existence at that time and I don't think it's too early to look at what is the impact of having intelligent vehicle highway systems to cope with. Some discussion has been that it will start with trucks. So, I think it's something to be

aware of.

MR. SMITH: That's a very good point. As a matter of fact, Ron Kelly went down to your alma mater about a couple of weeks ago and attended a seminar on the intelligent vehicle highway system. We are keeping close tabs on that to see where we can apply that technology to our highway carry system.

DR. PRICE: Okay. Thank you very much, T.C. We're running just a little bit behind, but not very much.

Jim Clark, you're going to catch us right up.

MR. CLARK: I'm Jim Clark and the agenda is billed here, the Transportation Manager; I'm the MPC Project Manager and I'll be giving this presentation for Bill. I'll focus on the substance of things that you may not have heard before. This is an act of procurement while I'll be able to talk to everything that is in the RFP and the design specs. I'll have to be careful about interpreting any of those specifications.

The subject is the MPC transportation cask, but the MPC is a system; it has separate overpacks. To talk about the transportation cask is to talk about the MPC itself, and to talk about the MPC sets us into discussions about the interface. So, we will talk extensively here about the MPC, as well as its transportation overpack.

Again, the MPC system is comprised of several

physical components. The ones that we would normally talk about in depth is; the canister which is the basket for a transportation cask. The transportation cask and its transporter, which I've mentioned up here, is the rail car. We will also have to recognize the interfaces with the storage unit or module, the on-site transfer cask, and various ancillary equipment, which are important, such as lifting beams and the such.

You have probably seen this slide many times, but the key here again is that the MPC--well, we'll try that some other time. You have to get people with good eyes. The MPC is contained within all the overpacks and it crosses these boundaries. It is part of the storage module, the transportation cask, and eventually the waste disposal package.

I didn't mean this to be a marketing--but again it goes to the question of the various requirements on the MPC and on the transportation cask. I'd like to also say that this is not just some assertion. These benefits have been backed up by system studies which I'll point out something you may or may not know in a minute.

This is more of the benefits of the system. We've had previous discussions on this in the discussions about the feasibility study and on the conceptual design presentation last year.

The word "conceptual design" we use as kind of a shorthand, but the reality of the conceptual design report was that the conceptual design report stood for a longer title; the multi-purpose canister implementation plan conceptual design phase report. You can see why we've shortened it to conceptual design or CDR. That CDR included a conceptual design, but it also included many system studies. It included a concept of operations, logistics data, and a series in Volume 5 of systems studies. As you can remember, the report itself filled a small table. We are busy distilling that report down to about a 100 page readable document that will present the systems evaluation. We call it a summary report. It's title will be MPC system development, a system engineering approach.

I ought to also mention, before we get too far into this, we also use the jargon "75 ton and 125 ton". Those terms are limits. We expect the actual weights to be different depending upon the vendor. So, we've been trying to discipline ourselves to start talking about large and small rather than 125 and 75.

I'll talk for a minute on the RFP before we go into the specs. Since we developed the conceptual design and presented the conceptual design report, we have been busy evaluating the information. It has been incorporated into the baseline, the MPC has. We have developed design

requirements documents. They were the basis for what we called design procurement specifications.

This RFP, this request for proposal, includes proposal requirements, statement of work, and these design procurement specifications. We issued the RFP early June. We had a bidder's conference in mid-June. We've had about 100 requests for the actual RFP itself. We had about 50 vendors, 50 representatives of industry, attend the bidder's conference. We have extended the original due date of the proposals from August until October to allow competitive proposals to us. You probably have read the difficulties people allege they might have with the bidder bonds. We have modified the bond requirements of that RFP. We expect the proposals, we require the proposals, to be to us in early October for the technical side and mid-October for the price or cost side. We will, depending upon the number of proposals and the degree to which they are good proposals, would expect to execute contracts and make awards no later than March of '95. We still have a target MPC deployment in early '98. That, of course, will be somewhat dependent upon what proposals we receive from the vendors. This is a competitive procurement. We are relying heavily on the industry to bid this process.

The scope of the RFP, we are requiring or we are planning on three phases. The Phase 1 is the design & the

preparation of safety analysis for submission to the NRC. Phase 2, which we would expect to begin about a year after the start of Phase 1, would be to seek the NRC certification and to develop and test prototypes. Phase 3 is the fabrication of the MPCs. It is targeted at the MPC requirements as best we know them for 1998 and 1999. Both Phases 2 and 3 are optional. Depending upon the bid prices, the performance, and the requirements of the program, we would execute Phase 2 or Phase 3.

Phase 1, itself, we are going to design both large and small MPC systems. Those will include MPCs for both BWR and PWR. They will be rail cask. We will include the storage mode in the design. We will include the on-site transfer system in the design and we will have all the ancillary equipment designed to both load transport casks, move it on the site, and to load the storage module.

Phase 2 will be certification by the NRC. The RFP does include the possibility that we will have to build and test regulatory models. They're 1/4 scale for the rail system compared to 1/2 scale for the truck system. We expect the designers to design by analysis, but in order to expedite certification, we believed it was prudent to plan for and, therefore, the RFP includes the potential for regulatory testing. Phase 2 also includes the fabrication and testing of prototypes. And, those prototypes are the MPCs

themselves, the transfer casks to move the MPCs to the storage mode, the trailer to do that. The storage mode itself--and, I use the storage mode just to try to avoid cask --it could be vertical, it could be horizontal, it could even be potentially a vault depending upon the vendor's design solutions. We have a limited number of prototypes in this. We have only two prototypes for the transportation cask. Those prototypes include one small transportation cask and one large transportation cask.

Phase 3, which would proceed based upon completion of our environmental activities, review by the Department on the acquisition side, obtaining favorable prices, and getting the NRC certification would be to start fabricating these MPCs and to deliver them in early '98. There, that fabrication is the MPCs. It does not include rail transportation casks or storage modes.

The important part of this is to get NRC certification. These casks in the procurement specifications rely heavily upon the experience that we have had both with the M&O and in previous lives certifying transportation casks. So, this is pretty standard requirements on both 71 and 72. But, we have, besides obtaining certification for both transportation and storage under those two NRC regulations, we have included in the design procurement specifications the need to be compatible with disposal. To

the best of our understanding of the requirements now, we've included specifications which we believe would allow us to utilize the MPC and its multi-purpose function and to eventually obtain a license as it's part of the waste package. That is not part of this procurement.

The prescriptive requirements, our plan on the RFP was to use performance based specifications to allow the vendors to achieve design solutions based upon their experience. We have included specific requirements in there that go to these characteristics, which I'll talk about, in order to expedite licensing and also to improve the desire for compatibility with disposal.

Again, we're going after complete systems. We're going to license it under NRC's Part 71 for this transportation cask. We are forcing the vendors to rely on the American Association of Railroads. You'll probably hear some more about that later. That goes to both the design and the fabrication.

Dick Hannon, this morning, used the word "everything has a story; every reactor has a story". They're all unique. We expect these kind of ranges with regard to which reactors will use which MPC system. We have detailed information on all 121 sites. It doesn't necessarily change day-to-day, but it does change as the various reactors see what an MPC is and what benefit it is to them.

Again, the large is less than 125 tons. We think there's margin there that they'll come in considerably lower. The 75 tons, the small, we think the 75 ton limit is a restrictive limit. We have placed restrictions--this is shorthand--with regard to the rail car in the specifications. We believe there's a possibility on the 4 axle car, but that's a design solution that the vendors will work. We put maximum dimensions on these MPC transportation casks for handling both the loading pit and the ability to get it on and off rail cars and to get it in and out of airlocks. So, these specification are specified in the RFP.

We have a design basis fuel specified in the MPC that goes to enrichment, burnup, cooling time. The one there that says large and small MPCs, our jargon is 80%. It nominally will carry 80% of the fuel that's obligated to be picked up in the first 10 years. Our enhanced fuel specification is for the remainder of the fuel. We are targeting or optimizing on the 80% number. We also recognize we have an obligation for about 2% of the fuel to stainless steel clad and we've included that requirement in there for design study. But, the large and small systems will be built to those middle requirements.

This is pretty standard stuff; the 30 foot drop, the puncture test. The MPC again is the basket for the transportation cask. So, it has a unique requirement on it

that you might not otherwise have if it was just a canister. The criticality requirements have been added to take credit for only 75% of the neutron absorber or, in inverse, we've required 25% extra neutron absorber because of the long-term potential for depletion in the repository.

On the one we just went by, note that the large PWR assembly MPC system requires burnup credit. Bill Lake will address that in detail in a little bit.

The dose rate requirements of Part 71 are up there. They're pretty standard. We do require an ALARA evaluation on the MPC surface lid which is somewhat unique compared to Part 71.

Disposal interface requirements are shown on this slide and the one I'd call your attention to is the thermal where we have specified a maximum of 14.2 kW to be in the MPC. We have some bounding work done by the repository experts that established the 225 degree surface temperature limit and a 14.2 kW package limit and we require our vendors to work back from those and show they meet the 350 max clad temperature.

On the materials, the one that got some eyeballs raised was on the no lead requirement with regard to the shield plug. We don't consider lead a RCRA material, but it might become an issue with regard to the repository, but we do consider it a potential RCRA material if this MPC didn't

work and if we had to dispose of it in shallow land burial. As a waste material, we might have to not only take on the RCRA issue, but the mixed waste issue.

The other requirements that are specified in the specifications just for the transportation casks are about 28 pages, go to intermodal capability, we expect to move lots of material by barge, has to be compatible with storage, has to be equipment intensive, use equipment rather than people and procedures. The option for full-scale testing is put in as a potential for Phase 3. Susan said we don't know yet what full-scale testing is. So, in this option, we specified it as a subset of the regulatory test. I think the one that was missing was the 200 meter submergence.

Greg Smith will talk to you later about the human factors and system safety.

I'll entertain questions?

DR. CANTLON: I may have not followed you correctly. I thought you said that when these were delivered to the utilities, they would be without transportation and storage.

MR. CLARK: If I did, I misspoke. We will deliver MPCs to the utilities for storage at the sites. The obligation for the storage mode and the transfer device to move it to the storage mode will be the obligation of the utilities. When we go to obtain the MPCs for interim storage or repository, it will be our obligation to send the

transportation cask.

DR. CANTLON: Is there enough uniformity in terms of cask transporters around the utilities so that they don't have to go out and purchase new ones?

MR. CLARK: I'll know in October.

DR. CANTLON: Thank you.

MR. CLARK: That is one of the areas people have been volunteering interest in. So, I think the answer is probably yes.

DR. PRICE: You mentioned 1/4 scale testing and 1/2 scale testing. Does that include the thermal tests, the 1475 degree? If so--

MR. CLARK: No, it does not.

DR. PRICE: If so, why; and, if not, why not? Or why?

MR. CLARK: These specifications for the 1/4 scale test were driven by the idea that in order to support design by analysis, we might have to expedite licensing by doing some structural work and those tests that I talk about are focused on the drop test aspects. I don't know. Maybe Bill could speak to this, any concern of the Commission's with regard to the thermal.

MR. LAKE: The NRC generally accepts thermal analysis as a means of demonstrating compliance with the regulations. Thermal analysis is better behaved, if you will, than some of the structural analyses because of the change from elastic to

plastic. And, buckling phenomena and things of that sort makes it much more difficult to do structural analysis. And, that's why NRC feels more comfortable with the verification tests.

DR. PRICE: Okay. I think we--just one comment if you could give it on--because you didn't mention it. I wish you would and so I'm going to ask you; no credit for moderator exclusion?

MR. CLARK: Yes, I'm sorry, I didn't. I thought that was--I went by it in the quickness. We don't take credit for moderator exclusion with regard to transportation because it's been traditional not to. And, the regulator/reviewer who we know very well, we would engage in difficult conversations. With regard to storage, it's been traditional to do it and the vendors will probably do that. With regard to disposal, our evaluations do not take credit for moderator exclusion. But, on the focus of transportation, we do not take credit for moderator exclusion.

DR. PRICE: Thank you.

DR. CHU: On the number of reactors that could not use MPC, your latest estimate is that they could be maybe only as few as four reactors that wouldn't be able to use it. Is there a typical constraining factor in these that--

MR. CLARK: No. The reality is that every one of these has a story whether it's loads, cranes. We have a cheat

sheet where we keep track of which reactors this day or in which category. And, Indian Point 1 and Ginna are probably the more difficult ones that we would face. They're constrained both by the airlock or the loading patterns on the pool.

DR. PRICE: All right. Thank you.

I think we'll take a break now and try to come back on schedule at 2:55.

(Whereupon, a brief recess was taken.)

DR. PRICE: Gentlemen and ladies, I'd like to direct your attention to the schedule that we have. What we're going to do is eliminate the next break at 3:55 in order to provide for more time for comments from the public and also because we need to be sure to meet the 5:15 dismissal time. The hotel has another group coming in here right after us and they do ask us at this dismissal time if we would hold our conversations outside the room so they can begin to prepare the room for the next meeting. So, they're running a tight ship; so, we'll try to accommodate them by being careful of that 5:15 time. So, we will eliminate the 3:55 break and go straight through from here on. There's only one speaker after the break and I think that's a reasonable thing to do.

Now, we'll have Bill Lake give us some things about burnup credit and perhaps a summary of what we've heard, so far.

MR. LAKE: Just in way of introduction, I'm going to tell you a little bit about burnup credit, what it is, a definition basically, and why we're seeking it. And, I want to talk a little bit about what sub-criticality is and the assurance of sub-criticality in transport casks. That's an important piece of background before we discuss burnup credit in detail. I want to talk a little bit about the current OCRWM strategy to incorporate burnup credit into our transport systems. We've discussed the issue for a number of years and the overall burnup credit issue and we've identified four major issues that need resolution at this point and I'll discuss those in some detail.

To begin, burnup credit basically recognizes and uses the decreased reactivity of spent fuel in demonstrating sub-criticality. Three things contribute or three factors contribute to this decrease in reactivity. As fuel is burned in a reactor, there's a net decrease in the fissile material which is necessary for criticality. There's also a production of actinides which are produced in the fission process which are neutron absorbers. Neutrons are integral to the criticality process while these new isotopes absorb a lot of those neutrons and reduce reactivity. Another thing that's produced during the nuclear process are fission products. These are maybe about 240 of them. We've found about a dozen which are very effective. Again, neutron

absorbers, they decrease the reactivity of the system. The three factors contribute about equally to the reduction in reactivity.

Why are we doing it? Well, burnup credit is a factor in increasing the capacities of casks and the MPCs. We'll explain this a little bit later. It's not a one-to-one factor. It's a little bit indirect. The NRC rules allow the use of burnup credit; that is, there would be no rulemaking requirement to use it, but we do have to work against a long history of practice. And, finally, the point I'd like to make is that burnup credit can be used without reducing safety. We use all the same safety margins that are used under current practice.

Okay. The first thing in discussing assurance of sub-criticality is to look at that K_{eff} which was mentioned earlier. That's basically a measurement of criticality or another way to say it is the measure of the neutron population growth. If population of neutrons from one generation to the next is one, we say that the system is critical and that's a self-sustained nuclear reaction. That's what you achieve at a reactor. We're seeking sub-criticality; so, K needs to be less than one. Another factor that we won't discuss is super-critical with K above one.

How do we design these criticality safety systems? First of all, we can control criticality by a number of

different methods. One is by limiting the fissile material. We're looking at multi-element casks; so, that's kind of out of the question. The other thing we can do is we can take care of the neutron population by effecting the geometry; remove the fuel far apart and so on. That's also difficult since we've got a limited space to work in.

Now, the other things that we can do is we can introduce neutron absorbers into the system. With spent fuel, we already have some internal neutron absorbers, but if you remember, Don talked about the baskets or the fuel support structure. Well, they had some neutron absorbers in them. That's one method.

Now, one thing I'd like to point out is we're talking about light water reactor systems. So, the first thing you really need is water and these are dry casks. So, of course, we preclude water; yet, we design the system as if water were in it. So, it's a double contingency for safety there.

On the regulatory requirements, basically the transport requirements say that you have to maintain a subcritical system. That is K less than one with some sort of margins for uncertainty. Practice has been that we design for a K_{eff} of .95. That's a 5% criticality safety margin. This is not a linear system. So, that's a significant margin. The other thing about the practice is practice has

been to assume that the fuel is absolutely fresh. It's a fairly easy calculation to do and that's why it's very comfortable. In the past, that's been easy to do because gamma shielding requirements and heat loads actually constrained you before you got to criticality. Now that we're shipping older fuel, criticality becomes a constraint. So, now, it's worth pursuing this.

I've already mentioned that we assume that water floods the system when we do the calculations. Criticality is demonstrated by calculation, but I would like to point out that it's always compared to an experimental benchmark. Let me say, the crucial point to look at is the critical point; that is, K is equal to one. So, experiments are done for a system that K equal to one and the analyst has to demonstrate that his or her calculations can do that adequately and then adjust the calculations accordingly. But, for that, we always assume that there's water in the system because you can't have a critical system without water.

Fuel baskets and flux traps, this has to do a little bit with capacity, as well. The fuel basket basically contains the external poisons for these multi-element systems. Boron is a good neutron absorber or poison. The concept of a flux trap basically takes, instead of a single plate between fuel assemblies, you take two plates with a small space. The concept is to enhance the capability of

these neutron-absorbing plates by having a space. Now, if the system were filled with water, that space would also be filled with water. So, that's a moderator that can slow some of the fast neutrons to the thermal level where they can be absorbed by the plates more effectively and that's the concept of a flux trap. Now, the down side of a flux trap is they're difficult to design from a structural standpoint and they also take up a lot of space. You've got to add an extra half inch/quarter of an inch between each assembly for space.

Now, since we've decided to pursue burnup credit and we're getting into a very tight schedule on MPCs and it could be very costly if it turns out we can't get burnup credit and design for it, we're really seeking an early decision from the NRC. We've done sufficient work ourselves to convince us that burnup credit is technically feasible and we can do a good job with safety, but we still need an NRC certification on that.

One thing that we've decided to do is rather than just attach these criticality arguments to the NRC applications is to go in with a topical report. There are many things associated with burnup credit that are just generic issues that would apply to all different applications. When you finally get down to it, of course, the final cutting edge would be design-specific. So, that would have to go in with the individual safety analysis

reports. We've had four technical exchanges since we've decided to go this topical report route, four exchanges with the NRC. That's been very effective in informing them of what we've done and getting feedback from them.

Now, here are the key issues that I've promised you and I've got detail on each one of these. One is the axial burnup profiles. The second issue is the benchmarking of actinide and fission product inventories. I'll get back to that. The third one is benchmarking criticality analysis methods. We've got a lot of history of doing the benchmarking of criticality analysis methods because we do it for fresh fuel. We're adding something new when we go into spent fuel. The second bullet, the benchmarking of actinides and fission products, of course, with the fresh fuel assembly we've got the fuel specifications. So, the analyst can just use that. When we deal with spent fuel, we need to have a predictive capability to know the inventories of these neutron absorbers and fissile materials. But, in order to do those calculations in the way we've done them in the past in criticality, we need to benchmark those activities. The first three address the calculational and design aspects and the third one is when you finally load the cask. We will be depending on reactor records for the histories of the fuel assemblies and so on, but we'll also be verifying those records through a measurement.

The first one I'll address is the axial profile and let me--in the interest of time, let me just go through this. Basically, we're only looking at burnup credit for PWR fuel which is fortunate. They've got the nicest profiles. The biggest thing that generates this non-uniform profile was the fact that you've got end effects. You get leakage of neutrons out the end of the reactor and there's no way you can get around it. There are other distributions which are taken care of by moving the fuel during its lifetime in the core of a reactor, but you can't take care of the end effects. That's just here; it's a given. We've characterized the end effects and we've developed techniques to show that we can account for them in the criticality analysis.

This is an example of an axial profile for PWR fuel assembly and basically what this is is the burnup. And, if you took the compliment of that, that would be, more or less, a reactivity curve with the ends being more reactive. And, it's about the first 10 to 12 inches that really has that big dip, but it's even on both ends. So, it's pretty easy to deal with and it's fairly characteristic from one run to the other. We're now developing a database of assembly profiles to develop that concept.

As I said before, this is a new factor that we introduce into criticality analysis; the consideration of

actinides and so on and we do have to do chemical assays of that. I would point out, though, that the NRC and analysts are not unfamiliar with the prediction codes that develop these materials because we use them for shielding. We have not used them for criticality in the past. So, since we are, we do need to benchmark these. We've done the selected materials that we'll be using. All the fissile materials have been chemical assayed and the dozen or so fission products will also be assayed. We'll only use fission products that we have, in fact, assayed.

Finally, we'll look at the benchmark criticality analysis methods. The NRC and all analysts are familiar with the fresh fuel critical experiments. Those will be important factors in the burnup credit case, as well, because we've done things like different basket materials and different configurations, flux traps, and so on, and their effects on criticality analysis.

There are some mixed-oxide critical experiments. These are important because they pick up the effect of the actinides, both the fissile materials and the actinide poisons. They don't pick up the fission products, though. Now, there's one good experiment with gadolinium which happens to be a fission product that's a very effective one and that we plan to use. A well-characterized experiment, a laboratory type experiment, has been done with that.

And then, finally, we get down to how we're going to look at the other factors that affect spent fuel. For that, we've decided to use reactor restart critical data as an implant experiment, if you will. Now, there's one shortcoming to that which I'll very briefly discuss and that is a restart critical happens to be done at a fairly high temperature. Spent fuel, a critical experiment for a cask would--you'd want to do it at a low temperature around room temperature. However, we feel this can be corrected for. We've got other experiments and other experience that would enable us to do that.

Finally, one of the end products of the analysis for spent fuel cask is to develop what's called the loading curve and you see the x-axis basically is the burnup level and the y axis--the x-axis is the initial enrichment. And, this is very much design-specific. It's specific to the fuel design and the cask design. The approach, of course, is to find the most reactive fuel configuration of everything that you want to ship in a given cask and develop one curve rather than have a collection of them. And, it's fairly simple to read. What you need to do is only select fuel that has higher burnup and lower enrichment than the curve; those are acceptable. Ones with lower burnup or higher initial enrichment could not be loaded into the cask.

Finally, we get into the implementation. If there

is approval and when there is an approval that may be more positive, we eventually have to load these casks up. And, as I said earlier, we will rely on the reactor records, but we do want to verify those with a measurement. The measurement that we've identified is--we feel is suitable to this type of application, it's not an absolute burnup measurement. It's clearly a verification and we'll see that a little bit later. The method is called the FORK detector. It's been used by the International Atomic Energy Agency in safeguards application to verify nuclide inventories. I've learned recently that it's also been used in France for burnup credit. They have, in fact, used a lot of our work and some of their own. I don't want to claim too much of it. But, they have, in fact, started to use very limited burnup credit, I understand, and they do use the FORK detector as one of their techniques.

Another thing we like about the FORK detector, it's a passive device. It measures gross gammas and gross neutrons, both. So, it's kind of a double check, as well. And, we have done, at least--we've done one test at a nuclear facility for this type of application. It's been used all over the world for a number of years on safeguards applications.

This is a not so good picture of it, but you can get an idea. The FORK itself is on the left hand side and

it's about this big and you can actually carry it around. The instrumentation to work the data and resolve the data into information that you need for loading is shown on the right hand side. This is a schematic of how you would use it. It basically is moved down with a crane. An assembly is taken out of the storage rack and the concept here is just to put it around the mid-section and get a neutron and gamma count data. It takes about five or six minutes to set it up and a few seconds actually to get your reading. So, it's very effective and minimally intrusive on the utility.

This is an example of the neutron counts versus burnup and this is, of course, resolved data from the collection and this is the one I was talking about in terms of a verification. These are not really absolute measurements. This is a neutron count versus the reactor data on burnup. And, if everything is correct and we show consistency, all those circles, squares, and so on will line up on a straight line. In this particular test at Oconee, they found two that are actually on top of each other off to the upper left. And, basically, the approach would be to resolve those and find out why they're different, to find out why they have different counts, and if you can't do that, it would be loaded into a non-burnup credit cask. They have not yet resolved what those differences were. They feel that it probably was a neutron source or something. But, this was

not for loading applications. So, they could not spend the time to go back and try to resolve that.

The summary, basically, I believe the key technical issues, the four that I mentioned, have been identified and we plan to work with the NRC and we hope that they will review and approve the burnup credit in the near future. We're looking at a tight schedule which I'll show you in a few minutes. I believe burnup credit can be used without reducing safety. We use the same safety margins. The calculations will contain biases and uncertainties related to calculations, measurements, and so on that we do with the fresh fuel assumption. And, finally, burnup credit can eliminate the need for flux traps which increases capacity, simplifies cask designs, and things of that sort.

This, of course, is our schedule. We have a group working in Virginia right now trying to put together the topical report which we plan to submit to NRC by the end of September. We've asked the NRC, and they haven't said no and they haven't said yes, to work very rapidly on this in accelerated pace and give us an approval for the topical by late 1995. The topical, I remind you, that gives us a methodology and would approve certain generic aspects of burnup credit. It would still allow the NRC and require the applicants to show that burnup credit for their particular cask was appropriate. The reason, of course, we're looking

at the tight schedule is to provide information to MPC and the vendors are expected to submit SARs in early 1996.

A fourth item that I didn't talk about, at all, today has to do with the MPC. Eventually, the MPC will be part of a disposal unit and that's another effort that we've --this transport group on burnup credit is working with the repository group to look at the long term aspects of burnup credit as part of the criticality control system. That ends my presentation.

DR. PRICE: Questions from the Board?

DR. CANTLON: You mentioned the difference in burnup credit within the reactor. Isn't there also a difference from top to bottom on the fuel rods?

MR. LAKE: Oh, yes, that's what the actual profile was.

DR. CANTLON: I thought that was--

MR. LAKE: Oh, you mean--

DR. CANTLON: Yeah, you gave us the actual one which is a distance from the center out, but isn't there a top to bottom within the individual fuel rods, as well?

MR. LAKE: Oh, no, that was top to bottom. That wasn't mid to end.

DR. CANTLON: Oh, all right.

MR. LAKE: Yes.

DR. CHU: On that last chart, the schedule, where you put down the dates that you would like to have certain things

happen, what are the contingencies if some of those dates aren't met? Then, either your desired dates for the MPC deployment may have to slip or you need to come up with some alternative for the canister design in order to meet the 1998 date. So, could you elaborate on that?

MR. LAKE: Okay. I guess, is your question having to do with how we'd adjust burnup credit or just the MPC part of it?

MR. CHU: Well, no, my question is that there are two-- the program has two independent requirements, one of which is to meet a 1998 date for deployment of MPCs. The other one is to try to incorporate burnup credit into the canister. And, if the schedules on your last chart are met and you still want to meet your 1998 date, what is your contingency?

MR. LAKE: Oh, okay, yeah, I see the question. Again, we're developing many, many MPCs and again there are two MPCs, the 75 ton and the 125 ton. We're only using burnup credit for the 125 ton and for PWRs. So, one approach--and, we're looking at the impacts of this right now. One approach is if we're convinced it's going to take too long to meet these schedules to get burnup credit approval, we'd have to look at--the most obvious contingency plan would be--or the two most obvious would be either to delay the large MPC and I don't think we want to do that or to come in with an underloaded system. A third alternative, of course, is to

look at moderator exclusion. If we're going to store in '98, but not ship, we could meet the storage requirements by moderator exclusion; basically, put the storage system away from water and load it in the borated pool and then work towards later approval of burnup credit for transportation.

DR. CHU: You haven't decided on any one of these approaches?

MR. LAKE: No, no. We're evaluating them and we need to look at what the impacts are in--I think what we're going to do really is to keep it as a living evaluation because things could change very rapidly and we need to be able to respond to those and make good decisions.

DR. DI BELLA: Do you plan to get any additional new physical data to support your burnup application to NRC?

MR. LAKE: At present, we believe we've got sufficient data to cover what we need to show NRC, but we are looking into some other types of things, some other experiments, and that. But, there are no commitments on those at this point.

DR. DI BELLA: Thank you. I have a second question relating to certification, too, and this goes back actually to Steve Gomberg's talk where he presented a schedule showing for the GA-4/9 cask, a two year certification period from submission of the safety analysis report, and yet a much shorter period--I think, a 12 or 15 month period for certification of the MPC. Could you explain the reason for

that or could someone explain the reason for that; differences and how long it would take to certify one versus certifying the other?

MR. LAKE: Okay. Although we believe we've given enough information to the NRC on the GA casks to show that they are, in fact, conventional, just higher capacity, the original thought was that we had a lot of innovative types of design features on the GA cask. So, we decided on our initial planning to give the licensee or the contractor a two year period to get approval. We saw no reason to change that schedule. It's a comfortable schedule. It's not accelerated and it's actually a lot easier to plan. It will be a little bit more difficult with MPC with a tight schedule, but on the other hand, we're suggesting even more conventional approaches, more conventional materials, conventional shape. You know, the GA cask was not circular. We may require additional analyses on that and things of that sort.

DR. DI BELLA: Thank you.

DR. PRICE: Okay. Thank you very much, Bill. I appreciate it.

MR. LAKE: Thank you.

DR. PRICE: OUr next speaker is James Daust with the Commercial Vehicle Safety Alliance on their enhanced inspection program.

MR. DAUST: I'm happy to be here today to represent the

Commercial Vehicle Safety Alliance or CVSA, as I will refer to it. I want to give you a brief explanation of our cooperative agreement and the enhanced inspection procedures that we are presently using.

CVSA is an organization of Federal, State, and Provincial Government agencies and representatives from private industry in the United States, Canada, and Mexico depending upon the jurisdiction in each state or--not necessarily the Canadian Government because all their provinces are represented--but it could be State Police, Highway Patrol, Public Utility Commission, and so on. We have 49 states that have entered into an agreement with CVSA and signed a memorandum of understanding, all the Canadian provinces, as well as Mexico. They have agreed through this MOU to abide by the inspection criteria and procedures that have been developed by CVSA for vehicle, cargo, and their drivers.

CVSA goals are to enhance the safety of commercial vehicles, improve commercial vehicle safety operation, minimize schedule delays, insure effective allocation of resources, and avoid duplication with reciprocity of inspections by use of the CVSA decal. The ordinary CVSA decal is a 90 day colored decal which is issued by quarters and is covered for a 90 day period.

In 1986, we entered into a cooperative agreement

with OCRWM and, under this agreement, we would develop enhanced inspection procedures based on the North American Standard and you're going to be hearing me refer to that shortly which covers spent fuel transportation vehicles, drivers, and cargo. We'll conduct a pilot study to test the procedures, determine the number of inspections needed for maximum safety, train our inspectors with the ultimate goal eventually to establish uniform enhanced inspection procedures that will be honored by all the states.

Under the North American Standard, which CVSA is best known for, developing uniform inspection procedures that is applicable in the North America, applicable to all motor carriers that are inspected by a CVSA member. They include brakes, steering, tires, wheels, driver qualifications, and cargo securement among the items covered. Changes are made to this North American Standard on an annual basis. They are then approved by DOT which is, more or less, a matter of rubber stamping because DOT is very involved in the actual workings of the committee of CVSA. So, when, in fact, they go to DOT, they are, more or less, rubber stamped. They are, in fact, then legal mandates.

Under the enhanced North American Standard, we will do at a minimum inspection at point of origin and destination. Now, under the enhanced standard inspections--and, I want to use an example here--under the North American

Standard, if you have brakes 20% or more on a vehicle that are out of adjustment, that vehicle is placed out of service. Under the enhanced North American Standard, no brakes can be out of adjustment. So, that is the difference and that is a big difference under the enhanced as opposed to the North American Standard. Shipments do not leave the point of origin until they are defect free by the standard that CVSA has developed. And then, we issue a special decal which you have a brochure in front of you which depicts the decal that is used. Now, the difference between the enhanced North American Standard decal and the regular decal is that this is only good for that one shipment. So, it's issued and put on the vehicle at the point of origin, such as right here at the cesium shipments when they leave Colorado, and then it's only good for that one shipment into Hanford. Now, based on the trip duration and the data collected from trial inspections, shipments may or may not be inspected enroute.

Now, one of the important elements of our cooperative agreement is to develop a special training course for our inspectors and that's the ENAS inspectors. We believe CVSA does play a major role in alleviating public fears regarding transportation of radioactive materials and the training program certainly is important. The course consists of classroom and practical exercises including the review of basics of radiation and radiological regulations

and radiological survey instruments and their use in transportation inspection. The enhancement, of course, is covered to the North American Standard. We do a refresher on driver impairment followed by instructions on the use of our pilot inspection form and then a practical exercise and inspection is done of a mock spent nuclear shipment. The course concludes with a review, testing, and a course critique. Now, in order for inspector to attend this particular course, the prerequisite is that they, first of all, be CVSA Level 1 certified inspector which is the standard inspector that you would have for motor carrier operation and they also must be HAZMAT certified, as well.

Now, the training courses conducted to date, we've had four training courses held to date with 55 State inspectors that have been trained. Now, the pilot program was built around the WIPP shipments and, as you're well aware, the delay of WIPP caused us then to be looking at other shipments that we use for our pilot program. Well, fortunately, for us, the cesium shipments came along and we're now using them in lieu of the WIPP shipments. Colorado is inspecting at point of origin; Washington, at a point of destination; and we do have some enroute inspections. The data is then sent to Battelle and processed by them which will give us some good information on what we're looking for as far as the longevity of equipment and will allow us the

training of our inspectors, our training, and curriculum, and so on. We're really very appreciative and happy to have the support from DOE and the carriers, as well as the participating states in the cesium transportation. As I said, this will give us valuable data to use in our pilot program.

The direction of the program this next year is we will be conducting at least three more training sessions and a refresher course for previously trained inspectors. We now are conducting inspections. So, it's important that we have a refresher course for those that we've previously trained. We also will be holding meetings with the Indian tribes to inform them about CVSA and the enhanced inspection procedures and soliciting their input and acceptance of the program with ultimately hoping that they will recognize the CVSA inspection and grant reciprocity.

We will be continuing to work on our outreach program. We have developed a videotape which is available if anyone would like a copy. It's just recently been produced by the Idaho State Police Media Center. I think they did an excellent job and it depicts what our program is all about. If you're interested, you could leave your name at the desk and I would be happy to send to you a copy of that tape along with our recently revised North American Standard enhanced inspection procedure which is available which we abide by as

far as the inspection program is concerned. Also, you have the brochure. We're going to update the brochure at the next printing so that we can include other than WIPP shipments because when it was produced and developed, it was built around the WIPP shipments and now we've got some other things to depict. We're going to put together a display unit which will cover the inspection program and what we intend to accomplish with it. Our theme of the inspection program is as what's on the videotape and that is safety and efficiency in the transportation of radioactive materials.

So, again, I'm very happy to be here to give you an update and tell you where we're at with our CVSA inspection program. We appreciate the support that has been given to us by OCRWM and DOE and we look forward to continued cooperative agreement.

Is there any questions anyone might have?

DR. PRICE: I understand that much of the inspection criteria, what to inspect and not to inspect, comes from the rich experience of the people who are involved in the CVSA and that, in addition to that, you're now in the process of compiling the data which will help you to determine in the future what to inspect and what not to inspect.

MR. DAUST: That's right. Hopefully, we can minimize the number of inspections because, as you are well aware, there are some states that will be inspecting shipments as

they come in at point of entry. Now, if we can show through our pilot program that at point of origin and point of destination there's been no significant change in that equipment, the driver, and the cargo, as far as our inspection is concerned, we hopefully then can alleviate some of the inspections which will move the product along a lot faster and get it to its destination faster.

DR. PRICE: Any questions?

(No response.)

DR. PRICE: Thank you very much.

MR. DAUST: You're very welcome.

DR. PRICE: Our next presenter is Greg Smith from TRW on human factors engineering implementation plan.

DR. SMITH: This afternoon, I'd like to provide you with some information on how we are currently implementing human factors in the transportation program.

First, I'd like to give you an overview of the transportation system human factors implementation plan and then provide you some specifics of human factors implementation in the MPC program. My comments today about human factors in the MPC program will be much briefer than I would like, but as Mr. Clark has pointed out, we have the RFP out on the street and we have to avoid interpretation of the information that we have in the RFP. Finally, I'll close with a description of future human factors work.

The transportation system human factors implementation plan was delivered in September 1993. The plan provided for each of the four transportation segments, a schedule of transportation activities, and the human factors input for each of those activities. Because it was anticipated that the M&O is going to aquire much of the transportation equipment and services through RFPs, the plan indicated whether for each segment that activity would be performed by the M&O or subcontractor. The schedule in the plan went to the year 2001.

I'd like to digress just a moment and talk about another document that we delivered, because the topics in it have been touched on by a number of speakers today. We also delivered a human factors assessment plan in 1993. In this document, we identified human factors issues associated with each of the transportation segments and we also assessed the applicability of the WIPP transportation system to the needs of the CRWMS.

Specifically, we reviewed WIPP's driver training plans, their driver certification plans, their database of planned highway construction for the WIPP routes. We looked at the issues concerned with safe havens, contingency planning, capability for continuous communications, the availability of emergency responses and resources along the WIPP routes. We also looked at problems associated with the

driver work/rest schedules or cycles and the hours of service restrictions. We looked at and evaluated 18 national and state transportation databases for applicability to the CRWMS driver briefing and debriefing. So, I wanted to show you that we are trying to use some of the lessons learned out there in building the transportation system.

Now, I mentioned then the implementation plan that each activity--we identified which activities or which tasks will be performed by the M&O and which would be performed by the subcontractor. So, for human factors, as is going to be true for any other discipline, is going to be implemented in one of two ways in the transportation system. Either the M&O is going to do the work or some subcontractor is going to do the work with the M&O reviewing and evaluating that work. If the subcontractor performs the work, then the human factors is going to be implemented to the requirements that are placed in the RFP.

As you heard earlier, Mr. T.C. Smith talked about the Legal Weight Transportation System. That and the MPC program, these are two of our current efforts and they are examples of subcontracted work. Both of these programs are using RFPs to acquire equipment and services. Since T.C. has already presented the Legal Weight Transportation System human factors aspects, I'd like to next move on to the MPC.

While the remaining part of this presentation is

concerned with the MPC program, we anticipate that we're going to be using the same model for the remaining--for all the rest of the subcontracted work. I'd also like to mention that systems safety has the same sort of requirements in this RFP as does human factors.

The MPC RFP requires a human factors specialist and requires that specialist to complete the tasks that are listed here; performing the task and skill analysis, identifying features that increase efficiency, increase safety, decrease maintenance time. The specialist will provide design input and will review and comment on the design. Let me caution you that these tasks are not exhaustive; they're only examples.

The RFP also requires a human factors report so that the human factors work can be documented and reviewed. The report should cover the entire system, describing incorporation of the human factors principles, describe those features important to human factors, and document all analyses that are performed. Again, these topics are not exhaustive, but only examples.

The MPC has three subsystems and there are specific human factors requirements in each of those subsystems. There are many more than are listed here. These are only examples. I note, though, in the first requirement that this requirement was not necessarily invoked by human factors

only; it could also be--well, it would be invoked by human factors because we will reduce the excessive number of tools and increase the efficiency of the operation, but also logistics might invoke this requirement because it reduces the number of required spares.

However, the second requirement where it concerns safety, there are certain cases where we do not want to have interchangeable components. For example, we don't want technicians incorrectly connecting a fluid line to an air connection line. Again, let me caution you that these are not exhaustive; only an example and the requirements here, the topics that were listed for the report, are no more/no less important than the other requirements in the RFP.

So, I'll go about demonstrating the importance that we get the right requirements into the RFP because much of our work is going to be via the RFP. So, in the future, we still would be involved in evaluating the human factors portions of the MPC proposals that we get and, after contract award, we'll be reviewing and evaluating the work products.

DR. PRICE: Mr. Smith, I read through the MPC RFP slightly and quickly the other night when I was still working on Eastern Time. But, I did notice that the requirement for a human factors specialist was there and it was coupled to also one with experience at these types of systems. And, with many vendors, I wonder if that's not a problem and what

in your evaluation of whether or not the human factors specialist is truly a specialist are your criteria? For example, there are degrees now in human factors in universities, there are certifications available for human factors professionals after suitable examination and so forth. What criteria will be applied to determine that this person is familiar with that type of systems process, if they're truly a human factor specialist, not somebody just designated?

DR. SMITH: I don't believe I'm going to be allowed to respond to that.

DR. PRICE: Proprietary. You will have criteria?

DR. SMITH: Yes, there will be criteria to select the vendors.

DR. PRICE: Okay. And, whether the plan works or not, by the way, we will see when we see what comes out of the end of the pipe as whether we can really tell whether the designs are as they ought to be and so forth, the final thing.

Any other questions?

(No response.)

DR. PRICE: Thank you very much, Mr. Smith.

We're not going to observe the break, as we indicated earlier, in order to be able to provide more time for public comment and be sure we observe the closing time.

So, now, we're ready for Peter Conlon who is chief

of facility services, Transportation Test Center in Pueblo, Colorado. He serves as the Association of American Railroads technical liaison to the DOE. Peter Conlon?

MR. CONLON: Thank you very much. I appreciate the opportunity to be here today to talk about some concerns that the railroad industry has and has had for some time about the transportation of high-level waste and spent nuclear fuel. I have to apologize for the viewgraphs. I made them up this morning. I've been traveling for the past couple of weeks and it's taken me some time to get some consensus on these comments.

As you know, the Association of American Railroads is a trade association representing the railroad industry and consensus is the name of our game and sometimes that is difficult to achieve. These are the issues that I'd like to talk about today very briefly and I'm sure that many of you have heard some or all of this before, but the issues are risk management, train speed, cask performance, rail vehicles, dedicated trains, routing, uniformity of regulatory enforcement, and emergency response. I will provide written comments as soon as I can get back to the office and retype this so you can have it for your record.

Risk management, safe incident-free transportation of customers' shipments including spent nuclear fuel and the high-level waste is a primarily goal of the railroad

industry. Railroads make every effort to fully comply with the comprehensive Federal regulations that are adopted pursuant to the Federal Railroad Safety Act and the Hazardous Material Transportation Act. In addition, the railroads have developed a wide range of safety and operating rules, special instructions, and other management practices which are based on over 150 years of experience in which we've learned that if it can go wrong, it will.

Because of the public perception issues surrounding radioactive materials, railroads have spent an inordinate amount of time, money, and energy to manage the safe transportation of these materials. The railroads' goal regarding the transportation of spent nuclear fuel and high-level waste is to use dedicated trains at timetable speeds following a risk management plan that is mutually acceptable to the carriers, Department of Energy, and other key stakeholders. DOE in its preliminary draft transportation plan discusses a plan for stakeholder involvement in identifying transportation risks. We are concerned abut the fact that the multi-purpose canister and railcar design process has already begun without first addressing the issue of risk management. If the transportation plan is to be fully effective, all risks should be identified first and plans for developing, mitigating, or managing them as a system should be developed.

The issue of train speed, the railroad industry believes that casks and railcars should be designed and constructed to meet conditions normally found in rail transportation. As a result of early concern about the integrity of the cask, the rail industry in 1975 adopted a set of operating restrictions to prevent a situation where the threat of a release might occur. Shipments of spent nuclear fuel from U.S. Naval facilities have also been restricted to 35 miles an hour by DOE and DOD shipping instructions. According to DOD, this is to prevent damage to the spent fuel cores.

It is becoming more difficult to limit the speed of trains carrying spent fuel and high-level waste casks. In recent years, rail traffic has grown and the carrying capacity of some lines has actually been reached. Restricting the speed of trains has significant impacts to the railroads' operating flexibility and impairs their ability to meet customer service requirements. Trains operating at slower than normal speeds cause scheduling problems for other trains, adds to crew scheduling difficulties because it takes longer than normal to traverse a crew district. Slowing down trains affect the railroads' ability to compete effectively with other transportation modes. Since the transportation plan we're developing now will guide shipments for the next 20 or 30 years, it's

imperative that the risk management plan be developed in cooperation with the railroad industry now to identify and control the risks of transporting spent fuel and high-level waste.

Since 1975, the rail industry has expressed its concern about the integrity of the cask in the railroad operating environment. The early controversy surrounding this issue was very contentious and had polarized the industry and the Government. A large part of the problem then was that the railroads did not believe the casks could survive a serious rail accident without a radiation leak. Questions about DOE's emergency responsibilities and capabilities were also raised. We would like to avoid this situation during the development of the new MPC system and the transportation plan.

The railroad industry would like to be confident of the cask's performance. We're not cask experts, we're not radiation experts; we're transportation people. The cask standards need to be described in terms that can be related to the railroad operating environment including accidents. A 30 foot drop test and all the others are difficult to relate to real world operating conditions for us. Knowing the limit of safety of the cask in terms of impact and fire and water immersion is essential to gaining the industry's acceptance of the transportation plan and to the development of an

acceptable risk-based transportation system.

DOE's plan to develop a 125 ton MPC has also raised some concerns in the industry. Some railroad companies have objected to the development of the large cask, to use your term, because some branch lines and secondary routes cannot accommodate the extra weight without strengthening the track and track structures. This will limit the flexibility of the railroads throughout the shipments and may expose a shipment to greater risk if the primary route is unavailable for some period of time. Another concern about the large cask is that it is not divisible. In other words, if it goes off the track and ends up down in the gully, we have to haul it out whole, intact. Normal railroad experience allows us to cut up cars or locomotives if they're beyond reach and this would not be the case for a 125 ton cask.

The recent issuance of the RFP on the MPC has prompted the development of an industry committee to work closely with DOE on the draft transportation plan, environmental impact statement, MPC, and so forth. Since it's clear that DOE intends to proceed with the development of the 125 ton cask, railcar design is very important. The primary goal should be to minimize the possibility of a derailment. The process of selecting or designing a railcar should take into account several factors, such as the capability of a railcar to move through different radius

curves and maintain dynamic stability throughout the intended range of operating speeds. The loaded car should be able to negotiate the weight and clearance limits of all possible routes. Rail vehicle interaction should be studied to insure that the vehicle selected meets an acceptable level of risk for various operating conditions. Factors such as vertical, lateral, and longitudinal forces should be considered in analyzing train and railcar dynamics.

When developing a railcar to carry the MPC, DOE should also consider the design of the other cars in the dedicated train including buffer cars and security escort cars. They should all have the same performance characteristics in order to minimize the possibility of derailment. The past practice of using railroad supplied railcars as buffer cars and security escorts may not provide the desired level of risk management.

The railroad industry has long favored the use of dedicated train service for the movement of spent fuel and high-level waste. Such service provides for the greatest level of risk management of this sensitive cargo in our view. I'd like to list a few of the benefits for your information of dedicated train service.

For one, dedicated trains exclude other cargos which would limit the mechanical and thermal forces in the event of an accident. They are more manageable to operate,

they're easier to control. A short train can be stopped more quickly and more easily with less risk of accident. In fact, new technology, such as the newly developed electronic braking, could be used to further improve stopping ability and in the dedicated train future technological developments would be easier to implement and provide for consistent performance. Dedicated trains are easier to interchange between railroads since there is less switching required. They can provide for advanced planning for route and train movement. They allow for more precise scheduling of week and time of day. They'll encounter the fewest possible enroute delays which increases equipment turnaround and reduces the number of cars that may be needed to transport these loads. They'll enable enroute surveillance to be maintained more easily, provide for greater security of on-board escorts. And, since railroads own their own right of way, dedicated train service may alleviate some public opposition over transportation and may result in greater public confidence in spent fuel and high-level waste transportation. If DOE allows each jurisdiction to perform safety inspections, dedicated trains become a very important tool for managing the time over the road because they'll be delayed. If you're handling spent fuel and normal train service and the trains are stopped every so often for local inspections, you're going to be delaying not only your freight, but others, as

well.

Routing any shipment is a function of origin, destination, transit time, cost, and other factors. The objective is to move a shipment from origin to destination as quickly and as economically as possible. Routing decisions can be made by the shipper or the originating carrier. A shipper's specified route could be selected for a variety of reasons, such as cost, transit time, carrier preference, and perceived safety. A carrier can develop routes using computer models of the rail system and focus on such factors as weight and dimensional limits of the line, frequency of service, track class and speed, and maintenance conditions. If the destination is not on the originating carrier's line, the shipment will be interchanged with another carrier. Before the shipment begins, an agreement is made with all connecting carriers concerning the entire route and interchange points. The route will usually consist of the carrier's main lines between major points and secondary are branch lines at the origin or destination. Main lines are used for most of a railroad's traffic. Main lines are maintained to the highest quality of a railroad's tracks and, therefore, have the highest speed limits. Secondary and branch lines have lower speed limits depending on their maintenance conditions and FRA track class designation.

In the event of an accident or natural disaster

while a train is on route, the shipment will be rerouted to the next best available road which may involve using another carrier's tracks. As many of you may have noticed during the floods last year, they may be very circuitous routes. Transporting spent fuel and high-level waste the shortest possible distance and dedicated trains over the best available track will reduce the possibility of a transportation incident occurring. The best available track is often located in densely populated areas. Routing to avoid population centers can only increase the possibility of an incident by lengthening the transit time and using lower quality track.

We note in the preliminary draft transportation plan that DOE plans to develop rail routing criteria for shipments in the absence of DOT rail routing regulations. The need for such criteria should be carefully considered in light of the present methods that are used for making routing decisions. The use of dedicated train service would further improve shipment planning and response to changing conditions on route. Further, a risk management based transportation plan would consider routing as one element of the management process rather than simply imposing criteria to address a concern.

The process of stakeholder involvement in the transportation planning process. Throughout this process

representatives of State and local governments and Indian tribes have focused on exercising control over transportation, primarily in the highway mode. Since there are no rail routing regulations, HMTUSA addressed the need for uniformity of regulation and enforcement efforts in connection with the transportation of hazardous materials by rail. Railroad companies are concerned about the potential for a wide variety of attempts to regulate the transportation of spent fuel and high-level waste even within the requirements of the law.

Rail operations require a high degree of uniformity in order to assure the safety of employees and the public, as well as compliance with the regulatory requirements. The lack of consistency between civilian and defense shipping programs is also a concern to the railroad industry. As I mentioned before, DOD-imposed speed limits cause operational problems for the railroads. The differences in current and future casks and railcar equipment may also pose some problems; operational and maintenance problems. For example, the DOD cars have the cask integral to the car and the DOE plans include having the cask where it can fall off the car. DOD requirements for moving casks at the end of a train have also been shown to result in dangerously high longitudinal forces; thereby, increasing the possibility of an accident. Uniform use of dedicated trains can resolve these problems.

Most railroads have some capability either in-house or through its contractors to respond to emergencies, but no railroad in the country has the capability to effectively respond to a transportation incident involving high-level waste or spent nuclear fuel. Railroads believe that DOE should accept the responsibility and develop the capability to effectively respond to incidents involving such materials, including technology, equipment, manpower, and plans.

The AAR on behalf of the railroad industry has been involved in these DOE sponsored activities including the TEC working group and the transportation coordinating committee for the past three years or so. We've participated in the discussions on emergency response and training in connection with Section 180C. Our message has been and continues to be that the DOE's expectations of rail transportation companies and emergency actions should be made clear. The extent to which DOE will be responsible for emergency response activities remains unclear.

Those conclude the prepared comments. I'd be glad to answer any questions that you might have. And, if I can't, I can certainly get the answers to you.

DR. PRICE: All right. Thank you. And, we would appreciate getting a copy of that.

To me, it sounded like not much has changed since

the last time the panel had a briefing similar to this. I think we're talking about almost four years ago. The list of things seems to be quite similar. We did hear at that time about concern about resonance in the handling of these heavy loads and the potential for derailment at that time. And, you made your comment about longitudinal forces. Is this concern still a strong concern?

MR. CONLON: It's a concern with regard to the placement of the 450,000 pound, or whatever it is, DODX cask at the end of regular trains as DOT requires, yes.

DR. PRICE: And, the MPC RFP that requires that the railcar be part of the design, what is your view of the adequacy of that to satisfying some of these concerns?

MR. CONLON: We've discussed with DOE and its contractors some concern about the railcar design and they have included in their specifications that it meets AAR's interchange requirements. I've attempted to point out to DOE that those represent minimal requirements for safety and that a risk management plan should be developed to identify what performance is required, what level of safety is required which would affect how much more that car designed. In other words, perhaps premium equipment for improving the suspension, premium braking, what have you. In other words, we feel that the whole process of developing a transportation system needs to be thought out before a car is actually

designed.

DR. PRICE: Now, many of your comments were related to dedicated trains and we're looking forward to a report that's supposed to come out from the Transportation System Center through DOT with respect to special and dedicated trains. Do you anticipate that some of the answers to these questions that you're raising will be involved in that report?

MR. CONLON: I can only--

DR. PRICE: We don't know what's in the report.

MR. CONLON: I don't know either. I haven't seen it. So, I can only hope so.

DR. PRICE: We're told that it's now going to be, what, September that that report is still going to be here?

MR. CONLON: I think the comment was that that was optimistic.

DR. PRICE: Yeah, optimistic. I heard that word, yes. I heard that.

DR. CANTLON: You didn't mention anything about any special training for the train operators. Is there a plan for that or what's been the practice with shipment of maybe fuel?

MR. CONLON: Regarding training--

DR. CANTLON: Special training for the engineers, the firemen, the crews?

MR. CONLON: I don't believe that--

DR. CANTLON: Or you just draw the crews as the normal railroad carrier?

MR. CONLON: As far as I know, that's the practice. I don't believe there are any special requirements. But, I'll ask the railroads to see if there are any practices. There are, at least, a couple of railroads, Union Pacific and Southern Pacific, that handle the majority of those moves.

DR. PRICE: Well, there's certainly a lot of skills involved in the proper handling of trains and perhaps a lot of people don't appreciate the difficulties that can occur from an unskilled or a fresh or a new kind of operator.

MR. CONLON: Just to expand on that comment, a lot of people don't appreciate the difference between rail transportation and highway transportation. One of the concerns that I've had as a representative of the railroad industry speaking to DOE now in the various forums for the past three years is an attitude that I see of, well, we focus a lot on highways, we spend a lot of money and a lot of time developing safe transportation plans involving highway, but we talk about using rail for a majority of the moves in the future of the MPCs and what have you without really doing much in the way of planning for it. We feel very strongly that again sitting down--that the railroad industry and the DOE need to sit down together and talk out and identify all of the risks and develop a plan for managing those to the

mutual satisfaction of those key parties. And, we don't feel at this point that that's occurred. My view is that the door is opening and that the opportunities will be there and we have been talking to a lot of people at DOE, but we haven't actually sat down to do this. I think it's high time that we do.

DR. PRICE: What would you be willing to say or would you be willing to say that just ordinary routing practices as practiced by the railroad today would not be appropriate for nuclear waste shipments; ordinary routing? Right now, a car is liable to go a very circuitous route from origin to destination, very circuitous just because of the way things work.

MR. CONLON: Well, I think what I read to you was a description of how it is done now and if we add to it the dedicated train service, the likelihood of circuitous routing, unless it's to avoid an accident or some kind of natural disaster, is reduced to the lowest level. But, I think the point that I was trying to make was that railroad routing practices now ought to be looked at pretty carefully by DOE if they're going to develop any criteria because I feel that we have--that the criteria and the practices we use now are adequate.

DR. PRICE: Are you optimistic with respect to past changes in the interaction of DOE with the railroad industry?

Is it changing and improving?

MR. CONLON; Yes. The old days are behind us, I think, although I think some of the attitudes from the old days may linger. But, I do believe that our willingness and DOE's willingness to work together will eventually lead us to the point where we can work to resolve these issues.

DR. PRICE: And emergency response right now requires access to private property because the right of ways belong to the railroad and maybe along a particular total route, it's several different ownerships involved in this. Does this pose a particular problem with respect to emergency response that is being addressed or you don't find it as a problem or--

MR. CONLON: It's not a problem. Ask any fire department that's ever gone to a railroad accident. I mean, the primary--the first responder, the primary responding agencies, are almost always police or fire departments and they don't have a problem with property ownership.

DR. PRICE: And, are you discussing with DOE the difficulty of retrieval at remote locations and the tying up of a line over a long period of time that you alluded to in your talk or is this some--

MR. CONLON: We've talked about that in the past with DOE, yes.

DR. PRICE: Thank you very much. Appreciate getting the

railroad's perspective.

MR. CONLON: Thank you.

DR. PRICE: And, it's about the same as it was before except it sounds like there's a little warmer, fuzzy feeling than there had been before.

MR. CONLON: I think the whole point of all this is that the communication is improving.

DR. PRICE: Yes, thank you very much.

We're going to now open the floor for questions/ comments from any of the listeners. We'd be interested if there are people from the utilities who would like to make some comments because we haven't had a specific presenter today in that area. But, we would welcome any of the comments that might come from the floor at this time. Please, come to the microphone, speak your name, and if you are representing a particular organization, please indicate that representation.

MR. SIMS: My name is Stan Sims. I'm from Nye County. That's in Nevada. Nye County is the second largest county in the United States. Nevada Test Site is in Nye County. The Nellis Bombing Range is in Nye County. Yucca Mountain is in Nye County. And, a lot of waste processing facilities are in Nye County. From all the discussions I've heard over the past few days here, a lot of things are going to come to Nye County and we are a stakeholder. We're not an organization.

The comments made earlier by Susan Smith indicated that we were represented in the TEC, for instance, which was held 30 miles south of here, on the same day with a lot of the same agenda items. The Board was interested in stakeholder input and I think we can be categorized as a stakeholder. I also represent and sit on the affected units of local government which are some 10 units which are Nye County and the counties surrounding it in the State of Nevada and one in California, Inou County.

We were at the TEC down south of here on our own volition. We weren't invited and we aren't a member of that group. We've asked to be a member of that group. So, Susan Smith is not correct in saying that she had seven out of the 10 affected units there. And, I think what's happened is she just miserly because she's worried about paying the transportation costs for one representative coming from affected local units of government in Nevada. And, we'll take care of that. Obviously, we're interested because seven out of the 10 units showed up and they aren't even members. A lot of the members didn't even show up for that meeting. So, that's a little piece of information for you there.

Also, I mentioned the overlapping agendas and I think that the Board is to be complimented on its approach to stakeholder input. One of the best indicators of stakeholder input is the fact that the State of Nevada filed suit on the

Department of Energy the 28th of June. And, I think this demonstrates some overall stakeholder concern. The public perception of risk is a very big issue. We have a lot of people out in the rural areas of Nevada that want to know about this and they've had some trouble in the past really knowing about what's going on. I don't have any real trouble with this because I've got about 30 years of wearing a film badge off and on. I was teenager on a submarine. I understand things nuclear. But, I think what we have to do is put the information out, get the stakeholder input, and clearly get their input. Not the input necessarily of organizations, although organizations are handy to have their data and their input also. But, if you're asking for stakeholder input, I think clearly we aren't getting a lot of stakeholder input at this point.

Thank you very much.

DR. PRICE: Thank you. Again, stakeholder input is one of our areas of major interest and also concern. I personally don't think that just opening the door and saying "you all come, you're all invited" really satisfies this and I think your comments indicate that. And, as to the double billing and double time of the TEC with us, I would welcome any kind of comment as to how that occurred.

MR. GOMBERG: I guess I'm the lucky winner of the short straw to answer this question. What I'll do, I guess, is not

make excuses or anything, but discuss the process as to how both these meetings occurred and how the dates ended up occurring the same time.

We had the last TEC meeting January 28 in Dallas. We've made it a habit at the end of every meeting because of the number of parties involved to try to pin down a window as to when we would conduct the next meeting. Normally, they are every six months. As it would turn out, back in January we decided that the week of July 11 in Minneapolis would be where we would have the next TEC meeting. Hopefully, those of you that were there will confirm that. I guess we knew that the Board had their Full Board Meeting in Denver in July. I think, initially, it was the 11th and 12th. However, the agenda had not been set yet and we had no idea that there would be a need to do a transportation presentation for this particular Full Board Meeting.

It wasn't until April, I guess, that we finally realized that we were going to be asked to put an agenda together for the TRB for a Board meeting here. By then, the decision had been made that we would have the July 11th window for TEC. That had already been made and we basically, in talking with our own internal working group--with DOE, with EM, and RW participants who were involved in this--felt that--the point where it was just a little bit too late because of all the planning and all the parties involved to

change anything. I guess, we thought it would help to have both meetings co-located, in part, to minimize the number of resources and potentially give people who normally attend TEC or normally attend the TRB to do both. And, initially, it was meant that we thought the Full Board Meeting was going to be the 11th and 12th and TEC would be the 12th and 13th and we felt that, given there wouldn't be 100% coverage, there would be enough coverage for people who had interest to try to attend both.

I don't know if that's acceptable to anybody. I'm not trying to make excuses, but that's sort of the development of this whole thing and it's very hard. Meeting logistics is a very tough thing.

DR. PRICE: All right. Thank you.

MS. HOFFMAN: Juanita Hoffman, Ezmeralda County, Nevada.

This is in reference to yesterday's remarks by Mr. Brocoum and Mr. Rousso concerning the proposed program approach regarding stakeholder involvement. Ezmeralda County would like to offer the following comments.

The May 21st stakeholder meeting left most of the affected units of local government frustrated and angry. Prior to the meeting, we were told that there would be a roundtable morning session and that only three of the counties were invited to participate. We protested that and were told that all 10 counties could sit at the table. By

the time of the meeting the next morning, the agenda had been totally changed. We never did see an agenda until we walked into the meeting and this is kind of repeat of what happened in August of '93 at the first stakeholder meeting. There was never a final agenda until the morning of the meeting.

In the presentation by Dr. Dreyfus, there was an extensive elaboration on what the affected counties were originally given about Scenario A. We were given just a bare-bones description of the proposed program approach. It wasn't even called that then. Five of the 10 counties walked out of the stakeholder meeting because they felt that there was miscommunication by DOE and they also perceived that there was deception by DOE prior to the meeting. We see many recent examples by DOE of stakeholder participation and they cite meetings with the affected units of local government and these meetings are mostly DOE, talking heads talking at us, and we're not doing a whole lot of participation.

I'm not here to beat up DOE, but we are here to try to work together to solve this national issue. So, it's important to correct any misperceptions regarding stakeholder involvement. In our view, being talked at or checked off a list doesn't constitute stakeholder involvement or pre-decisional input.

Thank you.

DR. PRICE: Thank you. I think that's a pretty clear

message and I hope it's relayed where it needs to be.

Other comments?

MR. FRISHMAN: If you'll indulge me as you often do, I'm going to, I guess, take you on a little trip through what you've heard again. I'll try to put it together in a way that, I think, touches on a number of different questions that have been asked for the last couple days. Also, one major concern that the Board has had all along and I don't think has ever really been quite satisfied that it should not be concern. And, I'll try to piece this together in a way that, hopefully, can be followed.

We started out yesterday hearing about the proposed program approach and we really don't know a lot about the proposed program approach, other than it is being imposed on the program very fast right now. And, one of the observations that I've been making is that I can't discover that there's any single document that really does describe the proposed program approach and at a level of detail that would permit such things to go on as are going on right now; such as the top-down/bottoms-up evaluation of costs that the M&O is carrying out right now with guidance yet to be issued on the planning for WBS elements down to about the third level. That guidance is supposed to be issued this month. Well, finally, about December, if you look at Steve Brocoum's discussion from yesterday, we're supposed to have some type

of a final strategy statement for the proposed program approach after it has already been essentially implemented into the technical program for FY-96 or FY-95.

So, we're working in an area where I'm getting the impression, first of all, that it's a sort of invent it as you go and then at the end we'll say what it is. Now, take that and sort of set it aside, but that is the driving force that we see out there right now.

Well, what are the elements of the proposed program approach that we do know? One of them is the MPC which has been discussed in relation to the program quite a bit today and I don't think we heard any more about it than we already knew. But, the MPC is the centerpiece of the proposed program approach. There's one other element of the proposed program approach that we do know not in detail, but at least in philosophy and that's that the approach to determining site suitability has been brought back into a very fast track where the intent is to have a technical site suitability evaluation in 1998 followed very shortly, within maybe a year or two years, by a site suitability determination. Well, we know that and we know also--and, that's just essentially a schedule effect.

The other thing that we know is that the philosophy of the licensing has changed, I think, pretty radically and I think we heard maybe--if we could at least infer, more

radically than we were led to believe in early discussions of this. The philosophy of the licensing approach, if I can paraphrase it, I think is coming towards trying to get a construction authorization and receive and possess essentially for pre-closure and then use a long pre-closure period with emplaced spent fuel to try to get together the site characterization information, not performance confirmation; site characterization information that would have been necessary for post-closure reasonable assurance determination. I think that's what's happening. And, if I'm wrong, somebody please tell me that I have paraphrased that wrong, but I've been listening to this develop through the last few months and I think that's where it's going.

Now, I think what's driving all of this is the goal number five that Steve Gomberg had in his presentation, "resolved in 1998, waste acceptance expectation issue". And, I think that is driving it. The MPC is out there to try to do that. But, at the same time, the Department really doesn't have the responsibility to do that and recent events have even shown that they're not going to resolve it anyway. They cannot resolve it themselves. It would have to take legislation to resolve that and there is right now two lawsuits--or there are two lawsuits out there seeking to resolve that without the Department. So, I think the incentive in the program right now is that; resolve the 1998

date and also get the site suitability and licensing as fast as possible and the two are linked because the MPC is sort of the way to do it.

Now, having gone through that, first of all, where do we see some evidence for this? If you look through the schedules that Steve Brocoum laid out--and, I would suggest that Board members or at least the staff try to follow through these schedules in detail because they become pretty revealing and I'll show you just one sort of sketch on how it works.

If you look through the schedules that Steve Brocoum put out and the schedule that appears in Steve Gomberg's paper from today, you find, first of all, in about September of 1996, you find an element that says "evaluate MPC design versus waste package, updated materials report, and preliminary thermal loading decision". This is for the MPC. Well, if you look farther down, you see just very shortly after that evaluation or maybe even at the same time is the submittal of the application for the MPC for a certificate of compliance and that's a critical path--it's indicated as a critical path activity on the schedule.

Now, if you go through Steve Brocoum's schedules and look at some of the things that were talked about yesterday--for instance, the performance confirmation people said they need to have some type of a pretty good handle on

the 3-D geologic and hydrologic system. They need a pretty good 3-D model. Well, if you look at that schedule, about September 1996 is a sub-final of that schedule. If you look at total system performance, just a very short time after this September 1996 date, you have another iteration of the total system performance assessment which is the last one prior to a technical site suitability finding.

So, what does this all come back to? What I see it's coming back to is that for the purposes, first, of the MPC, the program critical elements of the repository program are being shortened up and elements that the people who are working on with the program will have only two years to resolve to the point where management says that they are bounded or sub-final and sufficient to go forward with the MPC. And, that's where I think it really is going. I was talking with some other people and I'm getting the impression more and more--and, I've spoken to the Board about this, I guess, for three years now--getting the impression that repository safety determinations, one way or another, are being influenced by the early decisions regarding transportation or transportation storage which the MPC has become.

This is a schedule-driven program. I think we heard from people yesterday all across the board that they don't know an awful lot. They're learning, but they don't

know an awful lot and there's an awful lot that needs to be known and I think the message, if you have followed anything through what I'm saying here that the Board really needs to look at very carefully, is remember that in just over two years from now, the Department is going to be making technical decisions about the repository and about repository site characterization only for one reason that can be traced all the way back to gaining some confidence on their part that they can go through with the MPC all the way to a disposal evaluation.

I hope that hasn't been too complicated for you, but I think if you spend a little bit of time following through just the little triangles and diamonds on the presentations, you might be able to see the same thing.

And, just sort of a final note, we've spent a lot of time talking about transportation today and, if you look at that same transportation schedule, you see that the Part 72, certificate of compliance for the MPC, is on the critical path. The Part 71, certificate for transportation, is not. And, I think that maybe further confirms what I'm trying to explain to you that I'm seeing. What it comes down to, I think, in the long run is the Board's often stated--and, I think from probably its inception--great concern about whether the repository program is being schedule-driven to the point of being detrimental to the science that was

intended to be done in site characterization. I think the answer to that is yes. I think if you trace through what you've heard in the last two days and start looking at the schedules and the importance of the events on that schedule, you might come to that same conclusion. I hope if you do that you will be loud about it when you do find it.

Thank you.

DR. PRICE: Is there a DOE response to that? Dwight, are you leaving the room or are you--

MR. SHELOR: Maybe I should. No, I would just like to offer a perspective with respect to the proposed program approach. As indicated in Dr. Dreyfus' response to your original question, the urgency in putting together the proposed program approach and presenting this to the Congress was pretty much dictated by the schedule. I believe that additional stakeholder input and revisions to the proposed program approach are probably appropriate and certainly will be considered in the near future. Obviously, before any final firm plans can be made relative to that approach, we have to get a better picture and understanding of the Congressional intent for funding at the levels that we have proposed. So, that's pretty much to be determined as we go through the next few months and we'll get another indication of that when we begin to look at the FY-96 budget and your funding profiles.

The other aspect, I'm trying to remember. Steve mentioned so many things. One was his--I would like to briefly try to allay some of his concerns relative to the intent. The MPC, Steve, we believe is only one possible thing that could--one possible aspect of resolving the 1998 waste acceptance issue. We don't know how to resolve that yet. As you mentioned, there are two lawsuits. It appears that it is extremely important that we do resolve that. We don't have the answer yet. The notice of inquiry was intended to open that dialogue. So, I don't know what the answer is yet. MPC could be one of the answers or a partial solution to that problem.

The other aspect relative--I'm trying to remember now. It was relative to the licensing or the intent of the licensing for the repository. I think clearly we have looked and we have demonstrated that this licensing approach to the repository is well within the intent of the NRC regs and 10 CFR 60 in terms of post-closure performance confirmation. I think the technical site suitability determination is an important DOE management milestone. It's more of a look to see if you have--it's an investment decision. We do a technical evaluation and we want to see if that's the path that we want to stay on and invest more of the rate payers' money in or go on another path prior to a schedule for looking at a possible site suitability determination.

DR. PRICE: Thank you. That was Dwight Shelor who was in systems and is now in waste acceptance, storage, and transportation as deputy director. Did I get that right? Good for me.

MS. TREICHEL: I don't have a title nearly that long. This is Judy Treichel from the Nevada Nuclear Waste Task Force. I have probably an outlandish request and I use the word "request" because it's a lot nicer than "demand". I'm one of a whole big group of people which is growing all the time that would like to see the word "stakeholder" killed off and buried. It doesn't mean anything. And, I have asked a lot of people from headquarters on down to the project what's a stakeholder and, when the conversation gets done, the determination is that everybody is a stakeholder. Susan, in her presentation, had a whole page of stakeholders and that was probably a partial list. But, what happens is it takes away a lot of accountability from the Department of Energy.

And, as Juanita was saying, the meeting on May 21 has been widely talked about, the stakeholder meeting. And, DOE many times claims that to have been a wonderful successful meeting. And, it wasn't; it was a blowout, it was a real mess. And, yes, there were people who walked out. It was a chaotic situation and it really didn't accomplish anything, but it allowed the Department to go around the country and tell people that they had met with the

stakeholders and that stakeholders had been involved in the PPA. And, they weren't except as listeners. They've been listeners several times. So, what happens is every time DOE has a meeting with vendors, with the utilities, with any group that's out there, their contractors, they have had a stakeholder meeting. In most of those situations, they've come away with affirmation for whatever they wanted to do. So, they got very positive reinforcement for a fast track or for a lot of things that are troubling to the public and the public has not been involved and yet there's been a stakeholder meeting.

So, I would like to see that word go away and in its place say who you mean. If you're going to have a meeting with contractors, if you're going to have a meeting with the public, with public interests, with the professional public, just say who it is and then we know who is being talked about.

The other thing I wanted to mention was that I keep harping on public involvement and I don't think having stakeholder meetings is it because most of them are not public meetings and they do not in any meaningful way involve the public. When Steve Brocoum was talking, he said that they would be continuing with public involvement and they were aligning a lot of the programs that they're putting in and a lot of the new direction they're taking is being made

to comply with the draft public participation policy. Well, that thing never went anywhere. That was that piece of paper that came out right before Christmas and we were all supposed to submit comments before New Years. Most of the comments that came in--and, I saw a lot of those--just bombed them for having done something with that little time to comment on it and that sort of disrespect for sending something out. So, I'm not sure that there is any sort of policy.

And, I know that recently, Dr. Dreyfus asked the Board for guidance on a public participation policy and I've seen the letter that went back from this group, from you, to OCRWM headquarters and I think it was an excellent letter. I think there's some great ideas in there. What I would hate to see now is to have a couple of people at headquarters sit down and pick one or two points out of the letter that you wrote and come out with something that again they throw at us. Now is the time to take that letter and a whole lot of the comments--we're 12 years into this thing and they're still trying to devise a way for the public to become involved. But, what has to happen now is your letter and all these comments that have come in over these years have to be put on the table and a lot of us who deal with this all the time, those of us who have tracked the meetings, who actually can almost understand what was said yesterday, and you know, have followed this thing all of this time could be real

helpful. That's not one of those things that they've got to get full funding for. This is something that doesn't cost a lot. If they asked us to come in, we're real available and we're extremely cheap. So, this isn't one of those things that you have to redirect everything about and it's very easy to do. It just may be that it would make them accountable enough to make it very difficult. But, there's a lot of crying and whining about the lack of trust and confidence and the need for a public policy and this is one of the places where we're seeing sort of geologic time frames in order to even get any sort of basic beginnings for public involvement. But, I do want to thank you for the excellent letter that went from the Board and I hope it does something.

Thank you.

DR. PRICE: Thank you.

Other comments?

MR. STAUFFER: My name is Jack Stauffer and I am a private consultant. I don't represent anyone anymore. I have 20 years experience in the nuclear industry, 20 years in the railroads. What I'd like to do is go on record to ask that the cooperation that Dr. Price was alluding to between the railroads and the DOE, in fact, take place. I was a member of a task force that was called the Government/ Industry Task Force, 1981, led by Battelle Memorial Institute to get the railroads' views on how nuclear materials should

be shipped in the United States when they were shipped by rail. To my knowledge, none of the things that were brought up by that group have ever been implemented.

One of the things that was emphasized at that time was the use of dedicated trains which I've heard a lot about today. It was less than a year ago that the Courts ruled that the use of dedicated trains was unnecessary for shipping nuclear materials and the railroads refunded $8 million in what were called revenues. What I think needs to be done is a lot closer relationship between DOT and DOE and the rail industry take place. I'm emphasizing what Peter Conlon had said. I don't know how that's going to come about because I've tried for more than 10 years to at least get an audience with some of the people who are trying to design rail equipment. The performance record is pretty bad. The DOD cars that ship submarine fuel elements don't pass the minimum acceptance test of the railroads. Rail Garrison which many of you may know about, the MX missile on a rail car, all the cars in that train failed to pass the minimum stability tests for the railroads and yet the excuse was, well, we've already got the equipment designed; we're going to have to use it. I'd like to see maybe a little better cooperation between what nominally would be representatives of the rail industry and the DOE and I don't know how to accomplish that.

Thank you.

MR. POLONSKY: I'm here on behalf of Kaiser Engineers, but I'm not speaking right now on behalf of Kaiser Engineers. I'd like to change the pace to the DOE video that was presented on natural analogs and how appropriate it appeared to be and how it allayed my public layman fears about a repository and how applicable I think it could be to allaying most people's fears if it were shown as a Nova special or something like that on generic tv. However, it appeared to me after coming to many of these meetings that we're not even using a backfill or a bentonite or a clay which practically every natural analog on that tape discusses. It also discusses, well, these iron nails were found, they're 2,000 years old, but that was a reducing environment and Yucca Mountain is an oxidizing environment. So, it's a very interesting natural analog study for European repositories which may be in a reducing environment, but is not very applicable for Yucca Mountain which appears to be oxidizing. So, maybe, we should discuss engineered backfill again for Yucca Mountain, something that was discussed yesterday, and let's just leave the uranium or the nuclear waste out for 100 years to cool off a little bit more before putting it away for a million.

Thank you.

DR. PRICE: All right. You're talking about the video that Charles McCombie had a part of?

MR. POLONSKY: I guess so, yes.

DR. PRICE: And, that was not a DOE video, was it?

MR. POLONSKY: Oh, okay.

DR. PRICE: Any other comments?

(No response.)

DR. PRICE: Well, if not, I think I'll turn it back with a--first of all, I'd like to give a great big expression of thanks to all of the participants and speakers for their contributions.

DR. CANTLON: Well, on behalf of the Board, again let me thank today's speakers, yesterday's speakers, and the participation from the floor. The Board continues to derive the raw materials for its advice and assessments of the DOE program from these kinds of hearings, these kinds of iterations. So, we commend all of the participants and thank you for coming.

We're adjourned.

(Whereupon, at 4:50 p.m., the meeting was adjourned.)

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