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NUCLEAR WASTE TECHNICAL REVIEW BOARD

MEETING OF THE PANEL ON THE WASTE MANAGEMENT SYSTEM

SPENT FUEL TRANSPORTATION SAFETY

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P R O C E E D I N G S

(8:30 a.m.)

ARENDT: We've got a very busy morning and we need to get started. Good morning. Welcome back.

Yesterday, we had a day of formal presentations. Today is going to be a good deal more informal. It will consist primarily of a round-table discussion of the issues discussed yesterday.

In addition to the speakers from yesterday, we will be joined by five new participants. The five new participants are Dwight Shelor, Bob Halstead, Robert Van Namen, Robert Fronczak, and Fred Millar. We're going to begin with an opening statement of not more than 10 minutes from each of these participants.

Before we begin, I'd like to remind you that we will again have a period for public comment at the end of the session at about 11:30. If you wish to comment during either of these times, please sign up at the registration table in the back and we'll call on you at the appropriate time. I think yesterday there was a little misunderstanding and the wrong sheet got signed and I didn't realize that someone had signed up, but the sheet that people were supposed to sign up for for comment was--there wasn't anybody signed up, but the person actually signed the wrong sheet. So, please, make sure if you sign the right sheet if you want to make a comment after the period. We consider these comments to be very important. So, we want to hear from you.

The first speaker this morning is Dwight Shelor. He's the deputy associate director for waste acceptance storage and transportation in the Office of Civilian Radioactive Waste Management at DOE. Dwight?

SHELOR: Thank you, John, and good morning.

In my opening statement today, I'll briefly cover three topics. One is our mission objectives and a very brief status of where we are in some of the legislation and litigation. I'll also talk about our waste acceptance activities and, finally, with the transportation planning activities that we currently have going on.

Just to remind you, our mission objectives in the Office of waste acceptance, storage, and transportation are (1) develop a market driven strategy that relies on the private sector for waste acceptance and transportation services; (2) to develop a non-site specific design and licensing strategy for an interim storage facility; and (3) to maintain and manage the disposal contracts that we have with the owners of the generators of spent nuclear fuel and high-level waste.

As you know, the House and the Senate have passed

bills that would provide a site for an interim storage facility and requires to begin spent nuclear fuel acceptance in the time period 2002 to 2003. The Congress has now adjourned until late January. After they've reassembled, a conference committee will be appointed to work out the differences in these bills.

During the debate on these bills, the Administration has reaffirmed the Federal Government's long-standing commitment to permanent geologic disposal and that geologic disposal should remain the basic goal of high-level waste management policy. The Administration opposes siting an interim storage facility near Yucca Mountain before the viability assessment has been completed. The Administration believed that a decision on the siting of an interim storage facility should be based on objective science-based criteria, and it should be informed by the viability assessment. The President has stated that he would veto either bill if presented in their current form.

In regard to waste acceptance activities, the Court issued its decision last Friday on petitioners' request that the Court rule that the 1998 waste acceptance date is a statutory requirement and not a contractual requirement. In this decision, the Court determined that the 1998 waste acceptance date was a contractual requirement and the delay and disputes provisions that exist in the contracts are appropriate for use in this case. However, the Court will not allow us to claim that any delays in waste acceptance were unavoidable. We're now in the process of working with our general counsel to determine the proper response to this Court decision.

Finally, with respect to transportation planning activities, I will provide you with an update on the Draft RFP for waste acceptance and transportation services and the proposed policies and procedures to provide funds and technical assistance to States and Tribes for training public safety officials and safe routine transportation and emergency response. This is in accord with Section 180-C of the Nuclear Waste Policy Act.

With respect to the Draft RFP, we received approximately 1,000 comments from about 60 responders on the Draft RFP for transportation services issued last December. We have considered these comments and have prepared a revised Draft RFP. We plan to issue the revised Draft RFP in the next few weeks.

In the statement for work for transportation services, we will require the regional servicing contractors to comply with all applicable Federal, State, and local laws and regulations. This includes strict compliance with DOT

and NRC regulations with three exceptions. We're currently seeking agreement with the NRC for us to provide notifications or shipment notification to Tribes in addition to the States. The current regulations only require that the States be notified. And, also, to provide States and Tribes with appropriate information that we would receive from continuous satellite tracking systems on the shipments. In addition, we're requiring the contractors to use the commercial vehicle safety alliance inspection procedures on any and all trucks that would take place. At this time, I will defer any discussion of the proposed policy and procedures to implement Section 180-C except to say that we expect to issue the final policy and procedures in the spring of next year.

In conclusion, I believe that compliance with the DOT and NRC regulations provide for safe spent nuclear fuel transportation and the protection of the public health and safety. Further, I believe that consideration of any expert regulatory requirements should show a significant benefit to the nation as compared to its cost. This is especially true in this program considering the fact that we have a significant scope and the duration will be for the next two or three or four decades as we anticipate in this program.

Thank you very much.

ARENDT: Thank you, Dwight.

Our next speaker will be Bob Halstead representing the State of Nevada.

HALSTEAD: I promised I wouldn't do this, but it would probably be easier if I put on an overhead some opening comments. I probably will use my 10 minutes, Mr. Chairman. I have a handout that has a number of remarks on it. I'm not going to stick strictly to that because I think the discussion yesterday generated a lot of ideas that I would like to start off by instead of ending up with and review of recommendations that the State of Nevada has made on transportation risk management. I'll run through these and then, I think, the things I'll say afterwards will help flesh them out.

First of all, I'm going to start with #9 down here and that is regardless of what form of privatization the DOE decides to follow, it's very important that someone--and we think it ought to be DOE--is responsible for making program decisions and that those decisions aren't delegated to contractors and specifically that they're not delegated to regional servicing agents or the people who are actually carrying out a program.

Secondly, going back to #1, we believe in a comprehensive risk management approach that begins with a

comprehensive risk assessment, but continues past the preparation of the EIS for the life of operations of the facility. I think it's very important that there's a continuous feedback of post-operations audits to maintain the level of discipline that will be necessary to both prevent accidents and assure the public of the safety of the transportation system.

Point number two, ship oldest fuel first. You know, I haven't said this for about five years because it's been kind of a given that that would be the approach that the program would follow. But, it's not so clear under the terms of the RFP that's been out for a market-driven strategy and, in fact, the possibility that utilities might trade their spots in the queue under these contracts and end up shipping younger, more radioactive, as opposed to older fuel, early in the campaign is a concern. And, right here, it's important to remember we're talking about dangerous goods. Spent fuel and high-level wastes are a significant potential hazard. The good thing about them is that the fission product inventory has a relatively short half-life. If you're shipping 20-year fuel, the radiological characteristics are considerably easier to deal with than 5-year-old fuel.

Third, maximum use of rail. It's been our recommendation for 10 years. And, use of dedicated trains also has been our recommendation for about 10 years. A more recent recommendation, apply the lessons learned from the safety planning that's been done for the WIPP transportation program which, as most of you know, is right now being planned as a 100 percent truck shipment campaign. It is considering rail shipment. But, this is probably the most comprehensive program of stakeholder interaction with DOE to develop mutually agreed-upon safety protocols for accident prevention, as well as for emergency response. That's the model that we think DOE's Civilian High-Level Waste Program should follow.

Early designation of routes is another key program decision. DOE needs to be formally designating the routes after full discussions with all the affected stakeholders, particular the States and Indian Tribes who have legal jurisdiction, but certainly also taking into account the considerations of the customers of their service and the carriers that are going to be carrying their high-level waste.

Full-scale testing, yes, it's expensive. We still believe it's a good idea. To answer Dwight's concern, our latest cost projection which is still about two months away from being final says that the total life cycle transportation cost of this program is likely to be in excess

of $3 billion current year dollars; maybe as high as 3-1/2 billion depending on choices that are made about constructing a rail spur or building an intermodal transfer facility and upgrading the loads.

The long and short of it is it seems to us that spending $10 million to do full-scale testing--this would be regulatory compliance testing, not public relations testing--would be money well spent. And, the example we would show is the way that that testing in the WIPP program of the TRUPAC packages has made it politically possible for western Governors who don't normally have a lot of good feelings towards the Department of Energy to work mutually with them in developing the transportation system for WIPP. Stakeholder involvement is imperative.

With that, I'll turn this off. If we go to the second page of the handout, I've listed five State of Nevada--critical review of probabilistic risk assessment, the modal study, and RADTRAN and, obviously, I don't have time to go into them in detail. I believe that Lindsey Augin's critique of the modal study is still valid seven years later. I think particularly the criticism of the modal study's use of string on the cask shell is the primary variable to define damages correct. His concerns about the limited data on the probability of certain accident conditions is correct. The questionable assumptions about spent fuel damage as opposed to cask damage in accidents is also correct. I also believe that the observations he made about the limited applicability of the modal study to future systems because of significant differences in cask designs, capacities, and materials, changes in the modal mix and the average shipment speed, the higher SNF burnup rates and the implications of long-term dry storage are also valid. There have also been some actual accidents since the 1980s that appear to exceed the regulatory accident conditions or either accidents not addressed in the modal study, but the key issue is the failure admitted by the authors to consider fully the impacts of human error.

Regarding RADTRAN, I'm one of those people who has been engaged for almost 20 years now in dialogue with Sandia. I give them high marks for responding to stakeholder needs and criticisms. The current version of RADTRAN is not only an extremely useful tool for comparative risk assessments, I would argue it is the tool of choice. Nonetheless, I still believe that there are concerns when the accident risk outputs from RADTRAN are given in the way that gives a false sense of precision about our ability to quantify severe accident risks, and it also must be noted that the routine radiological risk outputs do not always--and perhaps it's

unreasonable even to expect them to always--accurately capture unique local conditions, particularly as those would result in exposures to residents along routes, frequency of gridlock situations, and so forth.

The studies that I've cited for you address the need to focus on human factors, individual and organizational behavior, and to avoid what Professor Freudenburg has called the atrophy of organizational vigilance. It is very important that we not succumb to the Exxon Valdez syndrome where a catastrophe occurs after 12 years of uneventful operation and 8,000 safe shipments. When human error triggers a catastrophe, that is exacerbated because the previously in-place accident prevention measures have been cut back for budgetary reasons and where, indeed, the Alyeska Emergency Response Team had been disbanded years before that incident occurred because the safety record led people to believe that it was not needed.

Now, I have just two minutes to wrap up. I've provided you with some information on past and future shipment characteristics. The point I would make is that the future shipments are going to be very significantly different from past differences. That means that we cannot be complacent about the past safety record which has been very good in avoiding catastrophic accidents, but has frankly been only average in terms of an accident rate compared to shipment miles.

In my summary of the safety record, I've only projected these accident rates into the future to argue that if an improvement in the accident rate of future shipments isn't made, the number of accidents would be technically and politically unacceptable. Now, I'm not saying that I expect severe accidents involving releases to occur. I'm saying I think it's unreasonable to assume that there won't be accidents, but even minor accidents are going to receive a lot of attention in the media and they're going to be very controversial. So, it's very important for the credibility of the program to make reduction of accidents a key program. And, that should be addressed to contracting. The RFP process should reward operators that don't have accidents and punish the ones who do.

Finally, my last 30 seconds, I think it's generally known here that the State of Nevada has finished a new assessment of the consequences of terrorist attacks. This is not the appropriate place to have a detailed discussion of this. We intend to discuss these issues with the NRC very shortly. I would hope that you will invite us back at some future date for a more involved discussion. I would say on the one hand, I agree with pretty much everything that

Richard Guida said about the relative invulnerability of the Naval spent fuel casks to a cask with high energy explosives, but I also have to state adamantly that we believe it's a very different situation with the new cask designs, the new high-capacity cask designs that are being developed for the civilian program. I think there are some legitimate concerns there about releases possibly in excess of 1 percent with respirable aerosol fractions much larger than originally calculated back in the 1980s.

And, with that, I'd like to say I thank you very much for the opportunity to be here.

ARENDT: Thank you, Bob.

Our next speaker is Robert Van Namen from Duke Power. Robert is manager of the nuclear fuel management.

VAN NAMEN: Thank you. I'd like to thank the Board for the opportunity to come and address you today.

I am a little bit cowed by the experience that has been preceding me in this discussion. I think that you have heard from a lot of people who have a very strong technical background and these are the people who you should be relying on for your judgments about the program, and I encourage you to continue with that.

What I would like to do is to focus more on the opinions of a user, of a potential future user of the transportation infrastructure and talk a little bit about our perceptions of where things are going and our need for action.

Duke Power has seven nuclear reactors; four Westinghouse units and three Babcock & Wilcox units. We have experience in dry storage. We have the NUHOMS system deployed at Oconee Nuclear Station. We are coming up on the deployment of dry storage at the McGuire Nuclear Station within the next several years. For this reason, I would like to encourage us as a collective group to do everything we can to get the foundation established for both the transportation and storage infrastructure and make sure that we're ready as Duke Power and as an industry as a whole to make the proper decisions about what technology we deploy.

We're facing a decision at McGuire. As Mr. Haughney said, he's got a variety of applications in front of him which do combine both transportation and storage technologies. Trying to make a decision right now for which technology to go with is somewhat difficult given the uncertainty and the licensing process and our need to deploy to provide relief for our reactors. So, I think that it is in everyone's best interests to have both the transportation and storage covered by one canister system, and I hope that we'll be able to establish what we need to do to get those

decisions made, the transportation requirements laid out, and to get those systems licensed as quickly as possible.

I'm not going to go back over what was discussed yesterday in terms of the track record except just to emphasize a couple of points. We have been transporting spent nuclear fuel for 40 years. We have done it in Duke Power with transhipments from our Oconee Nuclear Station to McGuire. We transhipped 300 assemblies in the 1980s in a very successful, smooth-running program. Not only can we rely on the experience and the track record of the U.S. program, but we can also rely on the experience of the Europeans as they transhipnuclear fuel on a much higher level than what we are doing in the United States currently. Basically, the track record is outstanding, and I think that we can look forward to that continuing into the future.

I would like to echo the comments of Robert Jones yesterday as he talked about the Shoreham experience. I think he brought up a lot of very relevant points that I think that the Board should pay attention to. I think that I can attest to the need for the advanced planning for the close coordination with the officials for the full knowledge of the regulations and the accurate implementation of these regulations. However, I will also attest to his comment that it was a very straightforward simple to execute process given the proper planning was put into place. I think our experience at McGuire showed transportation is not that big of deal and it's something that we really can do without a great deal of tie-up or problems.

What I would like to leave you with is the fact that I believe that transportation is something that we know a great deal about. It's something that deserves close attention. It deserves paying attention to the regulations that have been put in place by the Department of Transportation and the Nuclear Regulatory Commission, and it deserves listening to the people who know the facts. I think that's what's important to make the program work. We have been doing it currently or we have been doing it in the past and doing it quite successfully. All I would ask is let's get on with it and start moving nuclear fuel.

Thank you for your attention.

ARENDT: Thank you very much.

Our next speaker is Robert Fronczak from the Association of American Railroads. Robert is assistant vice-president for environment and hazardous material.

FRONCZAK: Good morning.

What I plan on talking about today, you heard I guess substantively in Pahrump last January. What I would like to do is clarify some statements made yesterday,

perhaps. We represent 73 percent of the freight railroad mileage in the U.S., 89 percent of the employees, and 91 percent of the revenue in the U.S., and all the major rail carriers that would potentially be transporting spent fuel. I want to quickly cover objectives, background, and a risk management approach and then quickly conclude.

What our objectives are is a safe, efficient, integrated rail transportation system for spent nuclear fuel. I believe firmly that it's safe today. I think we need to make it efficient in the future. We believe that the way to do that is a dedicated cask car train system which insures cask integrity in the railroad operating environment at timetable speeds with no restrictions on meets or passes.

To give you a little idea on the perspective on this, we heard a lot of estimates of how much would be transported by rail. Some of the estimates are up to 90 percent. today, I think, maybe we handle five to 10 shipments or carloads a year and that will increase to 250 to 450 casks per year. What does that mean to our business? If you look at carloads by commodity, coal is our largest commodity at 27.9 percent. Spent fuel at 400 asks per year is .0017 percent of all carload business.

And, of course, there's a premium for handling hazardous materials. If you look at revenue by commodity in 1996, coal was our largest at 22.5 percent. Chemicals jumps up to second at 15.3. If you use Three Mile Island shipping rates and shipping rates have actually gone down since then and I think about a 2,000 mile round trip, you're looking at .068 percent of our revenue would be spent fuel shipments; so, a very small part of our business. And, yet, we feel it would have significant potential to impact our business.

To approach and incident free transportation, we feel like the system needs to be treated as a system including the cask, cask and a car together, and the train. We feel that the car needs to reflect high design principals. We need to limit the probability of a derailment. Now, whereas the likelihood of a release in a derailment we feel is very small, we feel that any derailment is going to be a major incident and have the potential to disrupt our business. So, we want to avoid that to the degree we know we can. We'd like to limit the damage to the cask. We feel that there may be some things we can do to the cask car design to do that. We feel that there's a sufficient number of cars that are going to be demanded to create a small fleet of vehicles similar to what the Navy talked about yesterday.

We feel that we can limit the possibility of a derailment by selecting optimal suspension components. We've done a lot of research on heavy axle load suspensions and

we're limiting the load range. Now, in this case, we feel that that's not a possibility. DOE for years now has been talking about 125 tons and the MPC, for instance, I think was approaching 400,000 pounds gross railroad. So, I think that's the nature of the beast.

One thing I would caution you on is the Navy folks talked about the M-140 yesterday, and I think they implied that an eight axle span car weighing over a half a million pounds was standard. That's not. That car cannot be transported in free interchange. It has to be interchanged through agreement by the carriers. They have to look at their infrastructure to see if they can handle that car. We'd also like the car designed for known derailment modes. I think, Bob Jones mentioned Chapter 11 testing. Those are AAR rules. Any new car would have to be designed to meet those tests and, again, the Navy talked about program maintenance for a dedicated fleet of cars. I've already talked about that.

We think there are some things that can be done to minimize damage to the cask. We feel that a risk management approach ought to be incorporated for a dedicated train system. Once again, it minimizes any sort of weak link problem. You've got 40 or 50 year railroad equipment transporting in normal commerce today. We feel that this ought to be maintained to a higher standard. It also minimizes train handling forces. One of the things that is very important is that this is a very heavy load. A typical freight car weighs 100 tons. Gross weight on rail is 263,000 pounds. We're talking about a 400,000 pound load here. That is not well-mixed in with very light loads. So, we want that in a dedicated train.

One of the things that the Navy mentioned yesterday is that UP handles their car and dedicated freight for convenience purposes. They actually handle it because they feel that putting it at the end of regular trains is not a good idea because you have an accordion effect. You've got a very heavy locomotive and a very heavy vehicle at the end compressing that train and potentially increasing the potential for derailment.

A dedicated train would allow the use of best available technology. Electronic brakes or electropneumatic brakes, more accurately, could be used. One of the things that, I think, was mentioned yesterday, perhaps it wasn't, the electronic brakes greatly reduces the amount of stopping distance. In a coal train, that could be as much as 40 percent. More importantly, it would give electrical conduit throughout the train so we can monitor for known derailment of things like hot axles, hot wheels, brake failure, coupler

failure. And, electropneumatic brakes would still work if you wanted to return the empty in a regular freight service because there is still the pneumatic function of the brake. And, we've already talked about satellite tracking.

I think, Bob Jones mentioned yesterday that dedicated trains make a lot of business sense, also. You get better scheduling. You wouldn't have to go through classification yards. You can spend up to 24 to 48 hours in classification yards. Most classification yards are in heavily populated areas. So, you're talking about escorts being in those yards for extended periods of time. Not only is that not comfortable--but those are very dangerous places to be. In addition, you'd have a shorter train. There would be faster accelerating. You could travel at higher speeds and stop quicker. And, once again, you could have a system easily inspected.

I guess, in summary, we want the system designed as a system to insure safe and efficient transportation. We feel that the only way to get that accomplished is to have that built into the request for proposal in the prioritization effort and that's all I have to say.

ARENDT: Thank you, Robert.

Our last speaker in this session is Fred Millar, Nuclear Waste Citizens Coalition.

MILLAR: Good morning. It is a pleasure to follow up on the discussion we had in the Pahrump meeting. I would maintain that developments in the meantime have made it even more urgent that the Board pay attention to the nuclear transportation issues.

As you know, we have two bills in the Congress that have already passed. The Senate bill, S-104, passed by a vote of 65 to 34, and the House bill, HR-1270, passed 307 to 120. So, there's a considerable momentum in the Congress to get nuclear waste moving someplace out west, preferably to interim storage in Nevada. That would be a very massive campaign of shipments and it would only take two votes in the Senate to make a difference to override the President's veto. He has promised a veto, but it would only take two votes. So, I just want to say it's almost urgent to at least think about the possibility that by 2002 we may have the beginning of a massive campaign of shipments.

The second thing I might mention, I think, is that the Court case that we've had a decision on recently would indicate on the other hand that continued on-site storage would be acceptable to the Court. It sounds like what the Court is saying is that within the contract dispute that exists between the DOE and utilities, they open the way--the Court has opened the way that DOE may, in fact, simply

compensate the utilities for the cost of additional on-site storage. So, that's the other way that the situation could go if the Congressional bills fail to get all this stuff in motion.

The third possibility is, as you probably know, the Goshute situation where some utilities want to move their waste to a very, very poor Indian reservation 30 miles southwest of Salt Lake City. I think that is, by far, the least preferable to everybody concerned in terms of merely the public relations aspect. It's an astonishing example of environmental racism, and I think it's the least desirable from the utilities' point of view, as well as from most other points of view.

Let me just say that Mr. Van Namen from Duke gave me a reminder about how to illustrate my next point which is that I think it's important to understand that there may be very serious gaps in disconnection reality, both in the Government and in industry, about this and that the Board can sort of, you know, jerk people into a little bit of a reality check about certain things. You know, like there can't be studies like the modal study and all where there's data just made up. You know, you have to actually have real statistics and stuff.

I mean, the example--and, I don't want to pick on Duke, but I mean just as a useful example. You know, the industry is saying we have shipped a whole lot of stuff around the country, you know, from Oconee and McGuire and everything. You know, there was an early hearing about this where Duke Power Company had proposed to the NRC that they make these transhipments, but that the routes be kept secret through the commuter freeways in Charlotte. This was some years ago. But, I mean, the proposal was serious. So, the Nuclear Regulatory Commission looked at the Duke man and said, now, let me get this straight. I mean, aren't these enormous shipments on overweight trucks and aren't they clearly marked radioactive with a big placard on the side and don't they go between your one plant in McGuire and your other plant at Oconee? Isn't this going to be a little bit like elephants toeing through the tulips if you want to keep these routes secret? I mean, that's a disconnect from reality. The fact is that the NRC was in Congress at the very same time asking for a bill to keep commercial spent fuel shipment routes secret.

We went through Congress and we used the Duke anecdote and said this is ridiculous. And, sure, Congress said it is ridiculous. We can't have secrecy of commercial spent fuel routes. So, what we're going to do is we're going to actually pass a law to require notification of Governors

about routes and advance notification of shipments and so forth. So, that's where you got that whole scheme from was from our reaction in Congress to a proposal by the Government and the industry to keep routes secret.

Now, all I'm trying to say is that by analogy, if they were that disconnected from reality back then, you know, what about are there some possibilities of some sort of disconnects right now in terms of the way this whole system is operating? I would maintain that there are some very serious disconnects from reality. One of the disconnects is that the routes--I mean, the risks of nuclear transportation are just being considered as negligible. I mean, there's no serious effort by this Board up to now or by many other parties to take a hard look at their earlier studies, the modal study and NUREG 0170 and so forth. Now, I understand that you may have priorities on site characterization that are extremely important, but the fact is we may have the beginnings of a massive set of shipments in the near future and it would be appropriate for this Board to put some effort into that, I think.

We don't think that we have perfect casks. We've found out there's a bunch of casks on the road that have been withdrawn after being used in transportation which were defective casks. Now, the manufacturers are even more out of touch--I mean, people say they're out of practice. I mean, you know, we haven't been making a lot of casks. So, the human error situation there is entirely reason to speculate about.

I would say you have had no vivid presentation of the consequences of an accident. I mean, we have a new computer program, RISKIND, apparently that can show consequences, both health consequences and perhaps even cost consequences, of a serious accident, a serious release in an urban area. Now, just by analogy, in Arlington Public Schools, we have a terrific gap between the achievement of white students and minority students as a 40 point gap on a 100 point scale. When in public meetings the school board gets a chance to talk about that, they never bring the data to show that gap. They never bring it. You know, they never show people how serious the problem is. And, when you ask a principal or an administrator why don't you bring the data, the answer is, well, we don't know what to do about it. So, we don't want to show people the problem. I think there's a little bit going on here about the same thing. I mean, frankly, if there is a vivid way of presenting consequences of actions to you, I think the Board ought to have a look at that. That's maybe a request that you can make of the people who would risk tend and so forth.

As you know, there's no Federal standard for emergency response adequacy. So, to call up an old Indiana study from the hoary past and say, hey, this is an indication that is adequate emergency response around the country, that is really unacceptable. There's much more recent studies than that, and I would suggest that since there's no Federal standard of what is adequate, the Board might want to think about what is an adequate standard for emergency response capabilities in terms of response to a radiological transport accident.

There will be about 18 State laws introduced in January of this year by state legislators around the country on nuclear transportation precisely because they are alarmed about the imminence new shipments. And, again, people need your help with this. People and state legislators need the help of the Board to try to figure out what the situation is on a technical basis for--whether these old studies and all need to be redone or whether we can just be complacent about that. They need your help in those areas.

Finally, on privatization, I mean, you know, sometimes--I mean, my experience with State officials is they're very worried about the privatization thing because they have a hard enough time dealing with DOE, but to think about dealing with the other corporations that are going to be put in between DOE and them if the privatization--meaning dividing the country up into four areas. I mean, sometimes, when I want to illustrate this, I say, well, we have a possibility that we could have a set of routes chosen by Westinghouse in the northeast as the prime contractor to DOE which we'd then have to hook up with a set of routes in the midwest chosen by TRW which then, in turn, would have to hook up with a set of routes going into Nevada chosen by the Walt Disney Corporation. Okay? I mean, it's going to be private corporations apparently making some of these very basic decisions and negotiating with State officials and all that under the DOE's current privatization scheme. I don't think that's very adequate. I think that's a disconnect from reality if people think that private corporations can make these decisions and that the public is going to accept that.

The major problem here, of course, is that in the long-run, we have to have a system that wins public acceptance. That means that it has to have good technical basis and it has to make sense from all kinds of points of view of participation and democracy and whatnot. And, the Germans learned a good lesson about that recently when they just tried to move six casks over a 300 mile route and there was so much protest and farmers digging up the road with their backhoes and everything that it cost $10 million and

they had to call out 30,000 police to do that. That was because they were sending it to an interim storage site that did not have public acceptance. And, if we think we can send it to a--just because we want to dump on Nevada, if we think we can send it to an interim storage site that does not have widespread public acceptance, I think we're just kidding ourselves that there's not going to be that same kind of problem. And, we need badly a system that is very credible and very trustworthy. The transportation part of all that is a gap right now. The Board's attention to that is a gap. There has not been the Board attention even though it's one of the two major mandates in your charter, of your legislation.

We think that there are other issues about cask integrity, routing, the questions about human factors, the advantage of dedicated trains, security needs, terrorism, etcetera, that bear looking into. They're not just questions of public perception. They are questions that can be dealt with with technical kinds of studies. Another one is that you have made already a kind of, I would say, unsubstantiated assertion that a centralized storage site would be a useful idea at some point in the near future. Now, you made that in one of you presentations to Congress and it wasn't buttressed by a single citation to a study. Okay? That's a logistical question. If you want to say that it's a good idea to have a centralized storage site someplace in the near future, I mean, show us why that's a good idea. I mean, where is the data about that? Where is the logistical studies that say this is going to be useful for the way we handle it instead of just having a relatively simple facility at the end that unloads train cars and trucks and so forth?

So, again, we really appreciate the Board's attention to some of these issues and we look forward to working with you. We think the transportation aspects deserve a lot closer scrutiny especially in some of the technical deficiencies of the older studies.

Thanks.

ARENDT: Thank you, Fred.

We will now have a break until 9:30. There will be additional name tags put at the table. There probably will not be room enough for everybody, but I guess it's first come/first serve at the table. If you don't get to the table, maybe--well, we'll find someplace. Let's get back at 9:30.

(Whereupon, a brief recess was taken.)

ARENDT: Let's start first by going around the table and see if anybody has any comments they'd like to make. I'd say a couple, two or three minutes, a few statements would be in

order. I don't want any discussion right at this point. I'm more interested in any comments that you would like to make regarding yesterday's presentation and anything you might have heard this morning.

Let's start with Bob Fronczak. If you have anything in addition you'd like to say, a comment or two?

FRONCZAK: I think yesterday you mentioned something about shelf couplers, John, and that is a technology that's been used for many years now in the tank car industry. And, a shelf coupler actually prevents the cars from being uncoupled in a derailment. There's two advantages to that. Number one, oftentimes, there--or at least in the past, tank cars carrying hazardous materials would get ruptured because cars would become uncoupled in a derailment and a coupler would push through the shell of the tank car. So, they're required in hazardous material tank car applications. I'm not quite sure that they would be required in this application because it could be a standard flat car this would be used.

The other advantage of shelf couplers is that it prevents cars from becoming uncoupled in derailments and prevents the--or minimizes the potential for them to stack up on top of each other. In the case of a dedicated train shipment where you've got maybe multiple casks, you would want to prevent the casks from piling up on top of each other because, for one, the heavy casks are not tested for crush loading.

ARENDT: Bob, you have any additional comment?

HALSTEAD: Yes, I do, Mr. Chairman.

First of all, unfortunately, I missed yesterday morning's session. So, I didn't get a full overview of what Charlie Haughney had to say about the revalidation of the modal study in NUREG 0170. In my comments today because we were limited in time, I said the negative things that I felt about the modal study and not the positives. I want to say for the record now that all of us that critiqued the modal study have great respect for the task that Larry Fischer and C.K. Chu and the other people at Lawrence Livermore undertook; criticisms which lacked, I think, legitimate differences. But, the point is where we have said we should go and we've been saying this for seven years, we would like to see the modal study reopened.

We have a very large, long duration shipping campaign ahead of us. There's no point that we can't spend a couple of years addressing these issues either before or at the beginning of it and I know that most of us who have been critics of the modal study have stated repeatedly that what we would like--the remedy is the opportunity to have the NRC

or some other body fund the Livermore group to reopen these questions and take new data and address some of the basic issues like what the cask failure variable should be.

Secondly, I really appreciated the things that Bob Jones said yesterday about the experience with the Shoreham campaign, as a person who has followed the dedicated train/special train issue for a long time. I felt that Bob's comments about what he had seen positive, as well as the economic issues, was an important contribution. I'd also say that from my personal experience talking to people who were concerned about that campaign, the fact that the radiological characteristics of the fuel were such that there was no great radiological hazard, while that was probably lost on the general public. And, I think, as Bob said, the general public seems to think that everything out there is high-level and highly dangerous. I got a couple of calls from environmental groups who wanted to know if they should challenge this and our answer flat out was, listen, there's no great radiological risk here. You risk blowing whatever credibility you hope to have to pursue this. So, I think part of the reason why there wasn't a lot of opposition from organized groups or, say, in the city of Philadelphia, Port of Conchohacken, was a realization of what the risks were.

Finally, I think, Sieglinde made a really important observation about the potential exposures during routine operations with people doing mechanical and radiological safety inspections. Now, I would disagree with her perhaps on how many inspections should be done and what the safety merit was and remember that was a picture of a TRUPAC examination and the numbers we have from some other inspections--for example, along the Los Alamos spent fuel shipments--suggested even longer times like 60 or even 75 minutes may be needed. But, we think that the way to address this is to limit the number of inspections and, frankly, we're probably going to have to badge the inspectors from the standpoint of a state like Nevada where we may be dealing with hundreds or thousands of shipments per year, the issue of rotating the people doing the inspections to reduce their radiological exposure. But, I very much appreciate her calling that issue to our attention.

ARENDT: Robert Jones?

JONES: I think I had my hour and a quarter of fame yesterday. So, I won't take a lot of time other than to say that in the years that I've been in this particular business some things never change. One of the things that I don't think has changed is the transportation. It is perhaps the most vulnerable of all of the segments or elements in the treatment or disposal of high-level waste and spent fuel.

The reason is pretty obvious. It's the only one you can't put a fence around. It's the one that is out there with mom and dad and the kids. Because of that, there are an enormous number of challenges.

To not be too redundant, but I could only urge this Board to try to encourage the powers to be, if you will, to get on with the program. I continue to be concerned when I see dates of--Fred Millar, in fact, said we may be beginning a massive campaign starting in 2002 and 2003. I think that we're late. If that's true, we are far behind the power curve, if you will, for that. So, I can only encourage this Board to say to encourage others to get on with the program.

I was also encouraged by Bob Fronczak's perspective from the AAR. As I indicated yesterday, I've sort of been involved with the railroad transportation for a long time. I think that my encouragement ought to be passed on again to those who are the decision makers to sort of take up the cause. I sense a spirit of cooperation from the railroad industry and I think that that ought to be encouraged. And, that the DOE or whomever ought to be working closely to try to resolve some of the issues.

That's all I have to say.

ARENDT: Dwight?

SHELOR: Yes, I won't take very long, at all, except I would like--I'm at somewhat of a disadvantage today in that we have a revised Draft RFP that we hope to issue in the next few weeks. I would encourage everyone to look at it very carefully because I think many of the issues that have been brought up this morning have been addressed in that RFP.

ARENDT: Robert?

VAN NAMEN: One quick technical clarification for a statement that was made yesterday. I believe Marvin Resnikoff made the comment that the cladding temperature in the dry storage containers was at the same temperature that they operate in the reactors. I can assure you that we would not be producing very much power if that were the case. I mean, the 350 degree C number that I think you mentioned in the dry storage is accurate, but in the actual operation of the reactor, we're more like 600 to 650 degrees. So, there is a substantial difference in the temperature in the reactor versus in the dry storage container that I thought was worth pointing out.

One other comment is that the route selection as we move into this RSA concept is going to be done according to the DOT and the NRC regulations. It will be a point to point determination of what is the optimum route to select. There will not be the handoff and logistical problems that I think were implied in the end of the previous remarks.

Thank you.

ARENDT: Fred?

MILLAR: In line with my thing about a disconnect from reality, I think it might be just helpful to think about how radioactive material transportation fits within the overall context of emergency response planning in the United States. And, just briefly, the context is that after Bhopal, Congress reacted first by saying we need to beef up our emergency planning in the United States. So, they created 4100 local emergency planning committees around the country; LEPCs, Local Emergency Planning Committees, in every community. New Jersey has 588. But, the experience was--and this is the sobering part--they didn't work. They didn't do their job of getting information from the companies and communicating risk to the communities.

So, Congress took another look at that in 1990 and said this is not working. We have to have a real regulatory program like in Europe and they brought in chemical access prevention laws in the 1990 Clean Air Act Amendment of 1990. That has been a much more interesting program in the sense that it tells companies you have to do worst case scenarios and 13 different other kinds of technical documents and provide them to the workers and to the public.

So, the main theme I want to suggest here is that there needs to be, one, a technical communication of risk to the public and to the workers and, secondly, there needs to be transparency about all this. Now interesting and for your purposes as a transportation panel, the transportation industry got itself exempted from that. So, they don't participate in that whole scheme of things. So, jus tin terms of your thinking about do we have an adequate emergency response capability out there, I just wanted to mention that. The current situation is, on the one hand, we've had the experience that LEPCs didn't work; you know, on the other hand, the transportation industry is still exempted from the major regulatory structure that the rest of the chemical industry is involved in. And, nuclear, of course, is even more sort of removed from that whole kind of thing.

ARENDT: Okay. Fred, we will be looking at emergency preparedness, 180-C, and a few other things like that very shortly.

MILLAR: Good.

ARENDT: Shortly, maybe say six months or so.

NEUHAUSER: Thank you.

I had one correction or addition I wanted to make. That is that the 30 foot drop, the 30 mile per hour drop that everyone is talking about is equivalent onto an unyielding surface. It's equivalent to a 60 mile per hour

head-on crash between two casks. That might put it in a little bit more perspective. I should have said that yesterday.

Another question I had and it hasn't come up yet, the Volpe Center, which is the DOT's research group in Cambridge, Massachusetts, has identified differences in mass between adjacent rail cars. That's a big factor in derailments. Buffer cars are often simply empty cars and have a very different mass between the potential carrying car and a buffer car. We think that's something that should be paid some attention to. We just proposed a possibility of a boxcar filled with steel shot or something like that to equalize out the mass and reduce that potential differences of cause of derailments. It's not the only cause obviously, but it's something I think that the AAR might ought to think about when they propose their system is that buffer cars ought to be included in the system.

Lastly, although it's not directly relevant, the highest severity accident that we normally analyze and always have analyzed since the beginning of the Yucca Mountain program--well, before that even--were the EAs for site selection was 100 percent oxidation of all of the spent fuel in the cask, in the truck casks, in the real casks. That verges on the incredible and it's certainly bound the sabotage type accidents that are--or, not accidents, sabotage events that are being discussed. So, I think there's already a bounding case in your average risk analysis. You don't need to go out and do another--yet another less than 100 percent dispersal sort of analysis.

ARENDT: Richard?

GUIDA: Thank you. I have just a couple of comments.

One, with respect to the healthy tension that exists between us and the railroads on some issues--and, I mean, healthy here, okay? Is it as healthy? We're obviously looking to minimize the expense we incur in shipping which is why we use non-special trains. I can fully appreciate why it is that the AAR and the railroads generally would want us to use--and not just us, but others to use special trains. What I would ask the Board to sort of think about in this respect is there are two variables here which I'd like to think we can separate out.

One variable is the economics. The other variable is safety. Clearly, from an economic standpoint, we come at it from a different perspective than the railroads do and that's the way capitalism works, the way it should work. From a safety standpoint, I'd like to think that there is not as much, if any, of a disconnect between us and the railroads. I would offer in that respect that if you look at

our containers I talked about yesterday, the M-140s, for example, the total weight of the container in the railcar is a little under half a million pounds, 500,000 pounds. The data axles, that works out to less than the railroad per axle limit of 65,000 pounds per axle. We were just talking to Bob about this a little earlier and the weight of a loaded railcar with coal is around 260,000 pounds. They only have four axles. So, their per axle weight is comparable to our per axle weight, although albeit our total railcar weight is twice, almost twice what the railcar weight is for a railcar loaded with coal.

So, my point in making that is just that on a per axle basis, which I grant you is not the only metric here; there are other metrics. As both Bob and Sieglinde and others have identified the difference in mass from car to car, but on a per axle basis, the weights are not really that much different. In that sense, to the extent that there is already experience out there in moving traffic, a lot of experience in moving traffic like railcars loaded with coal, that should give some degree of comfort that the rail lines are able to move traffic that heavy without a big disconnect.

The other point I would make is with respect to an item that Mr. Millar mentioned about identifying up front exactly what the risks are associated with the potential catastrophic accident in an urban area associated with spent fuel shipment, what I would point out is that, as I've found to be often the case, if you look in our Environmental Impact Statements--not only the DOE EIS, but the EIS we prepared--you will find exactly that analysis. You will further find that in the public hearings that were held, I personally went through 20 of those public hearings on the programmatic EIS for DOE where I made presentations on Naval spent fuel. I covered exactly that accident, potential accident, as well as other potential accidents, the risks, the whole nine yards.

So, I would most strenuously disagree that this is something that has not been brought before the public. It has most assuredly been brought before the public. The difference is that the facts are irrefuted by the--the facts that are presented in those EISs were not refuted during those presentations and have they not been refuted since other than in a qualitative sense, not quantitatively. Where are the errors in those analyses? I have yet to hear where the errors are in those analyses. I don't think a Court has heard that yet or else they would have found these documents to be bereft of merit. So, that hasn't happened.

So, I would just point out I think that that's something we have amply covered in our public interactions.

Thank you.

ARENDT: Charlie?
HAUGHNEY: Good morning, Mr. Chairman. Thank you, sir.
One more little tidbit on cladding temperature. The 350 degree C limit is a steady state limit. There's some others for transient conditions and accidents; they're somewhat higher than that. But, it is a good comparison for long-term performance of the clad. Fuel designers will typically try to maximize the amount of fuel they can place in the canister. This limit may be one of the constraints, as well as weight and criticality and geometry and all that sort of thing. As a rule of thumb, you can find that in most PWR designs they won't go above 1 kilowatt per assembly in terms of heat rate and are typically limited to five to seven year cooling times, minimum cooling times, out of core discharge.
In reality, the fuel that gets loaded is typically much less than that. In fact, there have been difficulties performing measurements of sort of design basis heat loadings on actual campaigns because the fuel is--it isn't producing that much heat. So, typically, you'd find that the actual long-term cladding temperatures would be a bit lower than the 350; 250, 300, somewhere in that range.
Thank you.
ARENDT: Larry?
HAUGHNEY: Oh, I'm sorry, one clarification. That doesn't neglect the need to re-look at this issue for relicensing, going beyond 20 years out towards 100.
FISCHER: I want to point out that I was a little bit concerned when Bob Halstead mentioned that he thought we made up data for the modal study. Richard Mansing (phonetic) is a renowned statistician and he certainly didn't make up any data.
HALSTEAD: That was Fred's comment.
FISCHER: Oh, Fred's. I'm sorry, Fred.
MILLAR: I was talking about--
FISCHER: Okay.
MILLAR: I was referring to what is called engineering judgment which I generally attribute to making up--
FISCHER: Oh, okay. Anyway, it does bring up a good point though in that certainly people can interpret data differently. We found this to be true when we did seismic studies where the NRC--as you know, we had differences between EPRI and Lawrence Livermore on seismic risks. So, what we did is we got a panel of experts together, diverse experts, and developed procedures for how to analyze statistical data and do risk assessments in the seismic area. Professor Theoponus (phonetic) at the University of California at Santa Barbara also did this for reactor

accidents. This is a very fruitful method because it does bring in all the diverse opinions. You don't just have one lab doing it or just DOE or just the NRC. But, when I say diverse, Department of Transportation, even people from State of Nevada and so forth, would be in this panel. The rules are set up and people fully understand what the data is, what the limitations are, and where the extrapolations occur. So, a good honest--well, let's say, a consensus type risk assessment can be performed. But, more importantly, is we have to get into the mode of risk management. We keep talking about risk assessment. We need to get into risk management in this area like we've done in the seismic area and we've also done in the reactor area.

Another point I want to point out is that yesterday both Sandia and Argonne talked about using the GIS system for route analysis. Livermore has been doing that for the past year. In fact, we're doing it for weapons shipments. We are going to give a presentation in Denver on December 4 at the (inaudible) Conference. I left some copies in the back. Certainly, we would like people who are interested to come by and see our presentation on that.

ARENDT: Marvin?

RESNIKOFF: Well, I'd like to thank the chairman for putting me near the end of the table. When I go to Las Vegas, I like to sit at the end of the blackjack table to see, you know, which cards have been thrown.

First of all, I'd like to thank Sandia for putting their latest RADTRAN-5 code on the web. It's an important advance. Other Federal agencies should follow suit like the EPA who don't divulge their codes so you can't really see what numbers are built into it. So, I want to start off by thanking Sandia for that.

Yesterday, I attacked the NRC somewhat for their NUREG 170 and, you know, in the interests of equal time, I'd like to attack the Navy this morning.

GUIDA: Remember, we have aircraft carriers.

RESNIKOFF: Yeah, I just have paper. First of all, the Navy didn't willingly produce an EIS. Idaho had to take them to Court. I was part of Idaho's group that took the Navy to Court. They produced only an environmental assessment and the Courts forced them to produce an EIS and, in fact, stop the ship--most of the shipments until that EIS was produced.

I have some confusion about a lot of the remarks that were made. I just want to lay them out on the table. As I understand it, the Navy shipments go in standard commercial freight, but on the other hand, I'm confused as to how at the same time they limit the speed to 35 miles an hour. If they don't have their own dedicated train, I don't

know how they're limiting the speed. Perhaps, it's something I don't understand about commercial shipments.

It's important that the Navy divulge the necessary information for DOE in their repository design. It's important also that the State of Nevada be able to see that information. That is information about fission product inventory and their fuel, information about the cladding. That's one of the barriers to release of radionuclides. The state has to know this. In other words, some of the design details, secret design details, have to be released if the Navy fuel is going to go into a public repository.

Third, I was somewhat confused about the material that was laid out on the table, these little holes that we're shown. And, it wasn't clear to me whether the Navy was looking at all the various kinds of missiles that are possible. In particular, there were a couple of missiles that were mentioned in Bob Halstead's report; the TOW 2 missile, the Milan missile. And, it was confusing to me whether the holes--the little teeny holes that we're shown were actually representative of those missiles, as well.

Finally, the Price-Anderson insurance, I felt was a little confusing; Federal Price-Anderson insurance for Federal facilities like Federal agencies such as the Department of Energy. Yes, money has been authorized. A small amount of insurance is available, but if there's going to be a $500 million accident, then my understanding is you have to go to Congress to get the appropriation. That's not going to happen quickly, you know, if people are waiting for their insurance checks.

ARENDT: Richard, would you respond?

GUIDA: yes, thank you. Thank you very much.

Let me go down as I remember your questions, and if I miss one, please--I'm sure you will, but please make sure I answer them all.

With respect to Idaho, I think I indicated yesterday that indeed Idaho was due credit in the sense that they did compel the completion of the development of the Environmental Impact Statements that Dr. Resnikoff described. There's no question about that. It is also true that during the pendency of that EIS preparation, the Navy was allowed to make 27 container shipments. This is an 18 month period from January of 1994 to June of 1995. There were 27 container shipments that the Navy was allowed to make for national security purposes. So, obviously, it was not a total cessation by any means of Naval spent fuel shipments during that time.

With respect to the nature of our cladding and the classified information that is embedded with our analyses, I

have said categorically many times and I will say categorically now that we are more than happy to share our classified information with any state, whether it's Nevada, Oklahoma, you name it, as long as they get the necessary security clearances. We have shared classified information about our Naval spent fuel with a variety of states wherever people have received the information are cleared.

And, in one respect, I would point out in that regards, something we haven't discussed and I'd just as soon not burden everybody with it, but it's an element that's relevant here at one point. We have done a TCLP test on our spent fuel. That is a toxicity characteristic leachate procedure test to verify it is not a mixed waste. We're the only fuel I'm aware of where that test has been done. The results of that test were classified because we had to get into a detailed description of our fuel. We provided that to EPA on a classified basis. EPA said we did a wonderful job, accurate, under RCRA, and all the rest. We wrote letters after that to every state and I believe Nevada was one saying we have this classified document. Here's the sum of what the classified document says. If you have cleared people, we're happy to send you the classified report. Some states, such as Idaho, asked for the classified report. We went it to them. So, bottom line is, you know, we are prepared/have always been prepared to share classified information with regulators or folks who have what I'll characterize as a regulatory interest which clearly, I think, Nevada does and other states do with respect to spent fuel shipments.

With respect to the anti-tank weapons, what we understood from the Department of the Army was this. That there is a 10 to 1 ratio between the diameter of the incident warhead and the ultimate necking down of the jet to the point where it actually penetrates a container assuming the container is not just an inch thick, in which case Mr. Halstead is correct that obviously the hole would be larger. But, assuming that it's many inches of steel, there is a 10 to 1 ratio. What I held was a three inch diameter warhead which is what the Army considers to be the largest man or woman portable device. If you look at other weapons such as a TOW or a Milan, those are not portable by a single person. They are crew serve. You have to have more than one person to fire that type of a weapon. But, what the Army told us what even in those instances where the size of the warhead may be five inches, may be six inches--as I recall, the largest warhead the Army had was a seven inch hellfire and that is not certainly man portable. That, you need, to fire from a helicopter or from a large station. Even there, you get a 10 to 1 reduction in the size of the diameter of the

warhead versus the hole. So, what I was trying to illustrate yesterday was simply that there is a large reduction in the size of the hole compared to the size of the weapon and that is true for larger weapons as it is for smaller weapons.

Now, what else did I forget? I apologize. Price-Anderson and 35 miles an hour, thank you. 35 miles an hour, we impose--we have as a condition of our contract with the railroads that they restrict our shipments to 35 miles an hour. What that means is if we are in a large train, say, 100 cars, and we're the last couple of cars in that train then, our train is slowed down to 35 miles an hour which is one of the reasons why Mr. Fronczak appropriately expressed some concern over the impact on the rail network. But, the bottom line is that is exactly what we have done for 40 years and it is not only something that I can attest to the truth of from the standpoint of what the contracts say with the railroads, we have our couriers that go along with each shipment and most assuredly they verify, they maintain, they provide additional assurance that that standard was met, 35 miles an hour was met.

Finally, the Price-Anderson. Actually, I have a copy of Price-Anderson with me here not because I was expecting a question, but because I wanted to give it to Dr. Knopman after yesterday's discussion. Basically, what it says is very clear. It says that four contractors of the Department of Energy of which the railroads are one, okay, in this case, when they're extended liability coverage, their coverage shall be at least the amount--shall at all times be equal to or greater than the maximum amount of financial protection required of licensees under Subsection (b) which is for power reactor operators, the $7 billion to $8 billion fund which is increasing with time as more money gets paid and no accident occurs. So, in essence, the words in the statute are very clear for a contractor of the Department of Energy, the maximum protection is no less than what the coverage is for the power reactor operators. As I also said yesterday, once you reach that maximum protection, that is not a cap. What it is then, a come back to Congress. There are other words which I've likewise highlighted for Dr. Knopman. You go back to Congress and you then identify to Congress that more funding is needed and they then decide whether to provide the additional funding out of the public treasury.

What else did I not answer? What did I not answer?

RESNIKOFF: I don't think you answered the last question.

GUIDA: Okay.

RESNIKOFF: Are you telling me the contractors have $5

billion sitting in their pocket waiting to put up in case there's a Navy accident? Is that what you're telling me? Do I not understand this right?

GUIDA: What I'm telling you is what the words in the statute say. The words in the statute say that when the Government indemnifies a contractor, the level of the indemnity--from my reading of the words here and you're welcome to read them yourself and see if you come to a different conclusion. But, my understanding is that the level of the indemnity extended by the Government to the contractors shall be no less than that required of licensees under Subsection (b).

RESNIKOFF: That's an authorization; it's not an appropriation.

GUIDA: Yes, I understand that. That's correct.

RESNIKOFF: Money still has to be appropriated.

GUIDA: Absolutely, but the point is that like--

RESNIKOFF: That's the only point I was making.

GUIDA: Okay. Well, my response to that is very simply this. I agree with you that Government cannot appropriate for an accident that does not happen. True statement. The contrary argument, however, is the Government has a number of insurance policies for a variety of things in society where the Government commits to do something. And, if the concern is is the Government going to be good to the commitment that it makes with respect to this level of protection, then I would submit to you that if we have to worry about that, we have some deeper concerns about the way this Government operates.

ARENDT: Let me suggest those of you who are interested in Price-Anderson that you get a copy of that. I don't think we should discuss this any further right now.

HALSTEAD: Could I just comment on two things for 30 seconds?

ARENDT: All right.

HALSTEAD: The issue about classified data and waste acceptance criteria and Nevada's concerns about the repository, I did not mean to waive those concerns in what I said about the transportation issues. In the past, we've been very concerned about the classification not only of the Naval fuel, but the high-level waste calcites that are in storage in Idaho. I mean, even the details of the chemical and radiological composition there have been classified under the assumption that someone could back-calculate your fuel designs. So, we have not decided how we're going to handle that. For repository performance issues, it's still an open issue. Again, we're not getting into the details of the weapons. Milans are man portable, one TOW with a tripod is

man portable. Obviously, the TOW with the tripod is designed for a two person team. Remember the battle sets for these weapons assume that the first shot is likely to miss. They're set up for three shots. Missiles traveling 400 or 500 miles an hour, you know, one blip and you've missed the target. It's also important they're not as easy to use as some people--there are many, many issues here. Where I would differ with Sieglinde is that I don't think even the 100 percent oxidation accident reflects the particular dynamics of a large state-of-the-art missile hitting a GA-4 truck cask, and that's the area of greatest vulnerability that we'll have to pursue.

NEUHAUSER: A quick response to that. We've done quite a bit of analysis of penetration to casks and I think perhaps you're not really familiar exactly what anti-tank weapons are for. They somewhat take out a tank, but they're basically an anti-personnel weapon. They're meant to penetrate the interior of the tank and to kill the people inside and that is all. It's unheard of for an anti-tank weapon to penetrate through the other side of a tank or something like tank like a cask. So, you get one hole. The one hole situation, it is very hard to drive material out, even if you have a pyrophoric material in there for a short period of time.

HALSTEAD: I believe the British use of Milan missiles in the Malvenus War (phonetic) would provide plenty of contrary evidence. So, I don't think we should debate it.

NEUHAUSER: No, you're right.

HALSTEAD: I think we should--

NEUHAUSER: I do want to say one other thing. There is a genetic fallacy of logic here that the origin of something affects its truth or falsehood. The fact that the Navy wasn't willing to do an EIS originally does not mean they didn't do a good EIS when they did.

HALSTEAD: And, I would second that. I think that the second Navy EIS for shipment to the repository is a very good model for how I'd like to see it, in spite of the fact that I wrote 20 pages of critical comments on it. It was a very good effort.

GUIDA: We appreciated every page.

ARENDT: Let's continue. Richard Boyle?

BOYLE: Thank you, Mr. Chairman. I wasn't sure I was going to get to make a statement.

Not to minimize of the importance of the value of the work that many of the presenters, as well as this Board, are doing and the support that it gives to the transportation regulations we have, but I also urge the Board to be realistic. As I said in the opening statement, radioactive material is just one of nine hazard classes that's regulated

by the Department of Transportation. That represents approximately 1.2 million shipments a day, tens of thousands of which are RAM. If I can throw in a personal side, too, I think that 1.2 million is much more accessible and usable and valuable than any terrorist group than the spent nuclear fuel that would have such security. But, again, that's my personal opinion. So, I urge the Board to look at the transport risk and the consequences and the available data for all those 1.2 million shipments that are going on as we speak and compare that to what is available for spent nuclear fuel, as well as what some of the members of the presenting Board or this round-table has asked for. And, I would look at--be realistic and take a look at that data and those risks when you make your decisions and your recommendations.

Thank you.

ARENDT: Thank you.

HANNON: I'd like to make two points. One is in conversations during the breaks and so forth, there has been some concern expressed about the delay, the glacial delay, and the release of the--and the concerns seem to be that we're taking all sharp edges and everything like that off it. This is truly Government-in-action. I think it's the hyphenated version. No one has, you know, really been pushing for it and whether the Board will pursue that, as I indicated yesterday, that would be fine.

I think that the key findings are not going to be revolutionary. I think they're going to be pretty well the ones that have been discussed over the last couple of presentations and yesterday. But, the radiation risk is low, but there's still quite a variability in the safety factors. The amount of the materials that are shipped, it is divisible. And, we were not asked to look at the OCRWM type program shipment which is indicated that seems to be leaning towards rail, but we were looking at spent fuel in general and that the visibility can dictate loads, loads can dictate routes, and so forth.

We hope it's going to be a matter of, you know, a month or so. If anyone would like to give me their card, I would--I don't normally solicit them, but I'm coming out with a new line of storm doors. I will try to get a copy of it to you in the first part of the next calendar year, not fiscal. So, we are very close to getting it out. I've been basically reading from the executive summary. Those are the key findings. They're not going to, you know--the world will still be on its axis.

Another point, it's a point that Fred Millar brought up about the Clean Air Act and the imposition of the requirements, the LAPC, the 4100, the 500 plus in New Jersey.

There's a whole range of requirements that was imposed on the chemical industry. The impression was created that it wasn't extended by regulation to the transportation community, but the chemical companies, the industry, have done I think a reasonable job of extending that to the carriers that they use. There has been a real reduction in the numbers of carriers that companies are tendering their freight to. I think with the chemical industry, in particular, they have imposed de facto a requirement that they be good operators. They don't want to get sued. They don't want to bet the company on things. So, I think it has been extended to the transportation community by the chemical industry, in particular.

That's all.

ARENDT: Jim?

MCCLURE: A couple of minor comments. Back in the days when Sandia was doing the full-scale tests, I'll make the analogy in that point in time to where we are today. In those days, the Government bought me a Hewlett-Packard hand-held calculator for $395. I can go to Walgreens and buy the same thing now probably for about 10. But, in a crude way of preparing, one of the things that's true now is that the capability of computing is advanced far beyond what it was in those days.

One of the things that was true when the full-scale test was done, first of all, there was the obvious PR value of having performed the test. They have been used a lot in those films. But, one of the things that isn't often mentioned is that there was a strong element of demonstrating the relationship between the data of a full-scale test and the analysis that you could marry it to so that you didn't have to do a full-scale test every time. So, I make that comment in general terms. I'm not trying to really particularly refute the argument of doing full-scale tests because in the midlands, the Show Me State of Missouri, they want to be showed, you know. So, final analysis that you have to do that, that's fine, but from an engineering point of view, the effort was made to try to marry analysis and full-scale testing to the point where you didn't have to do a full-scale test every time. That's a point.

Another one that I'd like to comment on briefly is the business of the accident databases. The information we showed yesterday had to do with transportation accidents involving the vehicle transporting the material; in this case, the material was spent fuel. We have to make a judgment as to whether it was an accident or not and don't make any apologies for that because the Federal records don't say whether there was an accident involved or not. We have

to read the report to find out. But, the point there is that I want to separate the fact that that information exists from the fact that the severity studies that were done early-on by Sandia, they were to demonstrate, you know, if there was an 80 foot bridge that a truck could roll off the side, that belonged in the severity study and that kind of work was done. That was one of the first things that was done by Sandia. So, I want to separate actual accidents from potential for an accident that hasn't yet occurred involving spent fuel. One is a severity type thing, the other is an actual piece of information that says that the event occurred involving spent fuel or whatever material form you have.

Finally, I'm only tangentially involved with emergency response, but there's something afoot that I think you need to know about. That is early-on, perhaps as early as about 1980, the Department of Transportation was actively involved in chairing a committee that wrote a document, FEMA REP 5, which is the guidance document to State, local, and Tribal Governments on how to respond to a transportation accident. That's being revised presently for about the third time, I think, and that should be made available to the Board. I mean, copies that are in existence now can be made available immediately, but the revised thing won't be done until six months or so from now.

Another plug would be for the Department of Transportation. As long as a decade ago, they had a program where they provided free of charge to the Governor of each state a training package that had, one, of course, administrator's documents, a student manual--I mean, several student manuals and a set of about 350 35mm slides. Now, these were given to the Governor of each state or his designee free of charge so that they could take it into their regular fire academy infrastructure and use it. Now, I guess, I'm realist enough to know that people come and people go, but I'd be willing to bet you that perhaps that effort has sort of been diluted over the years. But, a good faith effort was made a long time ago by the Federal Government to make sure that kind of information was placed in the hands of every little volunteer fire department or whatever exists in your locality. So, I just want to say that because it happened a long time ago and I don't know whether anybody remembers it anymore or not. But, it should be called to your attention because the DOT was responsible for that.

HANNON: If I might respond, the FEMA REP 5 is from its title a Federal emergency management agency document. We, DOT, serve on the committee forming that, as I think other Federal agencies do. It is coming out and clearly if FEMA doesn't make it available, we will make it available to you.

The training, it hasn't slacked off. In the 1980 authorization of the HAZMAT program, there was recognition for a need for a grants program for emergency response, both the training and planning of the emergency responders. It's a Federal program that, you know, allocates money to states. It's not the magnitude that had been contemplated in 1990. It's actually about one-third of the amount of money. We have a registration program which we collect money and take a small percent and then send it back to the states to fund their programs. It's not a lot of money. It turns about $6-1/2 million or $7 million a year. It's an increment above what the states had been planning prior to the Congressional authorization.

The training materials, the 350 slide program, has now took a bold leap into the 1990s and it's now available in video. We have CD-ROMs. So, I think there is an improvement that we're getting training materials available to states. This is done in conjunction with DOE, FEMA, and so forth. There is a large body of information available that is communicated. I think the need does exist. There's a significant turnover especially in the volunteer forces which represent something on the order of 85 percent of the fire community. So, it's going to be a constant that training occur. This is general training, various levels. I mean, states can allocate the funds as they see fit, but the awareness level is always needed with the turnover. As people reach the higher levels of technician and on-site commanders, those are things that are geared and these are state decisions. That fund has been in force now--we've been out five years of funding. We are seeking reauthorization for that fund and there is consideration being given to changes in the registration program that could more fully fund or fully fund what the Congress did authorize in the 1990 legislation. So, rather than one-third, it would be something close--one-third being 6-1/2 million something, closer to $18 million or $20 million a year. But, that has not yet gone out. It's still being considered.

ARENDT: Fred?

MILLAR: I just wanted to respond a couple of things. You know, first, to Dick Boyle. One thing you mentioned is that there's, you know--there was a set of scenarios recently done on pre-Olympics terrorism training in Atlanta before the Atlanta Olympics and they chose three scenarios. They chose seizing of hostages at the airport, a nerve gas attack in the subway, and the third, was I understand it and reported in the Washington Post, the seizure of a spent fuel container from the Georgia Tech Research Reactor. So, if terrorists think like Federal officials who set up these scenarios and

whatnot, then you'd have to say that there's sort of recognition that nuclear materials have this sort of unique dread kind of potential. I mean, they didn't choose ammonia or chlorine or those kind of things, what you actually might have thought would be important and I would agree, as well. But, all I'm trying to suggest is that among the three, nuclear was one of them. The result apparently was that the material would have been removed permanently from the Georgia Tech Reactor.

But, the second thing I want to say is that, Dick, I mean, I agree with you that it might have been some squeeze on carriers and so forth about shaping up in terms of chemical transportation. But, my point was transparency and communication with the public. I've served on a local emergency planning committee here in Washington, D.C. We went to the railroads and said we want to know what you bring through there. Well, it took us a year of fighting with the railroads before they would even give us that because their basic attitude has been, look, we can bring any damn thing through your community and you have to be ready for it. I mean, that's the attitude, okay? We can bring anything through your community and you people have to be ready for it. So, we say in response we want to prioritize our emergency response training. So, we want to know exactly what you bring through here on an annual basis. We got to the point where they said we're not covered by your law, sir. And, we said, you know, that's true. EPCRA doesn't cover the--the transportation industry got itself exempted. So, our response was do you want to be in the Washington Post as the only industry that is not cooperating with something as mom and apple pie, as local emergency plan? And, they said, okay, we'll give you the information.

I just want to point out there is this culture of non-transparency, non-cooperation with local emergency planning committees in the general transcontinental transportation network. That's going to be an obstacle to people having the kind of transparency that's going to make this system work, I think, in a real way.

The last point to make is that there is a document that says what people should have at the state level. It's called NUREG/CR-2225. It's sort of a great unknown document. And, instead you hear about all this other stuff that's much less relevant. That document is called a Rockwell Study and it says what a medium sized state should have to be ready for nuclear transportation emergency. It has not been superseded. In fact, it tends to stay under the table. People don't even want to talk about it because it costs $5.1 million a year. And, nobody has been putting that kind of

money in and nobody has got any plans to.

So, I mean, Dick may be right that there might be some expansion in the aid to State and local officials from the Federal money, but I think that's very problematic. And, the current program is pitifully small and the current program is based, as I understand it, on a flat fee. So, if you're a mom and pop transportation company and you haul a few barrels of dangerous materials around, you have to pay a $300 a year fee. As I understand it, if you're DuPont and you haul a zillion tons of stuff around every year, you have to pay a $300 a year fee. Is that accurate, Dick?

HANNON: You are not inaccurate. Congress in their wisdom said that they put leaps and bounds on the amount that could be collected. I think--I mean, I think--I know the fee is the minimum that was suggested in--or was in the law that gave a range of $250 to $5,000. I don't think you can get equity between mom and pop and the DuPont or Dow or so forth. I think we did propose, you know, hiding behind the regulatory operational end, and that proposals were made for graduated fees. They did not prevail. I suggest that what will come out or plan to come out in the next month or so would be another approach at graduation within the latitudes that the Congress provide. I'm not happy with $250. I got a lot of hostile calls and still get them from people when they realize 250 is a lot to someone, but it's not a lot. If that's going to be the difference between they remaining in business or not remaining in business, they may be doing something else, marginalizing something else. But, I think it is--I don't think it's good Government to have that small a fee apply to everyone.

The counter argument is that the bigger companies are better prepared. They have better equipment. They have better training programs. There are two sides to the story, but I would--and we propose to have a fee that would give some latitude due to the size of operations.

ARENDT: Okay.

FRONCZAK: Can I respond to one of Fred's comments?

ARENDT: Okay.

FRONCZAK: I think you impugned the reputation of the entire rail industry on cooperation, and I think he was dealing with one railroad in high likelihood.

MILLAR; No, two.

FRONCZAK: Okay, one or two. I know for a fact that the railroad works extensively in certain areas of the country with local emergency response people. One of the concerns about providing information about chemical shipment through communities is just a competitive kind of thing. They don't want their competitors to know what kind of business they've

got and where it is.

One followup to Mr. Resnikoff's question to the Navy. I guess, I don't know that you answered the 35 mile an hour question. In my viewpoint, you are slowing up 90 or 100 cars to 35 miles per hour. Is there any compensation provided to the railroad for that?

GUIDA: The answer to that is we meet the tariffs or pay the tariffs, you know, set by what was then the ICC and now the Surface Transportation Board. All I can tell you is that if the railroads concluded that they had the ability to force us to either use special trains or to force us to not impose that kind of condition on them, I am certain they would have exercised that right. They haven't done so. Instead, what we have found, our experience has been that with CSX and some of the other railroads we use on the east coast, as opposed to UP which gives us a special train service, although we did not request it because it is either for reasons of safety or argued reasons of expediency and efficiency for them, for the east coast railroads, they have concluded that they can take our shipments and they don't pose a problem or an insurmountable problem. I didn't say they didn't pose a problem. They don't pose an insurmountable problem for them. So, you know, the record is the record in this case, fortunately. History is history. We can demonstrate this is what has happened. It's not a case of did it or did it not; it did. Maybe they do it as a consequence of commitment to national security. That's a possibility. That is definitely a possibility. You know, they're patriotic Americans like everybody. So, I don't know. For whatever reason, they've accepted it.

ARENDT: Okay.

RESNIKOFF: I didn't realize everybody would be dealt another hand here when I calculated the odds.

I wanted to bring up an issue which has concerned me which I neglected to bring up yesterday which relates to the NRC's jurisdiction and relates to repository operation. If the Department of Energy is not going to accept fuel that has gross cladding defects, where is this check going to be made? Is this going to be made at the repository or is it going to be made at the reactor sites? In other words, are they going to be shipping fuel with gross cladding defects out on the highway or rail? The reason I'm asking this is fuel is going to be packed in these welded containers for the most part, the NUHOMs, the Transtar, or VSC. They're all going to be welded containers. Those will have to be--if the fuel is going to be checked, those containers are going to have to be opened or at least a representative number will have to be opened. My question is where is that opening

going to take place and when?

HAUGHNEY: I'll give you an answer, but you really need to talk to the Division of Waste Management which is going to license the repository. The shipment of fuel with severe cladding damage, storage of it even, is intended to be done in a canistered fashion. We have a few applications now that aren't finished which are addressing that very issue. One is the site-specific application for Rancho Seco which is based on an NUHOMs system. It's a dual purpose application, too. It has the overpack that would be suitable for shipment once it's licensed.

I've always anticipated that there would be some unloading of fuel even from the so-called multi-purpose canisters for a variety of reasons. We probably can speculate about today, but not exactly predict. And, surface handling facilities at the repository would be needed to transfer fuel into one container or another. The people that work at the repository actually to a greater degree may be able to amplify this. But, there's no requirement in the regulation there be a multi-purpose canister. What there is in the regulations really an encouragement that dual purpose designs be licensed. But, if you look at the wording of it strictly, it doesn't explicitly require that off-storage containers be transportable, although the trend has gone that way. That shift has occurred very suddenly in the last couple of years. I think that's about all I can really say on that.

There was a statement yesterday about the TN-40 design which is in use at one power station in Prairie Island. It's a trans-nuclear storage system. It's not licensed for transport and it's not clear whether there ever could be. So, I think it's not quite accurate to talk about it, the TN-40, in terms of a transportation accident scenario. For the most part, casks like that one--let's assume for a minute that perhaps it cannot be licensed for transport. They would have to be unloaded at the reactor site either back into the pool and then into a transport cask or through a dry transfer system, you know, that's just begun the earliest stages of licensing which would be cask to cask.

ARENDT: Okay. Norm?

CHRISTENSEN: I'd like to make maybe three points so in order of generality, from most general to most specific. This issue, the transportation issue, in general, I think is something that the Board recognizes is maybe one of the most immediate and challenging technical issues that we need to be thinking about and that this meeting represents an important step on our part, and at least I can say for myself and several of my colleagues, that we're really anxious and very

interested to get into the details of this.

The more general comment I want to make has to do with the point that was made a couple times and it has to do with the various aspects of risk. I want to allege that there are three and that they're all important and we need to think about them. There's the issue of risk assessment which is basically the probability of something happening and a function of its consequences. There's the issue of risk perception which I'll allege is just as important and has real consequences, as well. It also is related to the probability of something happening, its consequences, and seen through the lens of its proximity in space and time. And, with regard to transportation, it's the issue that makes this probably more important than anything else to the greatest number of people. The largest number of people are going to experience a transportation issue as opposed to the repository issue. It's going to happen in time in a much closer time frame than the repository itself. So, regardless of the probability and consequences issue, it's going to be seen through a lens by the public and perceived as higher risk. That is independent, but it nevertheless has very real consequences, economic consequences. It will undoubtedly have legal consequences. All of these play back to the importance of our discussion on that.

I would allege then that the issue of risk management is one that has to be deal with both the issues of perception and the issue of assessment. A comprehensive risk management program is one that thinks about those. And, I know from my standpoint, I'm going to be very interested in trying to sort both of those things out, but I would say that one of the real challenges here will be the fact that the particular issue we're talking about is one that will be more directly perceived by the greatest number of people nationwide, and therefore, will influence its perception.

With regard to the conversation to get a little bit more specific and it relates to the comments that were made relative to the transport of hazardous materials and I see it personally as a challenge in terms of sorting it out, I agree there's an enormous amount we can learn from the issues of transportation of other kinds of radioactive wastes and other kinds of hazardous waste. But, to do that, we need to come up with a common set of standards and language that make comparisons legitimate. I have to say yesterday I was personally very confused by the fact that it's clear that the way in which we define an incident, the way we define an accident, the way in which these are operationally defined is not the same. Therefore, it's very hard to make hard comparisons. It's also clear to me that in this conversation

over these issues that the various stakeholders are looking at these issues and defining them in different ways that make it very confusing for those of us who need to sort this out technically. We're going to have to come up with and agree on some common set of standards for how we're going to measure this, if in fact we're going to have any kind of an agreement. Otherwise, we are going to be simply throwing apples and oranges. I think that's going to be a real challenge for us in various areas if we're going to have some commonality in our understanding of both perception and assessment of risk.

Finally, to get very specific and this really relates to something that Bob Halstead said in his and maybe it's an example of the level of things that I would like to have us discuss. You put up the issue of sequencing of fuel, old fuel first. And, at first blush, I could understand why one might develop a rule that said, well, we ought to go with old fuel first and others less. And, I'd be really interested in that dialogue to understand what the drivers are for doing it otherwise. That is why might we and are there reasons related to safety or risk or economics? Why might we decide that the sequencing of fuel to a storage site or to a repository might follow some other set of rules. It might have to do with spatial proximity. It might have to do with security issues. But, I think that that's a level of discussion that would be really critical on that issue and maybe an example of the kind of things that we should be considering on other issues.

ARENDT: Dwight?

SHELOR: Yes, can I respond to your last point relative to sequencing of fuel? In the standard contracts that we have with owners and generators which are primarily utilities, first of all, we're committed in exchange for a fee payment to accept all of their material and to dispose of it. It's my perception that those facilities or utilities that has spent fuel in dry storage now or even in the future that when we go to pick up that spent fuel in accord with the annual capacity report that was published in '95, they have the right to give us any fuel they want that's over five years old. I believe that they would be reluctant to give us the fuel that's already in dry storage. The driver will be empty the pool.

HALSTEAD: I agree and have done much thinking about this. I'm not sure how we approach it, Dwight, because the oldest fuel first philosophy was never more than a programmatic philosophy. I mean, there isn't any legal--

SHELOR: No, the oldest fuel first was implemented in the annual capacity report and that was primarily designed to

provide equity, more than anything else, because the oldest--
HALSTEAD: It was an agency action.
SHELOR: That is correct.
HALSTEAD: That's something not in the statute.
SHELOR: That's right. It was just a means to provide equity and also at least at the time and may be still be perceived as a way to develop a market for allocation rights. If the owners and generators had an allocation that they didn't need, then they could actually sell or trade that with other people who had a more immediate need.
ARENDT: Robert?
VAN NAMEN: Yes. Just the way that we anticipate managing the concept of delivery and making the spent fuel available, I agree with what Dwight said that the oldest fuel first is an allocation mechanism among the utilities. For instance, Duke has fuel at three different sites and we would expect to optimize the economics on our system giving DOE fuel that meets the requirements of the transportation systems and everything else, but it's--you know, if we have the opportunity to avoid implementing the dry storage facility in one place, we would certainly take advantage of that. It is not our desire for ALARA reasons and others to go in and cut open canisters to extract fuel from dry storage prior to delivering fuel out of the pools which is much more easily accessible and still meets all the requirements. It is our belief that the oldest fuel first concept gives us the allocation and the right to have DOE pick up the fuel, but from that point, we would manage it the best we could for the system as a whole.
ARENDT: Okay. Robert?
JONES: Yeah, I'd like to add just one point to the matter of allocation of sort of the place in line. It's something that's actually acknowledged in the current 961 contract and also is acknowledged in the legislation that's depending on centralized storage. And, that is the treatment of plants that are shut down. There are a number of plants that prematurely shut down; Rancho Seco in California, Trojan in Oregon. These are sites that are single unit sites and are looking at dry storage. But, estimates by those utilities have shown that the cost of just sort of caretaking fuel, even though their place in the queue may be decades away before their number comes up, nonetheless, they're looking at $3 million, $4 million, $5 million a year to simply babysit. I think there's an acknowledgement in legislation and there ought to be an acknowledgement that there's cause perhaps to depart from oldest fuel--from purely oldest fuel first in order to relieve the utilities of the financial burden given that the utility industry as a whole

has already contributed something like $14 billion to the waste fund and to add more to the economic burden seems like it's kind of shortchanging them.

CHRISTENSEN: It seems to me that one of the issues that may come here is not only the economic issue of trading it off against the risks, particularly of moving fuel of different ages to a repository or interim storage site, but that those risks are dispersed geographically? That is to say it seems like there may also be risks related to the distributed storage sites. I have a hard time kind of weighing those two issues. There's just sort of a large scale geographic issue as opposed to the risks that occur both in transit and in a different location.

ARENDT: Before you get started, Sieglinde, do you want to make a comment?

NEUHAUSER: Yes. I'd like to say I really appreciated Dr. Christensen's remarks because standardization of terminology in general would be of great use to the whole effort. Yesterday, Marvin Resnikoff had a figure that showed urban/suburban/rural which don't fit our definitions. We don't base them on political boundaries, we base them on population density. We really should be saying high, medium, well. Severity, what those other industries consider a severe accident would not challenge a spent fuel cask for the most part. So, we need to have some very common definitions that everybody follows including what's an accident, what's an incident. I mean, you know, placarding is--but nothing happened. Also, under-reporting, the level of under-reporting is much different in different industries. I really would be very pleased to see the Board come up with some recommendations on that.

HALSTEAD: If I could have 20 seconds on this issue? When SAIC calculated the accident rate, they were very conservative and only took an accident that was reported and involved a loaded cask. The accident rates they gave of one truck accident in 1.3 million shipment miles and one rail accident in 490,000. But, your point is very well-taken.

RESNIKOFF: This will be quick and it relates to a point that Bob Jones made. The utilities would like to relieve themselves of their possession-only license. I think that the driving force in this Utah proposal, they would like to ship all the fuel off the site and put it into a temporary storage facility so that they can completely decommission the site. The effect is all this material then goes out to one particular site in Utah and all the utilities that produce this material are relieved of their possession-only license. Then, some private limited liability corporation with no backup system, there's no pool, there's no dry storage, no

hot cell, then has all this fuel sitting out there in Utah. That's sort of where this whole trend is going unless the NRC steps in and takes more decisive action on this.

HAUGHNEY: We'll speak when we'll speak, Marvin, and you know that you and I are about to be across the table in an adjudicatory proceeding. So, I'm not going to discuss it here. But, we aren't done with the application and haven't filed testimony, written SAR, or anything.

ARENDT: Okay. Dan?

BULLEN: I appreciate Norman's comment on the general nature of risk and risk perception. So, I'm going to jump right to my specific questions. I only have about three or four.

The first of which goes to Dwight Shelor who sort of dated me a little bit when he said he had a 1,000 comments on the RFP response and that there were 60 responders and that there's going to be a reissuance of the Draft RFP soon. But, I was wondering could you give us a preview of coming attractions? What were the technical nature of the comments and what kind of significant changes do you expect to see in the proposed system based on those comments? Maybe I should wait and see the full version of the film.

SHELOR: Yeah, I should give you my standard response in that since this is a competitive procurement, we're trying to maintain a level playing field. If I say anything now, I may not have that level playing field. It would be in my view a disaster if we went through a two year process and then had a protest on the procurement. But, I think that--again, I urge you to look at it. We've considered it very carefully. A lot of the changes that we're making are procedural in nature and not necessarily--

BULLEN: Okay. Then, I'll move on to my next set of questions. That actually deals with the presentation by Bob Halstead who did a very nice job if you'll look at his handouts that he didn't necessarily go over, quantifying the accident rates for shipments. But, we also had an assertion from Robert Jones and I'd like to have some data on this about the European success in shipment and are there data with respect to the accident rates on shipments of actual spent fuel? Obviously, not in casks that are licensed in the United States, but the accident rates associated with that and other data that we can use to derive what the actual accident rate might be from which we could derive a risk. So, I'll start with Robert Jones and then Robert Halstead asking you have you analyzed those types of date?

JONES: Well, to begin with, my understanding of the European accident data is purely anecdotal. That's not to suggest that here aren't documents that exist that record

that and I'm sure there are. Ron Pope, of course, who has dealt more on the IAEA level perhaps has some information that could be provided. I, personally, don't know of any.

BULLEN: Bob Halstead, do you have any indication you could give us on that?

HALSTEAD: I am told that Ed Vince (phonetic) once had a project when he was preparing documents for DOE to assemble what information existed. So, that's the only source I know. As far as comparability of this--and I'm not trying, at all, to dismiss the IAEA standards. I just think that the physical geography of shipping to Nevada in the U.S. is so different from the European experience that I--you know, I don't want to dismiss their--my understanding is (a) there have been no severe accidents; (b) there have been a few minor accidents. But, it's difficult to break them out by modes. Swedish experience with coastal water transport is very different from the short haul rail experience in France, Germany, and Britain. But, if anybody knows, it would either be Ron or Ed.

MILLAR: Thank you. And, you know, one thing I just might mention that years ago when I poked around a little bit in France about what kind of European experience they had, I found that France had exactly the opposite safety philosophy on routing than we did which is that we were saying we want shipments to go on major interstate highways and rail lines right through cities, if necessary, because the railroads were always saying we were built to connect cities and so forth and those are the best tracks. On the other hand, in France, apparently, they decided that they should ship things on little tiny roads that go through the countryside and avoid major cities, even if that meant having flashing lights and escorts and whatnot. So, it was just interesting to me that there seemed to be a completely opposite kind of safety philosophy about routing.

BULLEN: So, the suggestion is that maybe the data aren't applicable if we're going to take a different philosophy?

HALSTEAD: Still, it would be useful to have them. I'm not sure how helpful though.

HANNON: Fred, I might suggest a different form of Government in the United States.

JONES: Yeah, I'd also like to challenge the assertion that somehow we decided that we're going to go right down Main Street, right through the intersection. I mean, if for no other reason, logistically, why would you want to do that? Yeah, I want to make a shipment as quickly as I can from A to B. So, I think I'm going to pick commute hour on the beltway in Washington, D.C. I mean, give me a break.

BULLEN: One final quick question to Robert Fronczak is he mentioned that empty shipping casks might go back as regular freight, but I'm thinking that you're only thinking about 10,000 pounds or so out of the cask. It's still going to weigh, you know, 400,000 pounds or so by the time you've unloaded it. So, you would probably most likely ship it back in a dedicated train. And, the indication I have is that regardless of whether the cask is empty or full, it's going to be reported as a nuclear incident whenever there's some type of accident associated with that just because we saw this yesterday. We saw essentially four accidents that were full and four accidents that were empty in yesterday's data, but they are all reported as such. And so, I would think that if you're going to have a 400,000 pound car that might have some problems as Dr. Neuhauser mentioned with respect to empty cars around it or the mass differences between the cars, you'd probably ship it out and ship it back in its own dedicated facility. Just an observation that I'd make and I see Robert Jones wants to comment on it.

JONES: Well, I think I made that statement that I heard some studies and those were strictly cost-driven. It's because--you know, I mean, at $50 a mile or $40, you know, it sort of varies with the rail line, but you know, that's a pretty steep price to pay for just hauling a heavy piece of gear around. So, it's slower. I mean, when you go by regular freight, it's a lot slower, but perhaps your logistics will work out and it's not quite the same press of the logistics on the empty as there may be on the loaded. It sort of depends on the fleet size, etcetera. I think it was mostly dollars rather than any other consideration.

HALSTEAD: I'm not at all trying to pick a fight with my good friend, but I just had to put some assumptions into a modeling exercise and we made the assumption that three to five car sets of rail casks would be returned by dedicated train strictly to facilitate turnaround time because we assumed it's going to be somewhere between $2.75 million and 3.6 million invested in each cask car and the accompanying properly ballasted buffer car. That probably the economics would drive--it is true that while an empty cask might be reported, security costs, escort costs, some of the incidentals would be lower on the back haul. But, obviously, until somebody gets written bids and, you know, all those costs expected of that, I think there is--to the extent there's an argument given, as Bob says, it would have to be economically justified.

FRONCZAK: Yeah, I would like to respond. The reason I said that harshly is because of, I think, a comment John made yesterday and it has to do with using the best available

technology. And, I understand the utility industry's concern about this, too. I think the feeling is if you equip a cask car with prevention technology that you'd have to equip the entire rail network with that. That's definitely not the case. You are very right. You don't want to have a very heavy vehicle still at the end of a regular train. But if you were to do that, you would definitely want to marshal that close to the locomotive. And, like Sieglinde said, you'd want to have appropriately designed buffer cars of consistent size and weight so you didn't set up that accordion effect.

MILLAR: Could I just add one word about the routing from the real world situation? That is that the current regulations--I mean, I wasn't trying to imply that somebody deliberately goes through big cities. What I was trying to say is that the current regulations say you're supposed to use the most direct routes. And, when DOE calculates what are the most direct routes, it turns out that they go through a lot of big cities using the interlining highway computer systems that they have at Oak Ridge. I asked the technologist there one time have you ever been asked by DOE to calculate the safest routes? It turns out they have not. That's what they told me just a few months ago.

There has been, in fact, a major study done by the Federal Government about the possibility of rerouting rail shipments to avoid cities. It was done by Ted Glickman many years ago at the Transportation Systems Center and the conclusion of that study is quoted often by the railroad industry as the suggestion that, well, we wouldn't want to have HAZMAT shipments avoid all cities as a blanket national policy because that might be going out on less adequate track and the study does say that. But, the study goes on to say in particular instances there should be a site-by-site, metropolitan area-by-metropolitan area determination of whether it makes sense to avoid cities with some of the most dangerous cargos. As Ted Glickman's study from the early '70s or something like that. As far as I know, there's been no followup in any metropolitan area about the possibility of using rail shipments that avoid a populated area with the most dangerous, hazardous cargos; possibly with the exception of Toronto after the Mississauga chlorine up there that kept 250,000 people out of their homes for a week or two. Whether there's been any in the United States, I don't know. In fact, maybe Bob Fronczak would know if there's been any similar studies. But, I think there's been no followup, a very sensible kind of suggestion, are there some metropolitan areas here you can imagine a rail route that would avoid urban, densely populated risks, at all.

NEUHAUSER: Thank you. A couple of points here. Number one, the rail network in this country is not very dense, especially compared to Europe. That's one of the reasons it's hard to make that comparison. There are few alternatives; in many cases, there's alternatives, definitely still to this day involve lower classes of track. And, another thing that contributes to this is that accident risk is linear function of distance traveled in most cases. So, you go very circuitous routes to get around one thing and simply--the safest, the use of a superlative is asking for something that can't be done. You simply have to show that it's safe by some objective standard. You can't ask for the safest because you can't find one that is, in fact, safest at all times and all circumstances.

ARENDT: Paul?

CRAIG: I'd like to try and stimulate a little bit of conversation on two ranges of numbers that have showed up a lot in the last day and a half; namely, 30 to 35 miles an hour and 60 miles an hour. The question I'd like whoever feels like it to address is the relative merits and demerits of shipping the casks somewhere in the vicinity of 60 miles an hour rather than the 30 or 35 miles an hour?

GUIDA: Thank you. Let me just make two comments on that respect, and then I'll defer to the transportation experts. The reason we ship at 35 miles an hour, the reason we advertise we ship, is not strictly for shipment safety. It is really for the fact that our containers are very expensive, our contents are very precious to us, and so therefore, we'd just as soon not put our equipment at any greater risk and I mean this relatively because I don't think it's of much risk in any event. We would prefer to not put it at any greater risk than we need to. So, we ship at 35 miles an hour not only our spent fuel, our new fuel. Our brand new fuel gets shipped at 35 miles an hour, as well. The fact is, however, that shipping at 35 miles an hour versus at 70, let's say, obviously, as you correctly observed yesterday, that's one quarter of the kinetic energy. What we understood from the interactions we've had with the railroads--and I would again certainly defer to Mr. Fronczak on this--but we understand that setting aside the impact that a lower shipment sees in clogging routes and things of that nature, the likelihood of a derailment is probably reduced by slower speeds. You have less of an accordion effect for heavy containers at the end of a train. You have shorter stopping distances. All the kinds of things that 35 miles an hour brings you translates usually into increased safety aside from the clogging effect and the worry about collisions perhaps, a faster train hitting a slower train.

So, is that fair?

FRONCZAK: I think there's two reasons for 35 miles an hour. I think you stated your case. Our 35 mile an hour speed restriction and it's a recommended practice for our member railroad is based--it goes back 20 some years to the 30 foot drop test and the fact that the casks are tested to 30 miles an hour and the lack of understanding of what that means to railroad accidents. We're taking a critical evaluation of the modal study right now trying to get a better handle on it. I think that the long and the short of it is is that you can--you can always envision some accident however improbable is that could reach a cask. What we need to get a handle on is what the disruption--first of all, that you can deal with that accident if it occurred. And then, once you're satisfied with that, it is how much does it disrupt your business and are you going to go under as a result. Those are the issues that we're trying to deal with right now. Our goal, once again, is track speed with no restrictions on meets or passes.

HALSTEAD: Our focus on cask performance has been sharpened in the last year or so as we've thought about this issue of what the actual operating speeds would be. In the rail arena, you know, we've for a long time supported the original AAR position that there should be a maximum 35 mile an hour speed limit and why you can make good safety arguments for that. You get down to railroad operations for the UP, there's a dispatcher at the Harriman Center in Omaha and he's got to clear trains through these blocks. And, if everything else is moving--I don't think we want these trains moving more than 55 miles an hour which I understand is the top speed of trains who are carrying HAZMAT. So, I personally would be very uncomfortable with it an unlimited speed limit, but at least we're thinking now that we will probably have to be realistic and assume that the train speeds for the last two-thirds of the journey from the east to the west, assuming that they do come to Nevada, are going to be on the UP system operating like key trains. It could be five miles an hour as they clear the blocks.

With truck shipments--and, I don't know, Dwight, whether you guys have re-thought this or, Sieglinde, how you've thought of it as a modeling exercise, but for a long time when the speed limits were low, there was an assumption that the truck speeds would be limited to 55 miles per hour. And, I'd make the same observation now if--you know, I make it my job to drive as many different interstates as many different times as I can just to get that anecdotal observation. And, you know, recently, on a number of occasions, I've been passed by loaded tankers, you know,

1203s and 1075s--for those of you who know your codes, that's gasoline and propane--going in excess of 75 miles per hour. So, one issue is having the spent fuel trucks travel at a speed so that they're not so much slower than the other traffic that they don't cause accidents. And then, the other issue is if there are a lot of rogue truckers out there who aren't afraid of losing their commercial driver's licenses which is, you know--that whole regulatory system has tightened up now. So, that's why I'm surprised that I don't see it reflected. So, I mean, I don't know the--I'm just saying we're having to now re-think our maximum and average speed assumptions that probably the truck shipments will be going 65, and in the east probably the rail shipments will go 55 if that's what's allowed. It may as a policy matter be good to restrict the trucks to 55.

NEUHAUSER: Well, that brings up an excellent point. We've grappled with that especially since what's now--another big difference is that there is big differences between the urban areas--and, by that, I mean real urban areas with high population densities--and lower population density areas outside of the city limits and one way that reduces your urban accident rate or severe accident probability and it increases your upper severities in your rural areas and we agree we have to start reflecting the real speeds that they're likely to be traveling at. We don't know what kind of restrictions are going to start coming down and this is an area where we do need to update from what we had done in the past definitely.

HALSTEAD: One other issue on speed where Fred's concerned about routing. You know--oh, is Fred still here? I have for many years shared Fred's concern about trying to route shipments around urban areas. A big issue for rail has been the abandonment, as Sieglinde--there aren't many rail lines left and I just don't see a lot of alternatives in trying to model this with the rail system to shipping into major transfer points which in Chicago and Kansas City and St. Louis mean you're in big time urban areas. But, I would argue that speed limits, inspections, dedicated trains, administrative--I mean, I would argue this in public--and I'm sure I would not be more popular than the people from the Department or Sandia--that the best we can probably do is to use the highest quality track, highest quality signal systems, and then use administrative controls to address the safety issue.

You know, with a truck, there is some possibility of even staying on the interstate and avoiding the urban area. But, again, as Sieglinde says, that circuitous routing significantly increases your mileage and your shipment time.

And, while I'm glad she qualified it to say that it's linear in most cases because I agree, generally there aren't as many options in routing to avoid highly populated areas as everyone would like. So, we have to live with the system. We've got to figure out how to use administrative controls and risk management measures to make that work.

HANNON: Yes, I'd like to comment. I think I'd underline Bob Fronczak's comment that these are ARR recommendations that their member companies can elect to follow or not. In the latter part of the '80s, the Three Mile Island cleanup, while it wasn't spent fuel, per se, it was very highly--you know, still radioactive rubble and it was being shipped in a container that looked like and walked like and sure would appear to be 125 ton rail casks. East of the Mississippi, it went at the recommended 35 miles an hour. West of the Mississippi, the UP, I assume for operational reasons, chose to run that in the 50 or 55 mile an hour speed range. Bob, I think is coming that way. We would like to have some basis if we were going to require that as a regulation. AS of now, there are not DOT regulations on speed limit for spent fuel. There's an industry practice. I think it's been grandfathered in because of the Navy program that predates all these shipments.

The other one on rail policy and the condition of tracks, FAR can speak for themselves if they choose. But, my understanding is that as a matter of policy, not as a matter of regulation, prior to the shipment of any of the spent fuel that has occurred over the last--oh, since Three Mile Island that there is a critical review of the track conditions, the signaling control, the qualifications of the crew, and so forth. That is a matter of policy. So, whether that becomes a regulatory requirement, we'll have to see. But, right now, I think, it's the responsible thing to do to maintain that current--currently, I believe it's six months if it's an extended campaign of shipment.

JONES: I just wanted to add a condition to Dick Hannon's story on TMI and that is the cask you saw yesterday was used in a number of shipments of--it would probably be regarded as Class C waste from two nuclear power stations and those went out to the U.S. Ecology site at Hanford and they came from the east coast in a similar fashion. They were carried in regular freight and they were moved at the 55, perhaps even 60, mile an hour speed. These have significant quantities of radioactive material in them and the railroads were delighted that they didn't have to treat it, you know, with the 35 mile an hour. So, we're talking about sort of an optics issue, I think, with respect to spent fuel. There's sort of some deep seeded problems from the railroad

perspective perhaps related to the Navy's insistence on the 35 miles an hour.

WONG: Actually, this is for Dwight Shelor and it's in relationship to something that Mr. Halstead said. He said that the DOE must be responsible for the major program decisions and it should not be left up to the RSAs because he saw problems that their activities may be uncoordinated or not necessarily transparent. And, the DOE has seen some challenges in managing the study and construction at Yucca Mountain through its multiple contractors and actually has an M&O to help them manage it. So, I'd like to hear a response as to how you think the DOE is going to coordinate the activity of all the RSAs and the shipment.

SHELOR: I guess, I'll deviate a little bit. In the revised Draft RFP in response to comments that we've received in that area, you will notice that the Department now will retain final approval of the routes. The contractors will essentially be asked to follow the DOT, NRC regulations using highway and interline to come up with a preliminary or a preferred route. We will ask them after our approval to submit that to the NRC for their safeguards and review. We will retain final authority on the approval of the routes, primarily to give the states and interested parties an opportunity to talk to fact.

HALSTEAD: You know, I didn't go, Dr. Wong, into great detail because of the time limit, but the program decisions involve many things that are outside the realm of statute; commitment to maximum use of rail, commitment to use dedicated trains, oldest fuel first and a number of these others, the way that the escort arrangements are made. My argument is that those decisions should not be delegated either to an M&O, although an M&O contractor might make policy recommendations to DOE, and certainly they should not be delegated to be handled differentially in different regions. I'm very much in favor of privatization on the implementation end of transportation. We don't need to see guys with DOE trucks behind the wheel. In fact, if you look in any windshield and you see a DOE hat, you know, on the driver, it might cause more concern than if it's a tri-state motor carrier or some of the people who are, you know, more familiar we know. But, the key program decisions, it seems to me, should be made by DOE and then implemented through contracts. That's a gray area right now. I know that--you know, I don't want to give Dwight--saying, no, he's fully aware of why we think those are--we'll be looking for that new RFP to see how it's dealt with.

ARENDT: I'd like to ask a question and it's going to take a lot longer than we've got time for. So, I think

probably Charlie and Larry and maybe Jim could respond or-- I'm interested in where can we go to determine the merits of quarter-scale testing versus full-scale testing? I'm thinking only of technical. I'm not thinking of any PR or trying to satisfy the stakeholders or what have you. I realize that that's necessary, but I'm interested where can I find a technical evaluation of quarter-scale versus full-scale or defending quarter-scale versus full-scale? I'd just like a short dissertation.

Charlie, do you want to comment?

HAUGHNEY: For me to comment on that subject briefly, quite frankly, I'm at a loss because I find it rather complicated.

ARENDT: Okay.

HAUGHNEY: I don't know of any piece of paper you can go to that's going to discuss that. Maybe, Larry Fischer or some others might be able to. I'll tell you what we found though in a licensing regime. The computer analysis which today is much more sophisticated than it was 25 years ago provides far more information on the dynamic loading and the performance of the materials in the cask. You can spot weak points, ones that are either close to margin or maybe a bit beyond it very easily in the fine mesh of the finite elements that are available today. Incidentally, these can be done on, of course, desktop size machines and we do it routinely.

In licensing, we find that the use of the modern computer systems for the multi-dimensional analysis of dynamic impact loading provides far more information than that that was used 20 or 25 years ago. The meshes are finer. You can locate points where you're close to or beyond the margin for the various limits that may be prescribed by these; I mean, code or some other standards. You can do analysis to show whether or not buckling will occur on the cylinder which is an important criteria. It's particularly amenable to the large, thick, stiff components in a cask whether they're storage or transportation. If you're trying to prove compliance with the regulation for a smaller package like a radiography camera, it's much cheaper and easier to just drop test it in a whole variety of orientations, although analyses could be formed. In fact, the regulations allow you to do analysis testing or some combination and, in fact, it's usually the combination that's used for storage casks; the combination of quarter or half-scale testing in conjunction with a detailed analysis.

I've said that my senior structural staff basically takes the position that if someone wants to do full-scale testing on one of these casks and the practicality is a whole other issue, especially in the United States of America at

this time, but if they want to do it, God bless them. We'll review it in great detail from the test performance plan out through the finish. But, we won't rely just on testing for spent fuel casks. Of crucial interest to us will be the computer analysis because of the amount of information it can get. I won't talk about scaling and all that stuff. It would probably take too much time, but it's a complicated subject, I think.

ARENDT: Larry, do you have any comments?

FISCHER: Yes. I can talk a little bit about scaling. We used to use scaling logs, oh, five or 10 years ago before we had computer codes and so forth which can do the very explicit analysis Charlie talked about where we can see where the weak points are in stresses and so forth. Also, we've got better instrumentation that we put on casks. We no longer do add those tests. We put accelerometers and so forth onto these casks and we also look for deformations and get a lot of correlations when we do these tests. Plus, we've learned how to filter things better at the appropriate cutoff frequencies and so forth. The experience compared to five or 10 years ago is just unbelievable, the strides we've made.

In the past, they limit it to one-half or one-fourth and the reason why is because there was an extrapolation going on and common sense said don't go any less than one-quarter scale. I think you still want to be prudent because when you get down to nuts and bolts and the little things, I don't think it's a good idea to go perhaps below a quarter-scale even though you can model a lot of things with your codes and certainly the one with the large-- the full-scale should be fully analyzed, as Charlie said, and they will be looking at that in a lot of detail, not just the scale model test.

CRAIG: One of the things that I do in my spare time is follow the unclassified version of stockpile stewardship. As you all know, we have a comprehensive test band treaty and the laboratory has bought into that at a very high price to be sure, but they did buy into the test band treaty. One of the places that those had to do that job is Livermore Laboratory. When I was reading Larry's report, my gosh, there is a linkage here that ought to be made. It seems to me that the computer modeling of these systems is pretty trivial in comparison with the modeling of earlier systems. It ought to be possible to do a really super job that should be convincing to a very, very critical public in analyzing things. I must say I no longer see any need for full-scale testing, but I sure see a need for very competent mathematical modeling that is subject to exceedingly intense

review.

Maybe Larry knows; is there cross-coupling between the stockpile modelers and your modelers?

FISCHER: Definitely. It's just we always have older versions.

JONES: Could I make a statement about testing, John?

ARENDT: Yes.

JONES: Very quickly. First of all, you know, there was a time decades ago when one didn't even have to go through any sort of modeling test. Now, I think, it's pretty clear that for spent fuel casks, the combination that Charlie Haughney talked about of analysis--based in analysis supplemented by model testing or even full size compliment testing has worked out very well. I might even refer back to ancient history that Jim McClure talked about where the Sandia program that culminated in the actual crash tests, in fact, the predecessor sequences of that had scale model testing and computer analysis and testing. So, this whole correlation between full-scale and model and reality has been pretty much put together even though that dates back 20 years.

Let me also give you some of a practical spin. Even when one does a scale model test now, the cask is not like your HO train. I mean, this actually is a scale model, whether it be one-quarter or one-half. It's actually a scale model of the cask that simulates those safety features that are of particular interest. It doesn't exactly model every single feature of the cask. If you were try to advance this and look at a full size model, what that really implies is that the design has gone through the entire licensing process, that you've gone through vendor selection, that you're now able to build a complete cask. It kind of changes the whole logistics and the whole sequence and certainly dramatically increases the entire time that it takes in order to get this thing done. I would question whether there's a marginal--whether the marginal increase in knowledge of the behavior of that package is worth the incredible cost and delay in time in gaining that.

So, I guess, I agree with Paul Craig. I think that there are lots of things that you can employ, do employ, and maybe can employ in the America methods arena that would keep you from having to go through full-scale testing.

NEUHAUSER: I'd like to answer that. The importance of getting really, really good data to benchmark your analytical approach with has prompted us to--we have trailer for data collection. It's built to NQA-1 standards and you can rely on your data very, very much and it's used as a benchmark codes that then go on and allow you to do the very high

quality analyses without lots and lots of expensive physical tests. I think this is true of every lab, Livermore, BNFL, Canada, everybody is doing this. This is the way it's being done now.

RESNIKOFF: Mr. Chairman, I'd like to argue for full-scale tests. No one seems to be. The argument I would make is with the WIPP tests that were done, the TRUPAC containers that would ship waste material to WIPP. I realize that those containers are much different than these Type B containers, but they were first subjected to computer tests and then the NRC to their credit required DOE to do actual physical tests. The physical tests actually found things that they didn't find on the computer. Namely, when the did the tests, they found a little grit got into the seal and kept the seal open and that's not something that they actually put into the computer model. So, it didn't come out of the computer model.

Similarly, while I agree with Charlie that the large components can be modeled, it's the small components that are important for what we're trying to do. We're not expecting the side of a cask to actually open up. We're expecting more in a severe accident the seals, the valves, the nuts and bolts of the cask to be of concern. And, it's that, some of those components, that drive me to ask for at least for one cask of the new model--there's a whole new set of casks that are coming out now that differ a lot from the 1970s that drive me to ask for that testing simply to benchmark these computer models.

FISCHER: I disagree. A spent fuel cask is much different than TRUPAC casks. The TRUPAC, first of all, is much smaller in size. It weighs a lot less. It's a lot less expensive. And, also, it's a flexible pipe joint with a closure. Whereas with the spent fuel cask, it is a very stiff, solid joint. The comparison of the two is just completely different, like apples and oranges, actually tomatoes and watermelons perhaps.

HALSTEAD: Well, let me add another argument to it briefly. I'd have to say that while the official position that we have still endorses full-scale testing and I think there's a reason to that, I will tell you on a personal level. My perspective, like many others, is that the improvements in the codes and the improvements in instrumentation certainly address many of the technical concerns that 10 years ago I would have insisted could only be done through full-scale testing.

But, I'd like to take Marvin's argument in a different direction on one side and stay with it on the other with the TRUPAC. I think that the new designs, particularly

the GA-4 and the GA-9, there's some question whether those casks will ever be built. It depends on whether the legislation passes next year and all that. But, where you have great differences in casks' general design, configuration, capacity, materials, there I think there is an argument for full-scale testing; (a) to validate codes, and (b) is the ultimate QA check. On the large rail casks, there's also the issue that there we're scaling up very considerably.

Now, you know, the IF-300 is basically what our rail experience for commercial fuel is and all of the rail designs currently under consideration call for at least a three-fold increase in payload. And, there are differences in, you know, are you going to pour all that gamma shield in a space adjacent to a machine depleted uranium composite shield? So, there are a lot of things that are new. I'm not at all trying to diminish the significance of the procedures that Charlie's people developed for the fabricators and the designers to follow. But, I think that where you have a major difference in the designs, testing is justified. And, I would turn this argument around that because of the improvements in codes and instrumentation, the cost of testing is very reasonable, particularly if we use Yoshimura's target out there. If we have to build a new target somewhere, testing becomes--and, this is not--I don't want to compromise my friendship with--I mean, other than taking it to England as a solution, you know, there aren't a lot of good test facilities. So, the cost of the test facility is a big factor and we once had a proposal to build one at University of Nevada at Reno. You know, it was one of those let's get something out of this program.

Frankly, the environmental issues, as Sieglinde would know, would be hard to site the fire pit at Sandia now somewhere else. You'd have to have a three year EIS project to site a test facility. So, assuming you use an existing test facility and assuming you take advantage of all the advances in the codes and the instrumentation and the high speed video, I think you can do a Cadillac testing job for somewhere between $5 million and $12 million. And, I said I've got have that band because I wouldn't know exactly what the stakeholders would expect, but it's certainly in the range of two to four times the cost of a rail cask. I appreciated Larry saying that my $3 billion total system life cycle transportation cost may be low. I think there's an argument for doing it.

Now, here's the catch. When we formulated our position on testing, we assumed standardization of packages for the system and, in particular, we assumed something like

the high-capacity truck cask with different designs rather than interchangeable baskets for BWR and PWR fuel would be the workhorse truck cask and that something like the MPC would accommodate maybe 70 or 80 percent of what was shipped by rail. Now, the problem is with the general proliferation of designs and the tendency of storage vendors to want to talk about captive shippers, yet particular reactor sites hooked into a transportation overpack conceivably, if Charlie's guys license these canisters for dual purpose, you now have a situation where you might have to do tests on 10 or 12 packages. And, I will agree that that makes it very costly. Why would you consider doing it in spite of all that?

The public that is going to be convinced by this type of testing may or may not be the general public. I have different feelings at different times about how people rationally respond to technical data. Maybe we don't communicate it well. I mean, the problem may be as well with the communicators as the audience. But, certainly, among the public that is likely to halt campaigns through litigation, the state officials, some at least of the environmental groups who are advised presumably by people like Marvin who might respond to this data, I think from the experience and planning for WIPP, there is nothing more compelling than those videos. And, they're boring videos. You know, they're not like the crash tests at Sandia that teenage boys line up to see over and over again. At the information center at Yucca Mountain, JC can tell you. But, you know, boring drop after drop after drop. And then, you know, you clip that out so you don't show the--you just show the drops. And, that's very compelling when you want to backup all of the computer work you've done.

I mean, I don't mean to sound wishy-washy because I think there's a good technical reason where you've got changes in design configuration, materials, payload. But, even if that wasn't of any value, at all, I think it needs to be considered that the public acceptance value of regulatory testing, not demonstration testing--and I'm sorry for taking this much time, but I've been waiting to have this debate for a long time and they haven't invited me back to the American Nuclear Society for a couple of years.

CRAIG: John, can I ask another question?

ARENDT: We're about out of time, and if you can do it in about one minute, yes, but we're going to have to--

CRAIG: Anything in one minute. The problem is related to that of doing--the reason we never did lots of cooling accidents in full-scale reactors, it's just too expensive. I don't know which corner you should drop the cask on in order

to do the definitive test. If you're going to get a good statistical basis, you can't do just one test. I'm all for the PR stuff. I'm all for lots of smaller scale validation, but if you really wanted to know what's likely to happen with a whole set of different angles and so forth, that's simply not accessible to you at the full-scale level.

HALSTEAD: Oh, I completely agree. I completely agree.

ARENDT: Thank you very much. I'm sorry that we're already over. I knew when I raised the question that it would take at least a week, and if we were all in the room together and couldn't get out of it until we resolved this, it just would never get resolved.

I want to thank everyone here. I want to thank you all for your presentations. For the videos that you supplied, they were excellent. I thank you for the time that you have devoted to this subject. We've got to do more. We understand that. What we need to do as a Board is to plan a little bit, determine what do we do next, and we have to determine priorities as to what's the most important in the transportation of spent fuel.

With that, we will get to our public comment. Mary Olson, since I neglected to or overlooked you or whatever yesterday, I will let you go first. Mary is from the Nuclear Information & Resource Service.

OLSON: Thank you. I am Mary Olson with Nuclear Information & Resource Service. I want to mention that we are an organization that works with concerned citizens nationwide. We have vocal organizations active in all 50 states on nuclear related issues. I can tell you that the transportation issue is something that is bringing many more people to want to know about our work and the information that we have which is partly to network them to entities such as the Board for the kind of technical information that you provide. So, I want to acknowledge and appreciate your technical position, but go ahead and make some comments that go across the full range of what we're been hearing for the last day. I will try and keep it brief, but I have a series of things to say.

The first is that we are deeply concerned by the tendency and multiple fronts upon which we see transportation analysis and evaluation being clicked and reduced in terms of public participation and public input. Specifically, the ways in which the Yucca Mountain Environmental Impact Statement have been started, stopped, tabled, possibly changed by pending legislation. I'd like to remind the room that the legislation has not actually changed. So, we're under currently today a law which does not yet assume that this transportation is actually going to happen, at all. So,

keeping that question open, we believe it's vitally important that the public be involved and have a voice in the process.

A second place where this is occurring is the Department of Energy's own move to drop the current siting criteria. The current siting criteria for Yucca Mountain requires that transportation and socioeconomic impacts be analyzed. Under the alternative proposal that's been put forward by the Department, those issues drop out completely under that front. And, of course, the proposals that are pending on Capitol Hill would preclude any participation by the public, at all, in the transportation issue until we have already designated Yucca Mountain as the site.

So, I'm here to say, no, this has not happened; yes, it does need to happen; and, no, quite frankly, I wish the Navy experience was representative and that we were only moving a relatively small amount of this radiated material and a relatively small number of shipments in highly engineered containers that they are capable of, but I don't see that experience or that analysis as representative of what we're facing here nor do the people I work with.

Now, I want to just briefly that it is a natural human tendency when doing an analysis, especially from a technical point of view, to be faced with a "problem" and then try and explain that problem away. I would like to encourage the Board and all others in this room to hear that that really does not help in what lies ahead, a very, very difficult tradeoff decision by different communities across the country in dealing with a problem that we all share. The radiated fuel is a problem we all share when you have statements come out like the original EA on Yucca Mountain stating that there is no significant radiological impact from the transportation of the radiated fuel to a centralized repository.

I was in the system architecture sessions that the Department of Energy ran under Mr. Shelor's shop for a number of days. This would have been like '94, I guess. And, hearing day after day about the projections of different aspects of the program and in the transportation section about the different accident scenarios. I had to go up and ask the DOE staff how the worst case scenario which does involve, you know, radioactivity leaving the accident site and contaminating civilians--and we all know that conditions depends on how far that goes, but you've got people who are deeply affected--how that stacks with that broad statement that there's no significant radiological impact and was informed that it is standard policy to average the local consequences across the entire U.S. population when you're doing a large analysis. Okay. We're past the large analysis

point. What I'm trying to say here is that you don't serve the whole process when language is used to mask the kind of information that we're getting here which is non-trivial. We talked about 8 curies as a release. That is non-trivial in terms of doses to people who are in the area.

So, what I'm calling for and I think will help with the public is an acknowledgement that it does help to talk about the consequences only. But, not just to do that in an isolated instance, but also when the information is being presented to policy makers and to concerned citizens.

Having said that, I want to say I appreciate that yesterday I heard concern expressed over routine exposures. That's one of our key concerns is the ongoing 10 milligrams per hour at the surface--or 100 milligrams per hours at the surface, 10 milligrams at two meters. That is a real concern for me. When we talk about health affects, we tend to only report fatal cancers, and yet we say we have a no threshold philosophy about radiation. Well, I'm sorry, fatal cancer is a very high threshold. We have to start talking about the other non-cancer health effects that this kind of ongoing exposure to the population is going to result in.

So, bringing that up, bringing up the environmental justice questions of who are the 50 million people that Department of Energy cites live within a half mile on either side of the transportation routes, are those 50 million people representative of the general public? If not, what are the factors for considering those social equity issues along with the technical and safety issues of the transportation.

And, finally, I liked hearing that there's concern these days about cumulative impacts because we are talking about decades. And, if there are indeed license extensions or new reactors which are being contemplated, we're not just talking about decades, we're talking about a fixture in our society.

So, I'm bringing these up, but in the spirit that they not be attacked to dismiss away, but in the spirit that they be examined and brought forward as part of the complexity of decision making. The fact is we haven't made these decisions yet.

Another thing that I really appreciated was hearing from a professional of fuel that if, in fact, the law is going to change and we are going to have an answer to where is this material going that we are behind in that process. So, today, we don't have that answer, but if the law changes, suddenly we do. From our perspective at the local community level, we agree there is very little time allowed in the legislation pending on the Hill which is one of the reasons

that people at all levels in communities including City Councils are opposing the legislations.

So, I'm going to keep this very brief, but I just wanted to state that arbitrary deadlines and schedules that don't permit resolving this very rich discussion that was just had on physical testing, I can tell you right now the public understands the value of high technology, but I think we also have a basic disposition to like to pay attention to data, real world data, things that have actually occurred. So, to move forward with a whole generation of casks that have never undergone any type of full-scale physical testing, I believe, will be a real mistake.

And, finally, I just want to mention that when Daniel Dreyfus was the director of the Office of Civilian Radioactive Waste Management, he did not take a position on physical testing, but to his credit, he was willing to put it on the agenda of the Department. I have not seen the Department move forward in regard to that question.

ARENDT: Mary, we're going to have to conclude. We're limited to five minutes.

OLSON: Okay. All right. I'm done.

ARENDT: And, we will take your full--

OLSON: One last little comment as I walk away is we're only halfway through the generation of this fuel and there's serious proposals for putting MOX fuel into our reactors. I think the Board needs to ask the questions about how would that change the irradiated fuel system.

Thank you.

ARENDT: Russell di Bartolo from Clark County? I remind you all we're trying to limit this. We've got about five or six more and we want to just limit it for five minutes and we will take your complete report.

DI BARTOLO: I promise to stay within the time limit. I passed out a map to you. We, too, in Clark County have a wonderful GIS that provides us with geographical analysis and so on. I have come with literally a hand annotated map, but I think it will provide you with the information that you need.

With all due respect to my colleagues and friends and experts on the panel, I would like to see the next session on transportation consist of a panel of local government decision makers, Tribal decision makers, others in the community who have a very different perspective, at least presenting perspective, but very similar values and requirements with regard to public safety and health, using such experts, as consultants or contractors may be sitting behind. This is the consensus conferencing model that is used in Denmark and some of the European countries as

citizens and the public consider technical issues. I would hope that this would be considered very much by this group.

Secondly, with regard to data and data assumptions, there's been a very good report that is presently--it's either just been released or will be released very shortly by Bentz (phonetic) & Associates, a consultant to Department of Energy, especially with regard to the waste management PDIS. It talks about data management, data assumptions which may lead to commonality of data and management of such information.

Also, at the Nevada Test Site, there's a center now for excellence. They have responded to local government concerns with regard to numbers of shipments and types of shipments through particular areas to the Test Site by presenting a quarterly data report that includes that information which we have asked for which include numbers of shipments, source terms, emergency response requirements, etcetera, etcetera. So, I would recommend that this group look at those reports.

What we have here, I think, and I think Ms. Olson referred to that, as did Board Member Christensen, is that we have sort of a town down rift here. We have a number of technical experts who do wonderful and very valuable work. However, in the translation, there is much loss. The fact is that routing agencies in the state with consultation with local governments and Tribes and so on, they have certain understandings of certain information and they look very carefully at immediate public safety concerns. Whereas, the models that are used look at the future health effects, primarily. At least, the emphasis appears to be there in the eyes of local government decision makers. So, there's immediacy versus the long-range effect; sort of a separation.

In the past, the models have emphasized probabilities where we looked at absolute. An accident in the Las Vegas area that in addition to being the fastest growing area in the country with now over 1.2 million residents, also has at any one time between 200,000 and 300,000 visitors daily in the area. Under present regulation, some of this, much of this, or even all of the truck shipments would come within one mile of that non-resident population and through the center of the resident population. So, we think very much about just one accident and what effect that may have on our economy, let alone our public safety aspects.

You will find that local governments and Tribes and States are very rasonable when the Department of Energy policy allows for very meaningful negotiation. As a matter of example in the WIPP program, there was an agreement that

is--I'm not sure if it's been reached or it's presently under final negotiation whereby the Sate of California will allow use of a route that comes straight south from the Nevada Test Site in route to WIPP to connect up with an interstate only under certain conditions, some of which have to do with the constraints on time, the duration of the shipment campaign, seasonal constraints, emergency response requirements, and so on. This, in fact, helps avoid the Las Vegas area and has proved to be very valuable.

Just a couple of more things. One is that under the spirit of cooperation and negotiation between local governments, State, Department of Energy, and Nevada Test Site, the emergency management division has just completed in cooperation with these agencies I mentioned, a feasibility study for intermodal transport that would bring low-level waste from Fernald (phonetic)--we're using Fernald as a case study--to Caliente, the handwritten entry into my map, and then by legal weight truck around the northern and western parts of the Test Site for final disposal at the Test Site. Here, they looked at some very different criteria for making comparisons among the possible intermodal transfer sites and associated routes. They looked at the cost of the program. They looked at public safety, feasibility of a potential site, and public acceptance. Public acceptance, in fact, becomes then a way to use this aspect of risk perception, the P word which DOE does not use in its EISs, because the local officials have their thumbs and their arms around the feelings of their communities. We find that there's some communities who want this, who see it as a way for economic development. And, what we are finding now, this has provided a very good basis for an environment assessment that will be done by the Department of Energy with the possible result of having a publicly acceptable and safe and cost-effective transport system that would take a number of shipments, almost 1,000 shipments a year, from going over Hoover Dam, a two-lane highway, at about 10 miles an hour, that attracts a number of people into the rural areas with excellent administrative control.

I would also like to refer to one last thing, the TEC working group. The Transportation External Coordination working group is now working in a subcommittee on a routing paper that will put in the prospectives of State, local governments, the Department of Energy, Tribes, and others with regard to the routing question for spent nuclear fuel. We will be discussing that even further in January's meeting.

Thank you.

ARENDT: Jack Edlow, Edlow International.

EDLOW: Thank you very much.

Unfortunately, I come here today as somebody who has a lot of experience in shipping nuclear fuel. My company is involved in shipping fuel and has been for 40 years. We ship everything in the nuclear fuel cycle from uranium ore concentrate through and including spent fuel. In the last 60 days, we have made three spent fuel movements in the United States, two of commercial fuel, one of foreign research reactor fuel, a total of nine casks. In the last 12 months, we have moved approximately 6,000 truckload equivalents of radioactive materials in, out, and through the United Sates. So, we have some amount of experience in this.

Personally, I've been involved in this business for about 28 years. Although I did attend my first spent fuel shipment at the age of 14 in 1963 when my father managed a shipment that came through the Port of Savannah at that time. Now, I say it's unfortunate that I come here with this experience today because I'm trying to observe here as a member of the public. You see, I'm not at the table with the rest of you. So, I'm trying to be a member of the public here. So, I want to make a couple of comments to you based on some public perspective, rather than my potential technical experience here, as well.

The two points I want to make is, first of all, there's nothing new that you all are discussing here today. This is something that obviously has been going on for a long time, both in the commercial program and in the Navy program in this country and around the world. Shipments of radioactive material have been going on, the fuel cycle continues, and will continue to go on. And, all of your discussion and all of your concepts about this is about something that is already happening. So, you have to understand that there's a system in place already, a regulatory system of Department of Transportation, Nuclear Regulatory Commission, and internationally other bodies, as well, who already understand this process, have analyzed it, have promulgated regulations, security, and will continue with this. And, what you're talking about is scaling up this process from relatively small numbers, some thousands of shipments in the context of an overall hazardous material scheme to a little bit more, to some hundreds of shipments a year, maybe going to 1,000 shipments a year potentially, but I think unlikely that it would even get that high. In the context of overall transportation system, negligible. It can be done easily within the contest of existing regulation.

To talk about worrying about routing of shipments to a place that you don't even know where it will be or speeds of equipment that haven't even been designed yet, to me as a member of the public is preposterous at this point.

Let's get on with the basic policy of what's going to happen and how it's going to happen, where it's going to go, and then we can worry about some of these technical details within the context of the regulatory system that already exists.

The only other point I want to make and this may be extremely controversial and that's okay. I have never ducked from this in the past. The public does have a right to know what's going on; absolutely. But, the public's right has been delegated through the Governmental process, through agencies like the NRC and the DOT. These are the representatives of the public through their Congressional representatives and through their Executive Branch. The public is not asked whether the B-52s should go to Iraq and the public is not asked whether a chlorine shipment should come down a road. The public does not need to be asked whether the routing through Clark County is adequate or not. This has been delegated through the regulatory agencies.

Thank you very much.

ARENDT: Thank you, Jack.

Our next commenter was Chris Cordner from the Electric Power Alert, Associate Editor.

CORDNER: It's going to be a few questions and I'll be off. What I wanted to do was ask a few questions to the members of the panel who are from NRC, DOE, and DOT specifically, but if any of you would like to add, that would be wonderful.

What I wanted to ask questions about today is the Presidential Commission report that they produced recently on critical infrastructure which they had a transportation section which I hope you're all aware of where they discussed DOT's inability to prevent terrorism and sabotage or I guess inability, so far. The questions I wanted to pose to you was what do you think of this report? Is there any significance to this nuclear waste storage and transport debate in the context of that report? Then, secondly, given the report's findings that DOT is a little sketchy on its ability to protect, can you be confident as the NRC person was yesterday that sabotage and terrorism is a relatively minor problem at this point or in the future?

ARENDT: Thank you.

Alex Thrower with the Urban Energy & Transporting Corporation, Project Manager?

THROWER: Good morning. My name is Alex Thrower and I'm with UETC here in Washington, D.C. We're a small non-profit representing the interests of Government officials that are interested in hazardous materials transportation and particularly in the transportation that DOE undertakes. My

ears perked up a minute ago when Bart mentioned the need to have local officials to provide their perspectives to the Board. If that's what--if you're interested in having that, I'll certainly be happy to talk with any of the members of your staff. We've got quite a list of very interested local officials who would be more than happy to come and give you their perspectives on these kinds of issues.

The only other thing that I wanted to say was to briefly touch on the issue that's come up a couple of times the last couple of days and that's the issue of emergency preparedness for local officials and State officials, as well. Bart mentioned the routing work that the TEC working group has been undertaking. My organization is the convening organization for TEC, although we get support for bringing that group together from the Department of Energy.

In addition to looking at routing issues, we also have a subcommittee that looks at training and equipment issues that are applied to a couple of different contexts. One is the requirement under Nuclear Waste Policy Act to provide technical assistance for civilian waste shipments. But, also, more generally, it tries to answer the questions of what is the appropriate level of training and response for the kinds of things that DOE is doing now and how do you integrate that into hazardous waste emergency preparedness both at fixed facilities and for the whole universe of other things around the nation's highways.

I guess, you know, I don't want to put words in anybody's mouth, but I've kind of heard an unspoken assumption here that there is a defined and agreed-upon level of preparedness awareness that everybody seems to think is necessary. I think there's probably no disagreement that awareness level training and information is a very reasonable thing for people along the routes to have. But, the experience has been in the TEC working group--and these people are composed of experts from industry and labor organizations and there's quite a few people here today who have been to some of our meetings--that's where the agreement kind of ends.

I think, there are different levels of what people think as far as how you go beyond that. There are a number of people that say we need to go ahead and spend the money. We need to allocate more funds and get local officials and State officials to have absolute best in response and detection equipment. On the other side of the spectrum are some people who are quite strident and they are State and local officials who have said, quite frankly, that it's much better to respond to an incident without this kind of detection equipment than it is to have the equipment and not

respond.

In other words, considering the high turnover rate for local officials who may be expected to be able to calibrate this kind of equipment and to take care of it, you've got a potentially horrifying scenario where you have got a traffic accident where somebody is hurt and for whatever reason, either lack of information or just something hasn't been properly calibrated or cared for, there's a perception there's radiation risk and somebody actually dies from routine injuries because there was this, you know, possibly an oversupply of information. That's just one thing I'd like to leave you all with.

I think we could agree that maybe more funding for DOT training programs and the other training programs is appropriate, but even if the programs were a wash in money, we've still got these other issues that DOE and the rest of the affected communities are working out.

Thank you.

ARENDT: Thank you.

Dave Elias?

ELIAS: Like Mr. Edlow, I, too, have a lot of experience through the years. I'm experienced in bringing together a large amounts of technical resources, financial resources, and people resources to accomplish various ends. I've been project engineer for the last four nuclear power plants built by ConEd, my current employer, and was responsible for the startup of the last three of those plants. My current role is director and executive engineer for high-level waste. I'd like to provide some information to the Board relative to some questions that have been asked over the past two days.

One of the questions had to do with the production rate of transportable overpacks. As many of you probably know, ConED was first or amongst the first to commit to the new breed of dual purpose storable and transportable spent fuel storage systems. We committed to the Holtec International system. Those systems will be produced by U.S. Tool & Dye. In recent conversations with the president of that corporation, he's assured me that he will have a production rate of about one per week for the transportable overpacks. They are currently building a production line in a facility that's about three football fields long and they intend to be able to provide one transportable overpack per week.

We at ConEd will need for all of our spent nuclear fuel if it's all put in dry storage about 1,000 canisters, large number of storage only overpacks, and then a more limited number of storage and transportable overpacks. So, it is happening. These systems are being built. The system

has not been licensed yet and a lot of this is happening in parallel on the basis that the system will eventually be licensed by the Nuclear Regulatory Commission.

There was some comments about utility interest and the quality of these systems and I'd like to just indicate to the Board that we at Con Ed indeed do have interest in the quality of these systems. We understand the entire industry needs to assure quality of the systems. We've embarked on a number of initiatives which we are sharing with utilities around the country. One of those initiatives is--and I believe it's unique to the spent nuclear fuel storage and transportation area--is quality functional deployment. We have put a significant amount of resources into further improving the quality of the efforts of both Holtec International and U.S. Tool & Dye with respect to the design and manufacturing of these systems. We are sharing that with the rest of the industry.

Another thing that we're doing is we're fabricating a prototype. It's a full scale prototype. It's not to be drop tested, but it will help us to wring out the fabrication processes and to improve the quality of the hardware that will eventually be coming off the assembly line. A significant amount of money has been allocated to this, both our own and the money of Holtec International. That prototype is scheduled to be fabricated in the early part of 1998.

We also have formed a utility advisory board to Holtec International. I chair that board. We had our sixth meeting about a month ago and there were over utility representatives present at that particular meeting. That board is open to all the utilities and the numbers of utilities participating in the board have increased. We offer in aggressive fashion advice and counsel to Holtec International. And, also, we have formed the fabrication oversight committee and, to date, 10 utilities have committed to me to participate in that fabrication oversight committee and we will monitor the fabrication of this prototype that's being built at U.S. Tool & Dye.

So, things are happening. Hardware is being built. I would like to offer to Dr. Resnikoff, if you have concerns with respect to a full scale prototype like grid underseals or some other things you uncover in your studies, I'll provide you with my card. I'd like to hear about them and perhaps we can work some of that into a prototype program. The prototype will not be used to store spent nuclear fuel. It will be used to wring out the fabrication processes. It will be used to improve our handling at the sites, to educate the people at the sites who will have to work with the spent

nuclear fuel systems, and it will probably be lent to other utilities so that they, too, can learn. So, all this experience is planned to be shared.

And, I guess, I would like to say one thing with respect to one of the Board members reached a conclusion with respect to strategies and what strategy the utilities will follow in terms of shipping spent nuclear fuel. We have 30 nuclear reactors at ConEd. As I said, we'll have 1,000 of these canisters. We will have a fleet of shipping overpacks and storage overpacks. Believe me, as we discuss the various strategies available to us in terms of how we will eventually ship spent nuclear fuel to wherever, it's a very complicated process. We represent about 12 to 15 percent of the installed nuclear capacity in the United States. And, you extrapolate that to the entire nuclear industry in the U.S. and it becomes a very complicated problem and there's no easy solution or one solution to the strategy we'll be pursuing.

Thank you.

ARENDT: Thank you very much.

Is there anybody here that has signed the register to comment to make sure I don't overlook anybody? If you have, raise your hand?

(No response.)

ARENDT: I guess there isn't and again I want to thank everyone for coming, for the time that you put in in preparation for the meeting. I think it's been very useful. We've gotten a lot of information that we need to digest and there will be additional panel meetings at some time in the future.

If you have any comments to people here around the table that you'd like for the Board to have, send them to Woody Chu at the Board office and he'll see that everybody involved will get them.

Thanks again.

(Whereupon, at 12:10 p.m., the meeting was adjourned.)