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NUCLEAR WASTE TECHNICAL REVIEW BOARD

TRANSPORTATION & SYSTEMS PANEL
PUBLIC HEARING

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BOARD MEMBERS PRESENT

Dr. Dennis L. Price, Chair
Dr. Melvin W. Carter
Dr. Sherwood C. Chu

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P R O C E E D I N G S

9:00 a.m.

DR. DENNIS PRICE: Good morning and welcome. This is the second public hearing of the Transportation & Systems Panel of the Nuclear Waste Technical Review Board. The Board is an independent organization established by the Nuclear Waste Policy Amendments Act of 1987 to evaluate the scientific and technical validity of activities undertaken by the Department of Energy in its nuclear waste disposal program. The charge to the Board is broad; however, the Act specifically directs the Board to evaluate those activities relating to the packaging and transportation of high-level radioactive waste and spent nuclear fuel.

To facilitate the Board's analysis, the Board has organized itself into a number of panels to which specific technical subjects are assigned. "Transportation" belongs to the Transportation & Systems Panel. I am Dennis Price; I am the Chair of the Transportation & Systems Panel. I am a professor of industrial and systems engineering at the Virginia Polytechnic Institute and State University. I am also the director of the Safety Projects Office and the university's graduate industrial safety engineering program. Two other members of the panel are Dr. Melvin Carter, on my left, and Dr. Ellis Verink. Dr. Carter is the Neely Professor Emeritus in Nuclear Engineering and Health Physics at the

Georgia Institute of Technology. He is an international consultant in radiation protection and an expert on a broad range of issues related to radioactive waste management. Dr. Verink, who cannot be with us today due to a conflict, is a Distinguished Service Professor of Metallurgy and former chairman of the Materials Science and Engineering Department at the University of Florida. Dr. Verink brings to the Board extensive experience in materials selection and corrosion. All of us serve on the Board on a part-time basis.

In carrying out its work, the panel has been reviewing work done in the transportation field. We have had discussions with the Department of Energy and the Nuclear Regulatory Commission. To date, we have identified several issues that we intend to pursue during the next few years. We presented these issues, along with recommendations, to the Board in late 1989. The Board adopted the panel's recommendations and incorporated them into the Board's First Report to the Congress and the Secretary of Energy published in March 1990. Two of the recommendations pertain to incorporating the technical disciplines of system safety and human factors engineering into the DOE's safety management processes. These disciplines provide useful tools to predict and anticipate hazards and to minimize human error as a contributor to accidents. Other recommendations pertain to issues in risk assessment and risk management. These issues

were selected in part because of the opportunity that exists to incorporate these disciplines into the DOE's plans for the transportation system and management processes while the plans are still in their early stages. The panel also intends to assess other issues that are important to the safety of transportation operations, such as routing, emergency preparedness, and inspection and enforcement. I would like to note here that the Board will be releasing its second report to Congress and the Secretary of Energy by the end of this month.

In addition to reviewing ongoing work, the panel wants to solicit information from the public. We have begun holding public hearings in selected parts of the country to obtain the views of those who are interested in issues relating to the safety of waste transport activities. The transportation and Systems Panel held its first public hearing in Amargosa Valley, Nevada, on August 17, 1990. The Board's Environment & Public Health Panel, chaired by Dr. Carter, held its first public hearing last month at the Peppermill Hotel, to solicit comments from the public on environment and public health and safety issues related to the nuclear waste disposal program. Today we may have some witnesses present who participated in that hearing as well as the hearing in Amargosa.

The Transportation and Systems Panel hearing will be

divided into two parts. First, we will hear from witnesses who have prepared and submitted testimony to us in advance. Copies of their prepared testimony are available here for you to take. A time limit has been placed on the prepared remarks to accommodate everyone and to allow for questions from members of the panel at the end of each presentation.

We are also providing an opportunity for those who were unable to schedule presentations in advance to testify here at the conclusion of the formal presentations. You may register for a five-minute presentation. The time slots are given out on a first-come, first-served basis. If you are interested please fill out a walk-in testimony request form and return it to the registration table. Your name will be called in the order it is received.

A verbatim transcript is being made of the hearings. It will include submitted texts, delivered remarks, and dialogue with the panel members. The transcript will be available about the middle of December, for review by any members of the public in our library in Arlington, Virginia, or on a library-loan basis.

Finally, we also have made provisions for written submissions. If you wish to testify in this manner, please send your material to us by November 30, 1990. Address it to Dr. Dennis L. Price, Chair, Transportation & Systems Panel, Nuclear Waste Technical Review Board, 1100 Wilson Boulevard,

Suite 910, Arlington, Virginia 22209.

On behalf of the Transportation & Systems Panel, I would like to welcome you and thank you for coming. We are looking forward to your presentations.

Our first presentation on the scheduled testimony will come from Mr. Brad Mettam, Program Director, Esmeralda County, Goldfield, Nevada. Mr. Mettam.

MR. BRAD METTAM: Good morning. My name is Brad Mettam, representing Esmeralda County. Esmeralda County may be the least populous county in Nevada, but it is also very close to the proposed nuclear waste repository. Although we have only 1350 people, scattered over nearly 3,600 square miles, our concern for our residence is just as great as that of the most heavily populated city or county in the country.

To tell you a little bit about myself, I have been a volunteer fire fighter for approximately twelve years, the last seven as chief of one of the three local fire departments in Esmeralda County. I'm a Nevada EMT, and serve on the local ambulance service. I've also been employed by the county for the last six years as head of the capital projects department, handling construction, repair and maintenance of county facilities. As Esmeralda County is, understandably, rather light on staff; I am also the county safety officer, and fill in on request as the planning department. When the Board of County Commissioners became concerned about the Yucca Mountain

Repository Program and wanted someone to represent the county, I was volunteered.

Esmeralda County has not been designated "affected" by DOE, for reasons which are unclear. We have challenged this in court, and are currently awaiting a ruling from the Ninth Circuit Court of Appeals. We have been unable to postulate any criteria which, applied fairly, would include Clark and Lincoln Counties yet exclude Esmeralda County; so we are anticipating a favorable ruling from the court. Until that happens our participation has been limited to some oversight and review, funded through the State of Nevada's Nuclear Waste Project Office.

Our program has focused on the issues that this panel is reviewing; those directly related to transportation to the proposed repository. We feel it is extremely likely that whatever materials are shipped by truck for storage at the repository will travel south on US 95, passing through the center of the town of Goldfield, our county seat. The Nevada Department of Transportation is in the process of finalizing state selected routes for the transport of route controlled quantities of radioactive materials. They have proposed two possible routes from the east coast that will ultimately provide access to the proposed Yucca Mountain site. One of these passes through Clark County, the center of the state's tourism economy, where two-thirds of the state's population

resides. The other is the one which passes through Goldfield.

Even though the only critical curve designated on any of the routes examined is in the center of Goldfield, we expect that the route through Esmeralda County will be selected when the final decision is rendered in early 1991.

The factors that were used to select alternate routes included as a primary goal the avoidance of population, which I think everyone agrees is a worthwhile objective. It must be clearly understood, however, that while the avoidance of populated areas reduces the public's exposure, it also means avoiding the areas that have the capabilities to respond to an incident. For example, the town of Goldfield is protected by a ten man volunteer fire department, which is not trained or equipped to respond to an incident involving radioactive materials. In addition, the Fire Department does not respond outside the town limits, leaving any emergency response to the sheriff's department and the ambulance service, neither of which are trained, equipped or staffed to respond to a radiological incident. Another factor that must be considered is that an incident on US 95 may effectively separate the responders from emergency facilities such as hospitals, as in most areas that highway is the only means of north-south travel.

Finally, it must be recognized that there is a difference between transporting through a rural area and

through an urban area, both in the degree of exposure and in the perception of risk by the community. A shipment through an urban area will generally travel on the highway, separated from the homes and everyday lives of most of the population. When that same shipment travels through a rural area, it may still stay on the highway but now that highway is also the main street of the town. Children will cross that street on the way to school. Many of the homes and businesses front onto that street. That same highway may be, and in the case of Goldfield is, the only way in or out of the community.

For all of these reasons it would seem logical to look at rail as a transport option. Rail access to the proposed repository could greatly reduce, though not eliminate, highway shipments. This would not get Esmeralda County off the hook, however, as two of the three routes proposed by DOE for further study pass through Esmeralda County. In my own opinion, while rail is the preferred transport option, it is becoming less and less likely for several reasons. First, rail routes would be most effective when combined with an MRS, a concept that is still uncertain of success. Secondly, DOE is not planning to finalize the decision on rail transport until the Environmental Impact Statement is issued on the repository. This doesn't seem to allow for sufficient lead time for planning and constructing an extensive rail spur. We understand that DOE is not

planning on producing a separate EIS on the rail spur construction, which we would consider necessary for such a major federal action. This too, would increase the lead time needed. Thirdly, land use options will become more restricted the longer DOE takes to review their options. We understand that DOE may have already lost the "Mina" option, because of right of way restrictions across an indian reservation that exclude the transport of nuclear waste. And finally, DOE's experience at WIPP, where the rail option was abandoned in favor of road transport, leads us to suspect that they are not really serious about rail transport at Yucca Mountain.

We have several concerns regarding DOE's program-wide approach, one of which the Nuclear Waste Technical Review Board has already noted: DOE's failure to plan for human factor effects. The lack of human factor consideration in DOE's work leads me to distrust the risk assessments and worst case scenarios done by DOE. Assumption of perfect cask performance and dismissal of catastrophic accidents as "not credible" raises doubts of the real world accuracy of DOE predictions. I am certainly not qualified to discuss the technical issues involved, but as an emergency responder, I would consider any plans that do not take into account human errors and human actions as less than credible. A majority of our response calls are to incidents caused by well meaning people doing things that, in retrospect, seem rather

improbable. The woman who drives off the highway because she doesn't want to spill her coffee; or the man who fails to account for the wind when burning weeds. These are everyday occurrences in the real world, and anyone who thinks that Quality Assurance/Quality Control "paper trails" and administrative controls are the solution is just not planning for the real world.

There seems to be a pervasive institutional attitude in DOE that the transportation of radioactive materials will be safe, and much of DOE's efforts appear to be aimed at easing the fears of the unenlightened without really addressing the issues. To illustrate the point, I would like to tell you of a conversation I had with one of the DOE subcontractor employees, at a DOE repository update meeting. We were discussing vehicle escorts, and he was telling me about the concept of in-vehicle escorts. The theory is that one man is driving and the other is the "escort". When I asked him about layover locations, he told me that they would not be needed, as one would relieve the other at driving. He honestly didn't understand my dismay at discovering that the "escort" would be spending his time in a sleeper, escorting unconsciously. In DOE's terms, it is acceptable to redefine the term "escort" to mean "relief driver", if that makes the process more palatable. I am reminded of the quote from Will Rogers: "It ain't what you don't know that will hurt you,

it's what you do know that ain't so."

We in Esmeralda County are concerned that the impacts of siting a repository will fall more heavily on rural areas, where a small effect can have a relatively large impact. We feel that routing choices should consider not only the size of the populations at risk, but also the extent of exposure of those populations. Rural populations are more at risk, because they have less protection in the form of well engineered highways and well prepared emergency responders.

We welcome the Nuclear Waste Technical Review Board's interest in this area, and hope you will consider the transportation impacts on rural communities. I appreciate the opportunity to address this panel, and will be happy to answer any questions you may have. Thank you.

DR. PRICE: Thank you.

DR. MELVIN CARTER: Well, thank you very much. I might say to begin with, I think that all of us are very pleased to be back in the State of Nevada and particularly Reno at this delightful time of year.

I'd like to ask you a couple of questions and make several comments. One, of course, Esmeralda County as well as Inyo County have filed an appeal as far as the affected county status. Now, are both of those tied together in the same case?

MR. METTAM: Yes. They were consolidated into a single

case.

DR. CARTER: When do you anticipate that the court will make a ruling, or do you have any insight into that?

MR. METTAM: Well, it's hard to judge when the court will rule. I expect an answer sometime in the first quarter of this coming year.

DR. CARTER: Okay. Thank you, sir.

The other question I noticed that, I guess by the regress, I guess of the Nevada Nuclear Waste Project Office, that they do make some funding, and I presume that funding would be rather limited, available to your county to do this sort of activity?

MR. METTAM: That's correct. We receive enough funding to do some general oversight things, basically to pay my way back and forth. However, we haven't really been able to do any direct work in Esmeralda County. Esmeralda County was left out--after the Section 175 report, Esmeralda County got dropped out of a lot of DOE's work. So there is not comparable data from Esmeralda County to work with.

DR. CARTER: Okay. The other thing, I wonder if you would explain to us how Esmeralda County now deals with medical emergencies, highway accidents and this sort of thing?

Are there medical facilities in the local area or do these people have to be moved, for example either to Tonopah, Indian Springs, perhaps Mercury or even Las Vegas?

MR. METTAM: The closest medical facility is in Tonopah, Nye County Regional Medical Center.

DR. CARTER: And how far is that?

MR. METTAM: From the town of Goldfield, it is approximately 30 miles. We respond to there from Goldfield and Silver Peak and the area that I am in, we actually take them to Bishop, California.

From Tonopah, if it is a serious medical condition, though they will use Flight for Life and fly them out.

DR. CARTER: Helicopter or some other way?

MR. METTAM: A fixed wing on that one.

DR. CARTER: All right. Very good. That's helpful.

Now the other thing I wondered, you mentioned the fact that the Mina option may have already been lost by DOE activities. I wonder if you would go a little bit more into the background of that, and describe for some of us, or some distance away, the location of Mina and so forth. I've got a pretty good idea since I lived in Nevada, but I suspect many people might not have.

MR. METTAM: Well, Mina is south of Hawthorne, and one of the DOE routes would be a rail line--an existing spur that currently leads to Hawthorne. And at the time of the start of the investigation led through there to Mina. The spur from Hawthorne to Mina has since been closed, but north of Hawthorne, that rail line runs through an Indian reservation.

And the best of my understanding, although I haven't seen any documentation on it is, that when the right of way for that was transferred, there was a restriction put on by the indian community, that it not be used for the transport of nuclear waste. And that's one of the reasons DOE has given for not using that option.

DR. CARTER: The other thing is just a couple of comments or observations. I think the quote you have from Will Rogers is just as accurate and true today as it was when it was proffered by Mr. Rogers many years ago.

And the other thing, of course, in the transportation area, there are indeed some trade-offs between numbers of people or density of population that you observed.

And the fact that in rural areas even though you are sparsely populated, certainly in general, the engineered highways and appurtenances and things that goes with those as well as the availability, not only of emergency responders but equipment and trained personnel are usually either lacking or certainly not on the same level as you normally would find in urban areas. So I think those are very sage observations.

That's all I have, Mr. Chairman.

DR. SHERWOOD CHU: Yes. I would like to follow-up on Dr. Carter's last point that in evaluating the relative safety of different routes going from "A" to "B". And you make the point of that weighing population centers is just one factor

and going through rural areas is the consideration of less well-engineered highways and the emergency response capabilities. Now some of that is cranked in in the federal guidelines in comparing alternative routes between two points, so that the smaller population in conjunction with possibly higher accident rates because the highway is not quite as good as something that goes through a city. So some of that is cranked in in the guidelines.

But emergency response capabilities, that consideration is not. It is just totally absent from federal guidelines. Now, are you suggesting that perhaps that the federal guidelines that are being given to state planners should be amended and altered so that these differences should be taken into account?

MR. METTAM: We don't dispute the selection criteria. When you balance 750,000 people in the Clark County area with 500 people in Goldfield, we are not saying that we would prefer it be routed through Las Vegas. What we are saying however, is you have to look at the entire issue. A specified group of criteria, average daily traffic and number of accidents per highway mile and route length and everything. All those are well and good, but you also have to look at the flip side of the coin, which is, by routing to say avoid population, you are avoiding the response capability.

So, I wouldn't say change the criteria, but I would

say extend the review to include some of the issues of emergency response and the affect on small populations.

DR. CHU: Right. That's what I meant. I mean I appreciate your point and I am just merely saying and I think you answered it and that is that the evaluation should in fact incorporate in some way the differences and capability to respond to an incident.

MR. METTAM: Yes, sir.

DR. CHU: Do you have any suggestions as to how they might be taken into account?

MR. METTAM: It is a difficult one. Some of the criteria have looked at a number of hospitals along the route, a number of fire stations, which really doesn't get to the level of precision that really answers your question.

For a project such as Yucca Mountain, I think that there really has to be, and not just in the State of Nevada, but nationwide, a very close look at response capabilities. And possibly for the first time, a more coordinated approach towards this thing. Hazardous materials have become a problem of all--hazardous materials of all types, to rural departments, and the response capabilities just aren't there in rural areas across the nation.

So, I haven't answered your question, but no, I don't know a good way to incorporate this.

DR. CHU: I think it's something that perhaps needs to be

thought about.

Thank you.

DR. PRICE: You mentioned the rail as perhaps being from your viewpoint a more preferred option than the highway. Is that kind of a correct interpretation of what you said?

MR. METTAM: Yes, sir.

DR. PRICE: But, with some fears that rail might not be realized. Does your interest in that option come in part from your view of emergency response to rail versus highway? Do you see your area's responsibility in the area of rail, you mentioned both, but two of the routes still come through Esmeralda County, do you see some relief from emergency response because they are private right of way? Or, how does this--why is there a preference for rail, I guess I should ask.

MR. METTAM: In the first case, I think that the rail line will wisely be routed to avoid some of the population areas. I don't expect it to parallel the highway through the town of Goldfield, which gives us some relief. Also, it's quite a bit easier and less traumatic to seal off a section of rail for--out in our part of the country, it is not unusually to see state teams take four to eight hours to arrive. So it's a lot simpler to close a rail line for a period of four to eight hours than it is the main thoroughfare through the state.

So it simplifies the entire process for us. We could see sealing the rail line and being able to keep people away from it a lot easier than we could see sealing the highway.

Also, I think it is rare to see a Volkswagen vans tooling down rail lines. So, I think there is going to be a lot less likelihood for there to be other vehicles involved. You know, the number of crossings would be the only place where you would actually wind up with a vehicle train interface. And, I think the train will probably win.

DR. PRICE: You mention that it is rare to see, so it struck my curiosity. Have you ever seen a Volkswagen van--

MR. METTAM: Only in the movies. They do a lot of things in the movies.

DR. CARTER: Let me ask you Brad, are you familiar with the rail line between south of Caliente down towards Las Vegas, fifty or sixty miles?

MR. METTAM: Not with that section, no.

DR. CARTER: Well it turns out, it goes down through a canyon. This is a Union Pacific and the road that goes with it, the last time I was on it, is an unpaved road, but it goes down through Carp and Elgin and a number of other small places, where most of the people that live in that area work of course for the railroad. But those two I would dare imagine, if that rail line was to be used I think there would

be no major change, I wouldn't think in the highway side of it, if you call it a highway.

So those two--the road and the railroad are in a canyon and I dare say that it would be an extremely expensive proposition to move either one of those. It's a little different than the Goldfield section.

MR. METTAM: That's the only section I think south from Caliente?

DR. CARTER: Yes.

MR. METTAM: If I not mistaken that's the one that would bring things through the rail yard in Las Vegas.

DR. CARTER: Yes.

MR. METTAM: Which is one of the reasons why I don't think that rail line is really going to be one of the ones they look at. That is the third of the three that they are looking at. The other two are the ones that come up to the north and wind up coming through Esmeralda County.

DR. CARTER: And of course, there is another possibility, I suppose that you could use that rail line and tie a spur onto it north of Las Vegas or north of north Las Vegas out to the Yucca Mountain area.

MR. METTAM: The state has recommended a spur leading through the test site itself which DOE has not been able to look at. They consider the land use and access problems to be insurmountable. The siting of a rail spur south of the test

site but north of Las Vegas, seems to run into a lot of land use problems.

DR. PRICE: It might be reasonable to expect that both highway and rail will be very seriously considered, not one or the other. Given that fact and your position geographically, what would you reasonably feel that DOE should do for you particularly in the area of emergency response, since you'll be the first on the scene if something is in that immediate vicinity, if something occurs in that immediate vicinity, you'll be the first on the scene. What do you think you need that you don't have now and that you would expect that you should have if this transportation system comes into effect?

MR. METTAM: That's a big question. I don't know if I can answer all of it, but I'll give you some ideas.

And maybe I'll start off by saying something that we probably don't need. What we wouldn't need would be a type of training program such as the one they have used in WIPP, which is a fly in and present and fly out type program. Sort of a portable dog and pony show. Any training that's provided is going to have to be done in-house. In otherwords, to make it work, training for this type of an incident needs to be internalized by the state and the local departments. It's not unusual for a rural fire department to have a turnover in a 12 month period of 50 to 60 percent. And if someone is going to fly in and say well, you need to have 20 people available for

us to train and we'll do it in, say Hawthorne, we won't get people to go. We need to be able to do it locally. I need to be able to put it on, say if I've got two new fire fighters. I need to be able to do a class of two and show them what to expect and how to respond to it. So we wouldn't want to have the type of training program that has gone on with WIPP.

DR. PRICE: So you are looking for a train the trainer?

MR. METTAM: Train the trainer with the materials and quite frankly there are going to be equipment that is going to be needed by rural departments in order to determine just quite frankly, do we have a problem or not. We've all seen the mock-ups of the cask design and it's a fairly obvious item. But once they put the personnel shield around it and they put the tarp over the top as they did with Three Mile Island, it starts getting a little less obvious.

I was talking with one of the DOE people and I told them, my preference would be to paint the thing neon, because I want to know where it is when it rolls off the highway.

But we need to have a minimum amount of equipment to be able to get to the scene, to be able to determine if we do indeed have a problem or not, and then how far back do we all have to stand. I don't anticipate every rural department having hazmat suits and being prepared to do decontamination.

But I do think that there needs to be some certain minimum level of training to be able to detect and isolate.

DR. CARTER: Have you ever had any other training or equipment in relation to past or present activities at the Nevada test site or related to the U.S. Ecology operation in Beatty and low level waste disposal site?

MR. METTAM: No, we haven't. We have some of the civil defense test kits. There is about seven of them in the county. We actually have a person in Goldfield who is trained to use them. And that's about the only person who is actually currently trained to use the kits. Generally speaking, the kits don't get opened until we send them back for recalibration, which happens about every other year, which, I understand is not often enough, from what they tell me.

But we have not participated. I have explored that issue. The problem is that most of those are done on site at the test site, and once again, you are asking volunteers who work full-time jobs to take one or two or three days off and travel 90 miles to get the testing. It's another problem of trying to deliver the information.

DR. PRICE: In your testimony, you said that you understood that DOE is not planning on producing separate Environmental Impact Statement on the rail spur construction and that this would increase the lead time needed. I guess I didn't fully understand that. Could you amplify that a little bit?

MR. METTAM: I'll try. That's not an area that I am as

conversant as I would like to be. My understanding is that the current plan is to do a single EIS, which would include the transport options. In my way of thinking, anywhere from 120 to 400 mile rail extension is going to be considered a major federal action and will need a separate EIS. And that can add perhaps another two years. It depends on when they come down and decide that they are actually going to need to do it. If they wait and are forced to do it, then it may add as much as two years to the entire planning process. If they run it concurrently, they may be able to pick up some of that time.

DR. PRICE: So, at this point, DOE does not feel it has to provide a separate statement, but you feel that--I'm trying to understand this.

MR. METTAM: My understanding is that DOE hasn't made up their mind if they need to have a separate EIS on the rail. I don't think they have decided that they are not going to. I just don't think they have decided that they are going to, which typifies some of the responses that you wind up getting at this stage of the game. But yes, in my opinion, it would be needed.

DR. CARTER: Just one question, in the story you related involving the DOE escort and your personal involvement in that, I presume you would like the record to show that at least DOE had a live human escort even though he was in an

animated state. Is that correct?

MR. METTAM: Well, I think the problem is is that when I think of an escort, I don't think of a relief driver, if you know what I mean. If indeed they have a vehicle tracking system and the driver has got to punch in a code every 15 minutes, that's a job for the escort. It's not a job for the guy who has got both hands on the wheel, hopefully.

To me an escort is someone whose job is to go with and make certain the shipment travels safely. It's not a relief driver. So my point on that was that they are redefining terms more than anything. A lot of people in local communities say, gee they should have these escorted, so the solution has been, let's call the guy next to us the escort. And that's not the solution. I would rather they said, there won't be an escort, than to say, yeah, he's an escort, but no, he's in the back.

DR. CARTER: Thank you, sir.

DR. PRICE: Thank you very much.

MR. METTAM: Thank you.

DR. PRICE: I appreciate it.

Our next presentation will be Mr. Roger De Hart, Planning Director and Mr. Chuck Thistlethwait, Associate Planner, Inyo County, Independence, California. Gentlemen.

MR. ROGER DE HART: Good morning, gentlemen. My name is Roger De Hart, and I am the County Planning Director of Inyo,

County, California. And this is Mr. Chuck Thistlethwait. He's the Associate Planner in our office and has been quite familiar with this Yucca Mountain site characterization process.

I am here this morning to address the panel, regarding some of Inyo County's concerns, as they relate to the transport of high-level nuclear waste, possibly through our county. The written testimony you have before you, was forwarded to you by our Fifth District Supervisor, Mr. Paul Payne, who represents the southern and eastern portions of Inyo County.

This morning I would like to address three issues or three concerns of Inyo County. The first and possibly the most important of the three is the failure of the federal government or the DOE to include Inyo County into the planning process for transportation of high-level nuclear waste.

The second concern is the failure of a State Agency, the California Highway Patrol to comply with the requirements of state environmental laws in designating routes for transportation of high-level nuclear waste through our county.

And thirdly, the unsuitability of some identified roads and rail transportation routes possibly passing through or contiguous to Inyo County.

The first issue is the failure to include Inyo County in the planning process. First, a little background of

Inyo County. We are the second largest county in the State of California, consisting of approximately 10,000 square miles, San Bernadino County being the largest. As a comparison, I think Nye County has approximately 18,000 squares miles.

Inyo County is located less than 14 air miles west of the boundary of the Yucca Mountain Repository site. We are the closest contiguous county to the repository site. We are quite rural in character. Our population is approximately 18,000 persons, which gives us a density of slightly less than two persons per square mile. Land ownership in Inyo County, over 98% of our county is under some type of governmental ownership. The Bureau of Land Management, the Park Service, State Lands Commission, Inyo National Forest and so forth.

Our economy is primarily based upon the tourism and recreational needs of the area. As far as our economy or employment, it is largely a service-related economy based upon the recreation and tourism. The second largest employment is of course government and then mining.

In addition to, we feel, significant transport impacts, Inyo County is also faced with the affects of Yucca Mountain including possible water contamination and water pollution. Yucca Mountain and eastern Inyo County shares a common aquifer. In fact the water or the aquifer under Yucca Mountain flows in a southwesterly direction and flows into the eastern portion of Inyo County.

There's also the possible affects of social economic impacts which would result from the construction and operation of the repository and possible rail lines.

As you are aware, the Nuclear Waste Policy Amendments Act, provides for the designation of affected units of local government. And this designation allows local governments to request grants and impact mitigation assistance as well as providing those governments direct involvement in the site characterization process and a general overview of DOE activities.

I'm kind of happy to hear that Esmeralda County, which is not a designated affected unit of local government is getting some funding through the State of Nevada. Inyo County has received no funding whatsoever.

Inyo County did request a designation as an affected unit of local government way back in the latter part of 1988.

This request was denied and we have been forced to seek litigation and relief through the Ninth Circuit U.S. Court of Appeals. This case was heard in September and we are waiting a decision of the outcome.

Without assistance and recognition as an affected unit, we have been unable to effectively participate in the manner that is of vital importance to the health and safety of our residence. The planning department has been given the responsibility of overseeing the Yucca Mountain project. We

have a staff of three professional planners. We cover 10,000 square miles. We just don't have the time or the expertise to adequately get involved with the Yucca Mountain characterization process.

Everyone at the U.S. Department of Energy from Secretary Watkins to the Yucca Mountain Project Office, tries to convince us that the California border magically protects the county from the impacts of Yucca Mountain, including transportation issues. This is a political boundary, it's not an environmental boundary.

Just considering transportation issues, such as selection of California Highway 127 as a possible truck transportation route and identification of three routing options, rail options, through or adjacent to Inyo County, we feel certainly makes us affected.

I'd like to make a comment at this time that we are deeply indebted to the Nevada Nuclear Waste Project Office, specifically Mr. Joseph Strolin for advising us of these public hearings and meetings by the Department of Energy and your Board. If it were not for his efforts, Inyo County would never have been aware of this meeting. We sincerely hope that this was an oversight by your Board, and not part of the continued deliberate effort by DOE to exclude Inyo County from participating in the Yucca Mountain Site Characterization process.

DR. PRICE: May I just interrupt to say, of course, it was an oversight and if you will please be sure that the name and the address to where you want information about the Board is made available to Helen Einersen in the rear of the room before you leave, we'll make sure you are on the list and you get direct mailing and don't have to depend upon the federal register or some other means.

MR. DE HART: Very good. I greatly appreciate that.

DR. CARTER: Well, let me point out a little bit different aspect of that. I'd be interested in your comments on it, but as Dr. Price mentioned earlier, I do chair the Environment and Public Health Panel, and we had a meeting in the spring in Las Vegas and visited the Yucca Mountain area but also the surrounding area including Death Valley and so forth and part of the Amargosa Valley. Now, it's my understanding that Inyo County was indeed invited to that meeting, and in fact we anticipated that someone would be there, but of course no one showed up. So, I don't know the communication trail, exactly, but at least that is my understanding of it, that there was an invitation, a direct invitation not through some other group. And we anticipated folks coming from Inyo County.

MR. CHUCK THISTLETHWAIT: It's been a difficult process. We may have received an invitation to that specific meeting. As indicated in our written testimony we were unable to

attend the August 17th hearing which is only three miles from Inyo County line because of staff constraints. But, basically our communications with the Yucca Mountain Project Office have been extremely strained and getting access to notices of public hearings and access to public documents has been extremely difficult, especially since we've been involved in litigation with the Department of Energy.

DR. CARTER: Of course, we know of your interest in this activity, so this was a reason for inviting you. The other reason, obviously, we were on your home turf. We were in Inyo County on part of this jaunt away from Las Vegas.

MR. DE HART: Yes. Just prior to that time, we did attend a field trip that was put on by the Department of Energy for USC&GS, I guess. And we were able to attend that field trip and we felt, I think, that it would have been kind of redundant to attend basically the same type of field trip.

DR. CARTER: Okay. I just wanted to point that out because there was an example of an invitation, apparently for whatever the reason didn't get responded to. Thank you, sir.

MR. DE HART: Okay, the second issue we would like to address and is possibly not directly related to the federal government involvement, is the failure of the California Highway Patrol, to comply with the requirements of our local or state environmental laws. Inyo County has received the statewide radioactive material transportation plan prepared by

the Nevada Department of Transportation. And the Nevada plan has two preferred alternatives and they are routes "C" and "E". I think the written testimony says "E" and "F", well it should be changed to route "C" and "E" for non-interstate route from the south, which include California State Highway 127 through Inyo County. And attached to your written testimony is figure 7, and it shows those two routes coming up from the Baker area through the communities of Shosone and Death Valley Junction.

In California, the California Highway Patrol has been given the responsibility of designating non-interstate routes for the transport of high-level nuclear waste. By comparison with the Nevada study, the California study by the CHP has been a process closed to public comment and scrutiny.

We have requested a copy of the draft study since May of this year, but to no avail. In fact, the California Department of Transportation, Region 9 which is located in our county has never been consulted about this plan, nor has input of their highway planners been solicited for the study. Thus, although we have not yet to see the routing plan, we feel it is inadequate based upon its flawed methodology.

As an example, to comply with the requirements of the California Environmental Quality Act or CEQA, and this is very similar with the National Environmental Policy Act process, the environmental document must be prepared to

analyze a potential environmental impacts of the proposed route selections. Inyo County believes that the routing assessment by the California Highway Patrol is a project which may have a significant impact on the environment and that environmental impact statement must be prepared.

The Highway Patrol submitted what they call a Notice of Exemption to the state and this claimed exemption to applicable state environmental laws ignores the fact that the routing assessment is a discretionary project and is subject to the California Environmental Quality Act. You cannot issue a Notice of Exemption.

In this regard, also important is a requirement of the California Environmental Quality Act, which requires a Notice of Exemption to be filed after final approval of the project with the State and with each county clerk of all counties in which the project is to be located. By failing to have completed the routing assessment at the time that the Notice of Exemption was filed, the Highway Patrol violated the provisions of the California Environmental Quality Act.

Based upon the conclusions of the California Routing Study, when issued, Inyo County may very well challenge the failure to address the environmental consequences of the selected routes by the California Highway Patrol.

Thirdly, we have some comments on the unsuitability of identified road and rail transportation routes passing

through or contiguous to Inyo County. Now, as I mentioned, we have not be designated as an affected unit, and have had to review this issue really as an outsider. For highway routes, we have only had access to the DOE's Nevada Highway Routing Study, final report and the Statewide Radioactive Materials Transportation Plan, including some oral and written testimony. If other relevant documents exist, we have no knowledge of them, and have received no notification of their existence.

First, Inyo County is concerned and we feel are affected, because Highway 127 identified in the Nevada routing study for two of the preferred routes pass through two communities; Shosone and Death Valley Junction. I'll refer you to photographs 1 and 2, which is attached to your written testimony. As the photographs indicate, the highway is a paved two-lane road with unpaved shoulders. In Shoshone, vehicles parked off the highway sometimes back up into the lanes of traffic. The community of Death Valley Junction is located on a blind curve with restricted speed limit of 25 miles per hour. Blind curves with restricted speed limits occur at several other locations along Highway 127, and figures three and four of your testimony depict two of those areas.

Highway 127 is not a typical desert highway, because for most of its length it parallels the Amargosa River, which

is a drainage for large portions of eastern California and western Nevada. Most of the year it is a dry river bed, but during storms, it can become a raging torrent within a matter of minutes. Only limited drainage improvements are provided along this highway. The majority of the flood waters flow as sheet flows over the roadway, often undermining the pavement.

Figure 6 (see attached) shows the damage that even minor storms can cause.

Lastly, Figure 7, shows a depth marker on the highway shoulder which is used by Caltrans to measure the depth of flood waters over the highway. During the most recent flood which occurred on April 15 of this year, a truck carrying hazardous materials, it was non-nuclear, was swept off the roadway. We are fearful of similar occurrences with trucks carrying high-level nuclear waste and nothing has been done to allay our concerns up to this time.

Lastly, Highway 127 should and we feel will experience increased recreational traffic, particularly going to Death Valley National Monument and hopefully someday it will be a national park. This increase in recreational traffic will include foreign tourists who are driving rental cars, bus tours and senior citizens with campers and motor homes on their way to Death Valley National Monument.

The California Department of Transportation's 1990 State Transportation Improvement Plan, indicates that the

projected increase in traffic on Highway 127 will raise its level of service to a level "D" by the year 2005. A level "D" means that the highway or the traffic will exceed designed capacity and frequent stoppages may occur.

We are not sure if this information has or will be taken into consideration when designation of the alternative routes are made. In addition, Caltrans has no plans for the next five years to do any major improvements to Highway 127.

In conclusion, we feel that there has been an uncoordinated, haphazard approach, both on the part of the Department of Energy and the California Highway Patrol in addressing transportation issues, as they affect Inyo County.

We feel that at a minimum, Inyo County must be afforded the status of an affected unit and allow the oversight role given to other counties adjacent to the host county. This Board must exercise its role by assuring both coordination between all the involved agencies and technical adequacy in the transportation route selection process.

I might here before I end, that Inyo County, either the planning department, my planning commission or the Board of Supervisors, have not come out in support or favor of Yucca Mountain. We would just like to be recognized that we are affected and be given the opportunity to become involved in the process as a participant rather than an outsider.

I would like to thank you for the opportunity to

address the panel and comment on this issue which is of vital importance to the citizens of Inyo County.

Do you have any questions?

DR. PRICE: Thank you. Dr. Carter?

DR. CARTER: I've got two or three. You mentioned at the last that Inyo County has not come out in opposition to Yucca Mountain. I presume that you are not in favor of Yucca Mountain, but you have not come out either way, I presume. You are still neutral at the moment.

MR. DE HART: That's correct. We would like to get the additional information and be involved in the process before any final determination would be made.

DR. CARTER: All right, sir. The other thing, in your opinion is it usual for the Highway Patrol to be the agency within a state to designate routes for hazardous materials or radioactive materials?

MR. THISTLETHWAIT: Yes, sir. They are designated under California Administrative Code to select these routes. Our concern is primarily that they have not been working with the Department of Transportation, especially the local Department of Transportation District 9 office, in coordinating this hazardous materials transportation plan. They have not coordinated with the State Transportation Improvement Plans, nor have they consulted any of the local transportation planners who work on these routes on a day-to-day basis.

DR. CARTER: Okay. The question wasn't exactly that. The question is, whether this is a usual practice within states that the Highway Patrol has this responsibility rather than the Department of Transportation?

MR. THISTLETHWAIT: I can only speak for the State of California.

DR. CARTER: Okay. The other thing you mentioned on the fourth page in your major item 3, that you have had difficulty in obtaining reports of DOE highway and rail routing studies.

I'd like to follow up on that a little bit. Do you make a verbal or written request either to the Yucca Mountain Project office, or to the headquarters of OCRWM in DOE or just how do you go about these requests?

MR. THISTLETHWAIT: Our requests in the past have been through the Yucca Mountain Project Office. We've requested to be notified of the availability of these reports when they are available and when they are issued. Mostly, we've only gained access to these reports through pre-trial discovery after we filed suit against the Department of Energy.

DR. CARTER: Okay. The other thing of course, in the identification whether it is Highway 127 or whatever, in terms of highway conditions or the design construction, what not of the highway and the appurtenances to it, I can see the concern in identifying these obviously, and perhaps having them corrected or at least changed before transportation of

hazardous materials or at least to a large extent a large increase or a flux in these activities. Of course, I'm sure you realize that that increase is projected now not to start for something like 20 years or so.

MR. THISTLETHWAIT: That's correct.

DR. CARTER: So fixing something today you know, when you've got 20 years to do it, may be part of the problem. So, identification of problems in this sort of thing, I think is fine, but I am not too sure you'll get instant relief on these kind of things that related to something that may not happen for that length of time.

MR. THISTLETHWAIT: Well, or Department of Transportation does believe in long-range planning to say Transportation Improvement Plan covers up through the year 2005. And up to that date there are no planned improvements for the highway.

DR. CARTER: Yeah. Long-range planning, I have no problem with. Thank you, very much.

DR. CHU: I don't have any questions. I just have a comment on the reports that you were wanting to see. As far as I know most of them are publicly available. And there are a number of DOE representatives here and perhaps when coffee break comes there may be an opportunity for out of court settlement.

MR. DE HART: We would greatly appreciate that.

DR. PRICE: I think you bring to our attention a number

of the kinds of things that need to be considered in transportation. San Bernadino County, by the looks of your map is also involved similarly to you with an adjacency. Have you had much contact with San Bernadino County? Are they similarly concerned or are they preoccupied with the other side of the mountain?

MR. THISTLETHWAIT: We haven't had any direct contact with them to this point, but we would certainly echo the comments of Esmeralda County as far as the lack of any emergency preparedness or emergency response. Neither Death Valley Junction nor Shosone have any available emergency response. The only response is a resident deputy that lives in Shosone and the California Highway Patrol, which periodically patrols the highway. We have no volunteer fire departments even in that area of the county.

DR. PRICE: Do you have any specific concerns about the types of training that might be delivered as was expressed by Esmeralda County

MR. THISTLETHWAIT: To whom?

DR. PRICE: To you.

MR. THISTLETHWAIT: No. My response would be to whom, as we have no organized responders that could react in the event of an emergency.

DR. PRICE: In all of Inyo County you have--

MR. THISTLETHWAIT: Well, we have responders, but they

are located, for example, the National Park Service has some limited response capability in Death Valley National Monument, and most of the rest of Inyo County's emergency response is volunteer fire departments located in Owens Valley, some four to five hours away from the highway that passes through the county, Highway 127.

MR. DE HART: I think the nearest state highway maintenance station is also located near Furnace Creek, which would be I guess maybe 50 or 60 miles away from Highway 127.

DR. PRICE: And some of the things you draw to our attention about both the future with respect to the adequacy of the selected route or the route that you think will be selected, and then specific things about the maintenance of the roadway, the curvature in certain locations and so forth, high-level watermark, I think our legitimate concerns which perhaps a good information system would have these are part of the considerations for alternatives, such as GIS type system where specifically they are identified by routes. Do you know if the CHP has used such information and has a GIS system they are working with?

MR. THISTLETHWAIT: They have acquired certain information. We aren't sure of any geographic information system they have used. They acquired certain information such as accident rates and things that are used to comply with the DOT criteria for route selection. However, in the Nevada

report which is the only report that we've seen to date, much of the required information for the route selection was missing. It was just not available.

DR. PRICE: So you don't know to what extent they have considered the specific factors that you are bringing to your attention?

MR. THISTLETHWAIT: No. And this is a desert rural area and accident reports are sometimes spotty, and the record keeping isn't as good as you would find in an urban area if you were selecting a route that passed through an urban area.

DR. CARTER: Just one question. Where do each of you gentlemen live? I guess Mr. Payne is in Independence. Are you folks from Independence?

MR. DE HART: Most of the population in Inyo County is concentrated along the western edge of the county along Highway 395. Mr. Payne resides in Lone Pine, which is just north of Owens Lake. Chuck and I reside in Big Pine, California, which is also on Highway 395 just south of Bishop.

It took us about four hours to drive up here. It takes us about four hours just to get over to Highway 127 and Death Valley Junction. So, it is a large county.

DR. CARTER: Just another observation, you also have a very pretty county. I've been in it many times in the Owens Valley where you folks live and it's quite attractive in its natural resources.

MR. DE HART: Thank you.

DR. PRICE: Thank you, very much. I think we would like to take about a ten minute break, ten or fifteen and be back. So, we'll break now.

(Whereupon, a short recess was taken.)

DR. PRICE: Well consider ourselves back in session at 10:21 a.m. and some of you have been asking who the person is on my right-hand and I apologize for not introducing my right-hand, Dr. Woody Chu, who is Senior Professional Staff member with the Nuclear Waste Technical Review Board, assigned to this panel particularly. And we have a lot of respect for his expertise in the area of transportation.

Our next presenter will be Mr. Daniel Nix, California Energy Commission, representing in fact Western Interstate Energy Board High-Level Waste Committee. Mr. Nix.

MR. DANIEL NIX: Good morning. Since you introduced me as being associated with the California Energy Commission, I have to comment that presentation today is strictly associated with the Western Interstate Energy Board and does not reflect any opinion of the California Energy Commission.

To my right I would like to introduce Ms. Lori Friel. She is an attorney with the Western Interstate Energy Board, and not here to advise me of my Fifth Amendment rights, but she is the architect of the strategic plan which we will be discussing and I think will be a valuable resource if you

have detailed questions in that area.

As I mentioned, my name is Daniel Nix. I am serving as co-chair of the Western Interstate Energy Board's High-Level Radioactive Waste Committee. The Western Interstate Energy Board, or WIEB, is an association of sixteen western states. WIEB and its High-Level Radioactive Waste Committee have been working cooperatively with the Department of Energy for the last six years to help develop the transportation system for future shipments of spent fuel and high-level waste to a repository and/or monitored retrievable storage facility.

The Committee's goal is to ensure the development of a safe, publicly acceptable transportation system before shipments are scheduled to begin. A successful waste management program must have both the facilities to receive waste and a system capable of safe transport of high-level waste. Development of an acceptable transportation system should not become a source of further delay in repository or MRS operation. The Committee believes that unless higher priority is placed on development of all elements of the transportation system, timely operation of a repository and/or MRS is doubtful.

The Committee's relationship with DOE has been generally positive and productive. Our conclusions about the need to pay more attention to all elements of the transportation program stem largely from our detailed evaluation of the total system. DOE's high-level waste

planning appears to have been focused on the siting and construction of facilities (the repository and MRS,); critical pieces of the transportation system have not been given enough attention. However, the transportation system, which extends well beyond acquiring a fleet of shipping casks is a critical component in the overall waste management program.

Transportation, including route selection, emergency planning and many other elements, is the aspect of the waste disposal program which affects the most people. Lack of public acceptance of any of these elements can jeopardize the entire program.

First I would like to explain why the Committee believes that a well-developed transportation system is essential to the waste management program. Then, I will discuss how the Committee's Strategic Plans and Schedules for the repository and MRS programs (which you have copies of), have helped the Committee in its transportation work and how we believe that a similar process would help DOE.

The management of nuclear wastes is a very high-visibility issue. Transportation to a disposal facility will attract public attention and will affect a larger number of people. If the public is not confident that the transportation system has been carefully planned with due attention to safety, lack of public acceptance can jeopardize an entire program. In the past, public concern has led to

drastic modifications and suspensions of entire shipping campaigns. Just to cite a few examples:

The 1985 Taiwanese shipments - public opposition on the West Coast regarding spent fuel shipments from Taiwan to the U.S. caused DOE to change it's planned port numerous times and prompted a court to order DOE to prepare an Environmental Impact Statement before using certain ports.

The 1985 proposed plutonium air shipments from Japan - public opposition to the air shipments which would have crossed the northern U.S. cause Congress to ban the shipments until the shipping containers were drop tested from the maximum cruising altitude of the plane, and in some cases, the loaded plane itself was subjected to a crash test. The shipper is still trying to develop a package that will meet these tests, and no shipments have been made.

The 1988 Three Mile Island shipments - a minor operational incident in St. Louis prompted a suspension of shipments, Congressional inquiries, modified shipping procedures, and a DOT evaluation of DOE's rail route selection system.

Planning a spent fuel shipping campaign is more than a matter of acquiring a fleet of shipping casks and operating a public information campaign. Numerous details must be planned in a timely way, for example, route selection, emergency response training, vehicle inspections and

prenotification. While the shipper may believe that some of these activities are unnecessary to a successful shipping campaign, failure to attend to these matters may create operational problems when shipments begin. For example:

The 1986 shipment from Nevada Test Site to Idaho - Failure of DOE or the carrier to consult adequately with the affected states led to interstate disputes, a DOT civil penalty assessment against the carrier for violating the federal routing requirements, a reinterpretation of the federal routing rules by DOT's administrative law judge, and a DOT rulemaking to re-establish its interpretation of the rules.

The 1986 Three Mile Island shipment - The Nebraska governor stopped the train at the state border due to a misunderstanding caused by DOE's lack of a formal, written shipment prenotification policy.

WIEB's High-Level Radioactive Waste Committee has long been aware of the potential problems that could result from failure to plan carefully for future shipments. In 1985, the Committee and the full Board called on DOE to develop a comprehensive transportation plan to guide all transportation decisions under the Nuclear Waste Policy Act. The Western Governor's Association adopted a resolution endorsing this recommendation. DOE has not yet developed such a plan. In 1987, the Committee developed its own Strategic Plan for the

development of the high-level waste transportation program.

The Committee's Strategic Plan has been an invaluable tool in guiding the Committee's participation in the development of the transportation program. Producing the Plan forced the Committee to clarify its thoughts about the logical interrelationships among all aspects of the transportation program. The Strategic Plan is updated periodically to account for new information and more detailed analysis of critical components. The Plan has helped the Committee set its work priorities each year based on the timeliness of each issue.

The Committee also uses the Strategic Plan as a template into which it tries to fit the fragments of information about the other groups' activities and plans. For example, at different times, DOE has made the following statements about its intentions:

The carrier will be allowed to select the shipping routes.

DOE will finish negotiating a contract with its carrier six months before shipments begin.

DOE will start its Congressionally mandated emergency response training (under Section 180(c) of the 1987 Nuclear Waste Policy Amendments Act) for states, tribes and local governments three to five years before shipments begin.

By putting these pieces of information together, it

is clear that one of of two things will happen if none of these intentions are changed: 1) DOE will train responders on all possible routes, including those which are never used (which would be a tremendous waste of resources); or 2) DOE will guess which routes its unknown carrier may choose five year in the future, and conduct training on those routes (which will delay the beginning of a repository or MRS operations if DOE has guessed incorrectly and training must start over on new routes). Neither of these results satisfy the Committee.

Our Strategic Plan shows DOE making the national route selection in advance of Section 180 training so that we are not forced into this position. The Committee carefully analyzed the existing route selection process in 1987 and determined that it should be enhanced to meet the needs of the unique repository shipping campaign, a large number of similar shipments by a single shipper to a single destination over a long period of time. Three aspects of the current routing system were deemed inappropriate for repository shipments: 1) carrier, rather than DOE, selection of the route is likely to be publicly unacceptable in his high-visibility program; 2) the carrier's authority under federal routing rules to use multiple routes, involving different states, for shipments between a single origin and destination would interfere with the states' ability to concentrate limited resources, e.g.

emergency responders, vehicle inspectors, on a smaller number of routes; and 3) the absence of any requirement that routes be selected well before shipments begin would prevent states from preparing for shipments, e.g. conducting emergency response training along the routes. In 1988, the full WIEB board adopted a resolution, you have a copy, I believe, calling on DOE to immediately assume responsibility for selecting routes well before shipments begin and to start developing the route selection process. The Western Governors' Association also adopted a resolution endorsing this recommendation.

Our Strategic Plan also indicates that a high near-term priority is reviewing the designs for the shipping casks that are being developed for DOE. This year at DOE's request, the Committee submitted detailed comments on four preliminary cask designs developed by DOE's contractors. Several common themes emerged during the Committee's review of the cask designs.

First, the cask designers rely too heavily on administrative controls to ensure safety. Administrative controls are useful to provide an added measure of safety, but they cannot be a substitute for sound engineering which provides an acceptable level of safety.

Secondly, safety margins of 5% or less are common in the designs. This may be acceptable to the cask designers who have great confidence in the models and analyses. However,

the public does not share this confidence and is likely to view these margins as being dangerously low.

Thirdly, better integration, in both directions, is needed between the cask designers' work and the rest of the transportation program. The scope of work and assumptions DOE directed the cask designers to use do not always accurately reflect the practices of utilities and carriers. Some of the designers' work conflicts with the recommendations of national standards-setting groups and with the findings of other DOE contractors. In the other direction, DOE needs to incorporate the cask designers' conclusions and decisions into other aspects of the transportation program, e.g., schedule, modal mix decisions.

Fourthly, the desire to increase payload should not be allowed to drive the cask design process at the expense of safety. DOE and the cask designers should be more cautious about the additional risks they are incurring for each incremental improvement in payload.

In addition to helping the Committee establish near-term priorities, such as route selection and cask design, the Strategic Plans allow the Committee to see the big picture. As you can see on the Strategic Plan and Schedule for the repository, the Committee believes that there is sufficient time to put the transportation system in place if we start immediately and work efficiently. The schedule for the MRS is

much tighter. If an MRS is to open in 1998, it is already too late to make the most efficient use of resources. Some transportation activities which can be done efficiently in sequence for the repository program must be done in parallel for the MRS program because of time constraints. For example, our schedule shows DOE analyzing routes to each potential MRS site under consideration. Certainly, it would require fewer resources to select the MRS site first, and then just analyze routes to that site. However, if route analysis is delayed until the MRS site is selected, there will be an even greater waste of resources at the other end because emergency response training will have to be conducted on numerous routes because the final routes will not be selected soon enough to focus the training program.

WIEB also uses its Strategic Plan to evaluate DOE's activities. In January of this year, WIEB commented on DOE's proposed schedule for the repository and MRS program. DOE's schedule included few details on the transportation program. WIEB, based on its Strategic Plan and Schedule, identified the major activities that the western states believe should be conducted in 1990 and the first half of 1991.

In conclusion, the Committee believes that DOE must place a higher priority on planning the transportation system for repository and MRS shipments. We continue to believe that it is critical that DOE develop a strategic plan for

transportation so that it can explicitly make decisions about the interactions among all components of the transportation system. The Committee believes that there is sufficient time to develop a safe, publicly acceptable transportation system by the time the MRS or repository is scheduled to open, provided we start immediately and work efficiently. Time is of the essence.

DR. PRICE: Thank you. Dr. Carter?

DR. CARTER: A couple of questions if I might. I think reading a little between the lines it may be obvious that the Western Interstate Energy Board is a creature of the Western Governor's Association. That is true, I think?

MR. NIX: No.

MS. LORI FRIEL: No.

DR. CARTER: Straighten me out.

MR. NIX: They are independent organizations. If my memory serves correctly, the Western Interstate Energy Board, grew from an earlier organization called the Western Interstate Nuclear Board. The WIEB activities are much broader than the former activities of the nuclear board and served to coordinate many different energy activities among Western States.

DR. CARTER: Well, the reason for the question, I think there is a parallel between the Southern State Energy Board, formerly the Southern State Nuclear Board and the Western

Board. I think these two are somewhat analogous. And I think in the history of them they had an association with a governor's conference, either the southern governor's conference in one case and the Western Governor's conference or association in the latter.

MS. FRIEL: We do work closely together and integrate our activities on energy issues with the Governor's Association, but we are separate entities.

DR. CARTER: I understand that.

MS. FRIEL: Well, created at different times. Actually the Energy Board was there before the Governor's Association. And we have separate histories. There are half a dozen different organizations in the West performing similar activities and then there was a long merging and dividing process.

DR. CARTER: Okay. And the executive part of your group is located where? In Lakewood, Colorado?

MS. FRIEL: We are in Denver now.

DR. CARTER: Denver, okay. Does the Western Interstate Energy Board have a federal representative?

MS. FRIEL: Yes, we do.

DR. CARTER: Who is that?

MS. FRIEL: Jan Velchick.

DR. CARTER: The other thing, I wonder if you would outline briefly for us your experience in these kinds of

activities, transportation of nuclear materials and so forth. I assume that you've had either contracts or grants with the DOE or the Department of Transportation, Nuclear Regulatory Commission and so forth to provide some of the funding for your activities.

MR. NIX: Are you asking for the Board's experience?

DR. CARTER: yes.

MS. FRIEL: We've had contracts and cooperative agreements with DOE since 1984 on high-level waste transportation activities. And it's been a productive relationship between the two organizations.

DR. CARTER: Okay. Any from the other agencies that I mentioned, either NRC or the Department of Transportation?

MS. FRIEL: No, no funding.

DR. CARTER: Have you done any work directly for the Yucca Mountain Project Office or the office of DOE in Las Vegas?

MS. FRIEL: No.

DR. CARTER: How about OCRWM itself, the Office of Civilian Radioactive Waste Management? Any direct work for them as opposed to DOE in general.

MS. FRIEL: That's who we have our cooperative agreements with.

DR. CARTER: Okay. And this is the one that goes back to '84 or whatever?

MS. FRIEL: Yes. Originally it was managed out of the Albuquerque Operations Office, but now it is part of OCRWM.

DR. CARTER: Okay. The other one, I guess if I understand you correctly, the major problem that you have at this time with the DOE transportation system involving high-level waste repository and/or the MRS, is one of timeliness as far as planning activities. Is that essentially correct? Or, are there other facets to it?

MR. NIX: Our concern is not necessarily so much with what we see that has been done, as it is with what we see that needs to be done. We think that it is imperative that the Department of Energy either critically review the strategic plan that the Western Interstate Energy Board has developed or develop their own plan, because we fear that there are important elements that are missing from the overall transportation system, that if they are not developed and put in place in a timely manner, two possibilities exist. 1) They will not be developed, or; 2) they will be a source of public opposition which will simply further delay either the MRS or the high-level repository.

DR. CARTER: So, I think by implication you would recommend that your plan be given high consideration by DOE?

MR. NIX: Well, we are not voting for this plan necessarily. I think it is in the public interest for DOE, for example, it may be expeditious for them to use this

strategic plan as a starting point for them to develop their own critical plan.

DR. CARTER: What about the availability of your plan, the Western State Energy Board? Is that available to the public by writing to someone, or does it have to be purchased or what?

MS. FRIEL: It's available and one can contact me, and we have the copies actually with our testimony so people here have them.

DR. CARTER: All right. Thank you.

DR. CHU: I'm going to move off the immediate focus of high-level waste for just a little bit. Again on the WIPP program, I mean I realize that you are the high-level committee and certainly our Board's charge does not include the movement of the defense waste to New Mexico, but to the extent that the WIPP shipments are impending, or at least they probably will come sooner than the civilian waste, and to the extent that they will also be using type "B" type of packaging, although they will have different materials inside, that it is an analogy and probably and possibly a very useful analogy and it will be a massive campaign. Does WIEB have any kind of plans or activities where you are looking at the planning process of the WIEB program, by that I mean both in terms of the State's government where the roots will traverse as well as the Department of Energy, a different part of the

Department of Energy's involvement in the planning process taken as a whole. And the second part of that question is, do you plan to do any kind of monitoring of the actual transportation experience when and if the shipments finally begin?

MR. NIX: I think if I could paraphrase your question, is are we prepared to take advantage of the experience related to the WIPP campaign.

DR. CHU: Some of which has already taken place, in other words, one of our witnesses earlier this morning has some opinion about the technical and financial assistance that DOE offers or at least the technical assistance that DOE offers vis-a-vis emergency response, so that--I mean some of the experience is already unfolding.

MR. NIX: I think there are lessons to be learned from the process of establishing the routes and training local emergency responders, in essence preparing for transportation of materials to WIPP near Carlsbad. But, obviously, not all of the same routes would be used to a high-level waste repository. So there is the question of dealing with different routes. There is a question of transporting different materials, whether there need to be modifications to emergency responder training, perhaps due to differences in materials. I think both Lori and I are very familiar with the Transuranic Waste Shipping Campaign to the Waste Isolation

Pilot Project. We were involved in that activity before it was subsequently transferred to the Western Governor's Association. And I am involved in that activity within the State of California on a personal level.

MS. FRIEL: The Western Interstate Energy Board has prepared a couple of reports on lessons learned from WIPP on very specific issues. We have one on the emergency response training program coming up with some recommendations on how the Section 180 program for the high-level waste could be modified to eliminate some of the problems that was on the WIPP training. And also in our routing paper, which we do have copies of, we mention the WIPP route selection process and some of the positive aspects of that which are incorporated in the Committee's recommendation and some of the things that could be improved on in the high-level waste campaign are specified here as well.

DR. CHU: But, you don't have--from what I'm hearing, okay, so you have looked at some of the things that have happened already, but you don't have a plan of formally kind of monitoring the WIPP shipments devising a lessons learned type of thing?

MR. NIX: Well, I'm not certain that--

DR. CHU: I mean in conjunction with the DOE.

MR. NIX: I'm not certain that the experiences that you would gain from critical review of the WIPP shipping campaign

would substitute for the elements that we think are necessary in the high-level waste transportation system. We are dealing with something like 70 physical reactor sites in the U.S., 103 units, and on the order if memory serves correct, about ten Department of Energy facilities which would be the source of transuranic waste. So there is a considerable difference in the potential routes that would be used from shipments of transuranic waste to the Waste Isolation Pilot Project and shipments of spent fuel from reactor sites to either an MRS or repository.

So the fact that routes have been designated for example for the WIPP shipping campaign does not substitute for a need to designate routes for high-level waste repository.

DR. CHU: I have to say two things. One, is I have to say something that Dr. Carter says often. And that is, when a question is asked, that doesn't mean that it is in the negative, it's neutral. The second is that I realize and appreciate your point and my only point in bringing up the WIPP shipment is that it is analogy and probably certainly not an exact analogy, but nonetheless that it may present an opportunity, keeping in mind that it is an analogy that in the meantime that we might be able to, we, in the collective sense, we might be able to learn something from that.

MS. FRIEL: And we do monitor the activities as much as we can. We don't have funding for the WIPP program. Most of

that work is being done by the Western Governor's Association now. But, periodically we have people from the WIPP program come in and update the Committee on the WIPP activities. And we've strongly recommended that DOE do a WIPP lessons learned study for the high-level waste program and also we suggested that we be funded to do a WIPP lessons learned study from the states perspective. And that work is going to be done by the Western Governor's Association, not the Western Interstate Energy Board.

DR. CHU: Okay. Now when you say that you suggested that DOE should do a WIPP lessons learned study, you mean DOE civilian office?

MS. FRIEL: Oh, yes.

DR. CHU: Okay. Thank you.

DR. PRICE: In your testimony, you referred to some common themes that emerged with your review to the cask designs, made some generalized statements I am sure out of necessity, such as the cask designers rely too heavily on administrative control, safety margins of 5%, better integration in both directions, and concern about the desire to increase payload should not be allowed to drive the cask design process at the expense of safety. And I presume back behind those generalized statements, you have some specific information. I think we would appreciate getting that either at this time if you can present it, or if it might be possible

if it's going to take a lot of time to provide us with some of that information that prompts those statements.

MS. FRIEL: We have copies with us, they are way too detailed to present at this hearing. We have about 40 pages.

If you would like a couple of examples on those points, we could do that now.

DR. PRICE: And could you make--perhaps a couple of examples, could you make those documents available to us?

MS. FRIEL: Yes. Yes, you can have these today.

DR. PRICE: Thank you.

MS. FRIEL: Well, on the administrative controls one of the key problems in several of the cask designs is when you look at the high burn-up and low burn-up issues. The assumptions used in designing the casks are unrealistic on the burnup levels of the fuel. And if the actual burnup levels are lower than in the assumption, then you have the potential for criticality problems, and at the other end, if you have higher burnup, you have shielding problems. And the cask designers rely fairly heavily on administrative controls such as measuring or record keeping on the burnup levels and possibly actual measurements at the time of fuel loading. Some of them have very complicated procedures. One of the casks I believe Babcock and Wilcox had in one of its tradeoff studies, mentioned the possibility of having up to three different cask bodies and five or six shielding inserts and

several baskets. And you would have to choose the right cask body, shielding insert and basket depending upon your fuel burnup level, and even then you would have to ship in some cases partially empty. So, you would have to know when to leave some of the cells in the basket open. There's great deal of opportunity for human error there. There are similar kinds of problems in the other cask, often in the burnup level issue.

As far as the safety margins, there were several examples of the lids in the structural analysis having safety margins in the 5% or lower level. Some of the neutron shields seem pretty close to the materials limits and in some case even under normal operating conditions, just because of operating in the desert, they may not be able to survive that or they are very close to the limits.

DR. PRICE: As I recall, one of the temperature conditions was an ambient temperature of 100 degrees which could be easily exceeded along the routes to a western repository.

MS. FRIEL: And on the integration of the cask designers work and the rest of the program and what the rest of the world is doing, one of the biggest examples is the assumptions used about the fuel burn-up levels. The 30-35 gigawatt days per MTU is not representative of what fuel is going to be out there when the repository opens in 2010.

According to some of the utility figures, as much as 70 percent of the fuel will exceed those burnup levels which brings in all the problems about shipping high burnup fuel.

And I'll be glad to make copies of these available and if you have any questions about our detailed comments after the hearing, we'll be glad to talk to you again.

DR. PRICE: I would appreciate getting those copies.

You express a concern about the, and I interpret as some of your statements similar to what Dr. Carter did, about the integrated planning of DOE, that things are not fitting together and that this is one of your major concerns, that training gets out of sync with some of the other things going on. Do you feel that--you talked about planning, consultation, prenotification, do you feel that if these were done properly, we would avoid, or would it be a matter of really basically minimizing some of the opportunities for public concern? We are probably going to have public concern and perhaps rightly so, regardless of how well you plan.

MR. NIX: Well, I don't know that doing all the right things in the right order is an automatic recipe for success.

But if you want to be successful you should not do the right things in the wrong order. It just simply opens up opportunity for public concern.

I know from our own experience in California, if you look at the detailed schedule on the MRS, it allots if the MRS

is to be operational in 1998, it allots about one year for alternative route designations. And we believe that is important in California because under current federal statutes all route controlled quantities such as high-level waste shipments of spent fuel would be routed through the Los Angeles basin. We do not think that this an appropriate route, so we would take steps to designate alternative routes to try to avoid that major population center.

It is not likely that that route designation process would be completed in one year. And in fact, probably two years at minimum would be necessary for that.

But, I think the value of planning is to identify some of the inconsistencies, not to hold them up as failures in the program, but rather to say these are problems that we are now aware of and it should be corrected. So we do hope that the Board's Strategic Plan effort is viewed as contributing to a timely and successful operation of either the MRS or the repository.

DR. PRICE: But it is your view that there is something lacking in systems integration with respect to the way in which this event occurs, then this event occurs, and so forth.

I think we are going to have some testimony a little later in the day which will express some concern about some parts of the program occurring earlier than perhaps they ought to. Your concern has been some parts of the program occurring

later and therefore confounding the ability to carry out for example, the training.

MR. NIX: Yes.

DR. PRICE: Dr. Carter.

DR. CARTER: Let me explore one area with you. You mention of course that the Southern--excuse me, I keep referring back--I'm from Atlanta and this is the reason for where the Southern States Energy Board is located. In fact it's within a few blocks of my home, where it was recently, up until recently.

Anyway, the Western States Energy Board, my question is it has 16 member states, are those contiguous states? Are there any major states in that area that do not belong to the Western States Energy Board?

MS. FRIEL: There are Alaska and Hawaii and then the rest of the states are contiguous. However, Oregon is not currently a member. It has been in the past, but it is not at this time.

DR. CARTER: Okay. Are there any nuclear free zones or that sort in the area served by the Board?

MR. NIX: I can't speak for the other western states but I think something on the order if memory serves, something on the order of 100 cities in California have declared themselves to be nuclear free zones, including as I recall the city of Oakland which was at one time the planned Port or Entry for

foreign spent fuel shipments.

DR. CARTER: What's the legal status of those in California?

MR. NIX: Well, not being a lawyer, I hesitate to comment on that.

DR. CARTER: Well I was curious about it because I suspect that your Board has done studies of either legal and/or institutional impediments to transportation of nuclear materials within your area. I presume you've done that. Is that true or not?

MS. FRIEL: Yes, it is.

DR. CARTER: What are some of those?

MS. FRIEL: I'm sorry?

DR. CARTER: What are some of the impediments either legally or in terms of institutional organizations to transportation of nuclear wastes and particularly the high-level nuclear waste. Are there any?

MS. FRIEL: Well, actually we've always looked at it from a different perspective, from our state's perspective. And we look at the same issues, but we are saying, what kinds of regulations could states adopt and looking at the federal court cases and pre-emption, and we don't ever come out with yes or no answers. And we don't advise people to adopt particular types of regulations. We just say, if the states are interested in regulating transportation, these are some of

the things you should think about in deciding whether your actions would be permissible and withstand challenges in court.

So we would not take position on whether a California community should declare themselves nuclear free zones or whether that's legal. And we wouldn't advise them to do it or not do it.

DR. CARTER: Well, I guess that still doesn't answer the question. You refer back to California where I presume most of your experience is, but of course you are representing the Energy Board here, so my question is really broader. It is whether there is legal impediments or institutional impediments to the transportation of high-level nuclear waste within the area served by your Board.

MS. FRIEL: Impediments created by the State Law, is that what you are asking?

DR. CARTER: Yes. Or, local communities or whatever that you might be familiar with.

MS. FRIEL: Well, I guess my problem is referring to them as impediments. Maybe declaring yourself a nuclear free zone is a pretty clear impediment.

DR. CARTER: It stops there. It might stop the transportation through that area, so I'd call it an impediment.

MS. FRIEL: It might, but aside from that limited issue,

if you get into the broader issues the things that states do that they feel are necessary to protect the public health and safety of their citizens are often viewed by other people as impediments to transportation. And so it's a matter of semantics of whether you are creating an obstacle of transportation or protecting your citizens. You know we have a different perspective. I guess I don't understand what you are looking for in terms of impediments created by state law.

DR. CARTER: Well assuming, and that is an assumption obviously that you know transportation of nuclear things, the federal law is that they have the primacy in this area. I think that's been demonstrated in court to quite an extent. In fact some nuclear free zones or areas I guess have been declared invalid from a legal standpoint. So I'm using impediments as something that would be against that. I am not saying that I am for or against it, that's immaterial.

MR. NIX: Are you asking whether the declaration of a particular city as being a nuclear free zone precludes transportation of nuclear material?

DR. CARTER: That's correct. That's one of the questions.

MR. NIX: Well I can say that our experience has been no, that it does not. But I think that is a clear indication--

DR. CARTER: Well then it's not an impediment.

MR. NIX: Pardon me?

DR. CARTER: It's not an impediment as I am defining impediment in this case.

MR. NIX: Well, I think it depends upon your definition. I would have to go back to Lori's comment that if the citizens of a particular city or locale have elected to declare themselves a nuclear free zone, that's an expression of concern. So the transportation system must be prepared to address that.

For example, in involving the public in understanding emergency response procedures, the safety actions that have been taken, the process used to designate routes, that may result in the eventual successful designation of routes and shipment of material. It may tend to slow the process down from the perspective of some parties, but again I think I would emphasize that I do not view that necessarily as an impediment.

DR. CARTER: Okay. So there's some questions marks if you will in this area in terms of particularly local areas.

We heard in fact, the gentleman from Goldfield mentioned that in Nevada that the area at Mina might present a problem. It may be more complicated than that, but essentially a local determination if you will. This is the sort of thing that I was looking for as far as what your experience had been.

And the other thing, if you have done studies of

this sort, the institutional attitudes if you will within the Western Interstate Energy Board's area, if those studies are available, I think we would be interested in taking a look at them.

MS. FRIEL: We haven't done a comprehensive survey to see what state and local laws exist in the western states.

DR. CARTER: Thank you, ma'am.

DR. PRICE: If there are no more questions from the panel, thank you very much. We appreciate it.

By the way am I the only one who feels a little chilly in here?

UNIDENTIFIED VOICE: No.

DR. PRICE: Could we get an adjustment to the thermostat to warm it up just a tad? My tea has gone cold so I can't drink it to warm me up here.

DR. CARTER: You are not going to let us vote on this?

DR. PRICE: Our next presenter is Mr. Ivan Stuart of the Nuclear Assurance Corporation. Mr. Stuart.

MR. IVAN STUART: Good morning, I am Ivan Stuart, Vice President Design Engineering at Nuclear Assurance Corporation.

I have been engaged in the nuclear industry for 28 years. I started my career in the design of the nuclear power plants, then progressed to responsibility for their licensing review process. Later I was responsible for repair and maintenance of the plants, including fuel loading, reconstitution and fuel

storage. At one point, I was responsible for the Morris Illinois fuel storage facility and transportation of spent fuel to that facility. I am pleased to be here today to present my thoughts and those of NAC. I hope this testimony provides positive and constructive suggestions for the Federal Waste Management System. My comments are made from the perspective of a spent fuel management and transportation company.

NAC has been deeply involved in almost all aspects of spent fuel transport and storage for over 15 years. We own a fleet of 16 transport casks and have made well over 2,000 spent fuel shipments, covering millions of miles throughout the United States and the world. We have handled commercial light water reactor UO₂ fuel, metallic fuel, failed fuel and other special shipments. We want to emphasize that spent fuel transportation has been, and is being conducted with complete public safety. The record in that regard speaks for itself.

I'd like to talk about NAC's Technology Development.

NAC is a leader in the design, licensing and supply of metal casks for both dry storage and shipment of spent fuel. This method of spent fuel handling is a mature, proven technology.

It offers the substantial advantages of reasonable user costs and preparations, plus casks are purchased only as needed. There is virtually no ratepayer risk; the casks are already licensed. There is no fuel transfer outside the reactor plant

pool and its containment system. The casks are fabricated in a pre-qualified factory under intensive inspection, testing and quality controls. A utility receives a proven, safe and passive spent fuel storage or transport cask. NAC has established a family of four different licensed transport casks as well as high-capacity, metal dry storage and transport cask systems covering intact, consolidated and failed fuel.

NAC has also developed a dual-purpose, that is storage and transport version of our cask family, designated the STC. The cask body of our storage casks was upgraded for transport based on time-tested transport safety features, including multi-wall construction using stainless steel and lead.

NAC was selected by the Spanish government authorities in 1988 to provide our technology for the dual-purpose cask as the bases for Spain's national waste program.

An important factor in their evaluation was that the STC, in addition to meeting NRC storage license requirements, is also designed to meet the U.S. NRC's transport license requirements.

The Safety Analysis Report for Packaging or SARP for the STC was submitted to the U.S. NRC for transport certification in September of this year. This followed the Topical Safety Analysis Report or TSAR for storage submitted

to the NRC in April this year. It is expected that we will receive both certificates in 1991. The STC is designed so that it can store and transport consolidated fuel as well as intact fuel.

NAC has also been actively developing fuel rod consolidation technology for over ten years. Our program has included a cold system demonstration at Barnwell, delivery of a system to TVA and hot system tests at West Valley. Many problems have been encountered by all those who have done consolidation and many lessons have been learned. We believe the problems are now solved. We have performed a component demonstration of our latest equipment called the FUEL-PAC system, which is a fully automated high capacity robotic system that uses simple one-step processes and easily repairable or replaceable components. Fuel rod consolidation is not yet a mature technology, however, we are confident that it will be in the near future. Although fuel rod consolidation was developed because it is fully compatible with pool storage, there are also benefits for metal cask storage and it has become very apparent that consolidation's real benefits are in cask transportation and ultimate disposal.

NAC is also in the process of developing a spent fuel burnup meter that will be calibrated with data from isotopic analyses of reprocessed fuel previously measured by

the burnup meter. This program includes an agreement with the Power Reactor and Nuclear Fuel Development Company known as PNC of Japan where small batch processing of fuel will allow individual assembly measurement and later correlation with reprocessed isotopic analyses. The burnup meter will provide a positive safety device to assure that only spent fuel is loaded into transport casks where burnup credit is part of the casks criticality design bases.

If I could diverse for a moment and just say this device is specifically intended to address the concern you just heard about, about loading different burnup of fuel in the spent fuel casks.

Since 1968, NAC has developed several data banks that are unique sources of nuclear information recognized worldwide. The oldest and most comprehensive data base is called Fuel Trac and contains technical and contractual details on all the fuel in all the plants in the free world. More recently, NAC has conducted studies at all U.S. nuclear plants to determine the Facility Interface Capabilities, a study referred to as FICA, and a Near Site Transportation Infrastructure study, know as NSTI. Both of these latter studies provide valuable information affecting transport of spent fuel from reactors in the United States.

With that background, I would like to turn to NAC's views of the current Federal Waste Management System Program.

In addition to the technologies NAC has developed as described above, we also interface heavily with every player in the Federal Waste Management System, i.e., the DOE, its contractors, the National Laboratories and the utilities. Our view of the overall Federal Waste Management System program comes from that extensive interaction base.

NAC takes the view that the current methods of transportation and storage have served the industry well and that they have established the record of safety first. Optimization from these tired and true approaches needs to be taken in measured steps so as to maintain the acceptance of, and confidence in new technologies.

The magnitude of the Federal program and the benefits of its successful implementation are sometimes ignored in these public forum discussions. While there is a general consensus that environmental issues need to be resolved with maximum urgency, the public acceptance of specific solutions represents an important step to success. With the Federal Waste Management System, we are attempting to safely store waste for thousands of years. This has never been done, and like putting a man on the moon, requires the contribution of our top scientists and thinkers and the full support of the public.

If the goals of this program are achieved, we will have established that we can, as a country, solve

environmental problems and the implications of this success will benefit other disposal problems outside of the nuclear industry.

For this reason, there is an unprecedented support for the DOE efforts, both within the government and within the nuclear industry. The program is unique in that the industry is providing the funding for the program. So far nearly \$5 billion has been collected and nearly \$3 billion has been spent to solve the problem. Nevertheless, the schedule for receiving wastes has been considerably delayed and there is a growing skepticism that the task will be completed. With that overview, I would like to turn to more specific observations about the Federal Waste Management System.

For some time NAC has held the view that a dual purpose cask is the optimum solution for the nation's spent fuel transportation program. Others seem to hold this position also and like NAC are developing their version of this technology. Perhaps NAC's experience base with both transport and storage casks was the reason that the Spanish government adopted the dual purpose cask. Their participation came through an organization called ENRESA which can be characterized as similar to the U.S. OCRWM. Virginia Power Company and the Electric Power Research Institute, also participated and combined their sources with that of NAC to fund the design of a dual purpose cask that is now going

through the NRC licensing process. The cask as I have mentioned earlier, is referred to as the STC model. Based on the present program laid out by NAC and NRC, it is expected that the NRC licenses for both storage and transport will be issued during 1991. As mentioned earlier, others are pursuing a similar concept and it is expected that follow-on approvals will be forthcoming.

The concept of the dual purpose cask is really quite simple. Having said that, NAC has found that implementation of the dual purpose cask concept, and demonstrating compliance with the multiple requirements of NRC, while optimizing payload, but living within transportation weight limits has proved to be a complex technical matter. Notwithstanding all of that, quite simply with a dual purpose cask, the reactor operator loads the spent fuel in his pool operating under all of the existing safety and plant operation rules that NRC has approved. These are conditions with which the operators are familiar and that they have demonstrated are safe and appropriate. The loaded cask is then stored at the reactor site in a simple pad area within the normal plant security controls systems. There will be a minimal added monitoring and alarm system to notify the plant operator if anything unusual occurs. Alternately, the dual purpose cask is immediately ready for shipment to any selected location such as an MRS, the repository, or a lag storage location used by

DOE. The point is that the fuel need not be disturbed or removed from its cask until some final disposition is to be undertaken even if that is many years in the future.

Conceptually the dual purpose cask has an unlimited life. The NRC has granted licenses for metal storage casks that cover a 20 year period with five year renewable options; so it is anticipated that the dual purpose cask will also be similarly licensed.

Our design of the dual purpose cask uses a double lid concept where the inner lid and its associated metal o-rings act as part of the stainless steel containment during the storage phase. The outer lid is also installed during the storage phase and provides added margin to assurance of containment. However, in accordance with design rules the outer lid is not considered as part of the official containment structure in the storage phase. In the transport phase, the outer lid comes into play and is relied upon as the containment barrier according to the design rules applicable for transport casks. The significance of this prescriptive distinction on the functions of the two lids is that the outer lid is removable at the storage site where its teflon seals may be replaced while the inner lid maintains containment. The outer lid can then be reinstalled and leak checked to assure that transport starts off with a newly qualified leak tightness after what may have been an extended storage period.

Note that during the entire dual purpose cask life, i.e. the storage period; the simple preparation time for transport; the actual transport; and any later storage at an MRS or the repository; there is no additional fuel handling, and limited additional man-rem occurs. This contrasts significantly with the present Federal Waste Management System that contemplates storage only vaults at the reactor, separate casks during transport, new vaults at the MRS, separate casks during transport to the repository and possible vaults at the repository for lag storage. The multiple fuel handling sequences that such a program entails appears to NAC to be decidedly non-optimum and in fact highly undesirable.

The key reaction of people who understand the benefits of the dual purpose cask is to ask how much such a device will cost. While I assume cost is not an issue for this Board to address, I will tell you simply that NAC has shown that when the dual purpose cask, in its existing form, is integrated into the total Federal Waste Management System, there is a moderate cost savings to the program. If fuel consolidation at the optimum time is considered, or even if burnup credit is utilized, then the use of the dual purpose casks in the Federal Waste Management System can save \$1 billion or more. In addition, the inherent safety of the dual purpose cask system; its flexibility to accommodate any conceivable change in timing or direction of the Federal Waste

Management System; its ability to expand or contract to meet needs; the reduced amount of transportation required; the ALARA benefits; and the basic peace of mind offered by a one-step fuel handling system; all of this must be worth significantly more to the nation than even the program dollar savings NAC believes can be demonstrated.

The dual purpose cask system that NAC has designed utilizes a multi-wall concept made up of a 304 stainless steel inner shell that is 1.5 inches thick, then a 3.7 inch thickness of lead for gamma shielding, an outer shell of 304 stainless steel that is 2.7 inches thick is used, and finally 5.5 inches of a solid neutron absorber material known as BISCO. Imbedded in this neutron shielding material are copper and stainless steel fins to promote heat transfer to the environment. This assures continuous cooling of the fuel so that cladding temperatures remain below 380 degrees C as required by the NRC. The double lid concept alluded to earlier uses an inner lid of 9.0 inches thick made of 304 stainless steel and secured by 42 bolts 1-1/2 inches in diameter. The outer lid is 5.5 inches thick and made of 17-4PH stainless steel material. It is held in place by 36 bolts of 1.0 inch in diameter. The fuel in the dual purpose cask is held in place in an aluminum basket made up of 27 discs 2-1/2 inches thick stacked six inches apart from center-to-center.

The 26 tubes that each house a fuel element run transverse to

the discs and use a borated aluminum material to insure criticality control at all times.

There are no moving parts in the dual purpose cask system. It relies strictly on the natural heat transfer properties of the materials used and the shielding quality of its materials, all of which can be documented, measured and verified if need be. There are no maintenance needs of the dual purpose cask. Its integrity is continuously monitored by a pressure transducer system that can alarm upon detection of any change in the pressure of the internal cavity that houses the fuel. The volume between the two lids is also monitorable to determine that lid leaktightness is being maintained. This integrity measurement is achievable both during transport and storage.

The STC cask weighs 125 tons when fully loaded with 26 PWR fuel elements and has its impact limiters installed ready for transport. The complete assembly is analyzed in accordance with very strict NRC rules to demonstrate its ability to survive severe accidents including a 30 foot drop on an unyielding surface at a variety of angles and a one meter drop onto an unyielding pin of approximately eight inches in length on both its side and its lid end. These tests show the sturdiness of the cask as well as the ability of the impact limiters to absorb the deceleration energies with overall demonstration that the cask damage is minor and

containment integrity is maintained.

During the STC test program, done at Winfrith in the U.K., a 1/4-scale test model demonstrated its design conservatism in the various drop tests. One specific test subjected the cask with its basket and simulated fuel assemblies to g-loads that were five times the design values.

I might say that this is not 5% as alluded to earlier, but five times.

The simulated fuel showed no damage, the basket exhibited minor distortion and the cask body was dented, but not breached. In the pin drop test series, the lid showed itself to be so hard that only a minor scratch was evident from the drop. These data demonstrate the safety and conservatism of the dual purpose cask concept.

The shielding materials used in the dual purpose cask are simple and their properties are known. These properties can be counted on to be maintained throughout the cask life to assure worker and public exposure are controlled.

Verification of surface radiation fields can be done at any time if needed. The maximum dose rate at or near the cask must be within NRC limits. There is a personnel barrier that surrounds the dual purpose cask to minimize direct contact. At two meters from the cask surface the dose rate is less than the limit of 10 mr/hr.

An estimate has been made that 60,000 man-rem could

be saved in the Federal Waste Management System if it utilized dual purpose casks exclusively, compared to the current program of storage only and transport only vaults and casks. These benefits of the dual purpose cask continue to reinforce NAC's belief that the Federal Waste Management System could benefit significantly from adopting the concept. I believe it is even worthwhile to evaluate whether the dual purpose cask can be qualified for a third purpose namely the waste package used for the ultimate burial of the spent fuel. Perhaps simple additional tests would qualify its materials. Or perhaps reasonable additional features such as welding the lids shut would also be appropriate. It may be practical to view the waste package, made from whatever special material is needed, as simply a liner into which the dual purpose cask is inserted.

I would like now turn to specific recommendations for this Board. I felt it was important to go through this rather detailed look at the dual purpose cask because members of the public who may be present here need to have a complete understanding of the thought process and design consideration involved in implementing a cask project. The complexity is necessary in order to assure compliance with regulations designed to protect the public safety. Nevertheless, I must inform the Board that the dual purpose cask concept is not currently a part of the Federal Waste Management System as far

as NAC can determine from discussions with DOE and their consultants or contractors.

I might add at this point however, that the new DOE management is re-looking at this matter at our request.

The modeling techniques used by DOE for evaluating alternative concepts appears to be incapable of properly evaluating the dual purpose cask concept. This stems primarily again from the division of responsibilities where DOE does not consider the storage at the reactor site as a phase in the total Federal Waste Management Program. Other modeling limitations exists such as single purpose attributes of casks versus multi-use attributes. This should be considered by this Board and the DOE itself as an unacceptable situation. NAC invites this Board to review the details of the NAC dual purpose cask and the engineering analysis that demonstrates it's capability and ability to meet the NRC requirements.

This review could include our cost analysis and savings both in time and in man-rem or other system savings such as in number of shipments. We have started such a dialogue with DOE, but we are concerned about the limitations of their evaluation techniques, as I noted earlier, and the timeliness of the review relative to decisions that DOE will need to make to meet it's 1998 obligation to accept fuel from the reactors. One evaluation technique that could be

worthwhile is for this Board to sponsor a Probabilistic Risk Assessment or PRA of the Federal Waste Management System considering the use of dual purpose casks. NAC is confident that the reduced handling and reduced shipments, combined with the inherent safety of the dual purpose cask, would show it to be a superior risk concept.

Once again, if I could digress for a moment, the burnup level issue spoken about earlier, burnup credit and safety margins are all items that you would find discussed in great detail in the safety evaluations.

The issue of fuel consolidation seems to be languishing in indecision within the Federal Waste Management System. It is NAC's belief that consolidation should be done.

Further, we believe that the full benefits of the dual purpose cask lies in consolidating the fuel before it is inserted in the cask. Consolidation, in our opinion, is properly done at the reactor plant where required operations are either familiar to the plant staff or are logical extensions of their capabilities and that of their service vendors.

The consolidation would be performed within the plant containment structure or the fuel building, which is certainly the safest place for it to be done, by an infrastructure in place, versus building a new one such as at an MRS or at the repository. Here too, NAC believes a PRA

would show this to be the prudent approach. One again, however, the separated responsibilities of the utilities versus the DOE does not encourage the evaluation of what is best for the nation on this issue. Some sort of incentive needs to be provided to the utilities to encourage them to consolidate their fuel so that the Federal Waste Management System can receive the benefits, since the utility will clearly not see the full benefits of this activity.

We have heard that some responsible participants in the Federal Waste Management System have raised the issue of whether the waste package needs to be demonstrably criticality safe over thousands of years even if intrusion occurs due to deterioration or human activities. Certainly consolidation would help to alleviate concerns in this area.

NAC happens to be on the leading edge of the dual purpose cask technology. We see its benefits and we believe that the public and the Federal Waste Management System need to seriously consider this concept. The STC is an economic asset because of our lead position. However, we expect others will successfully develop and in fact already are developing their own versions of the dual purpose cask.

At the same time, NAC is developing a transport-only cask concept under contract to DOE. That design includes a generation of features such as an innovative WEDGE-LOC lid that requires no bolts and has more efficient shielding

material through use of depleted uranium. Notwithstanding this diverse participation in cask technology development, NAC believes the dual purpose cask concept, even in its current stage of development, has a higher benefit/cost ratio for the Federal Waste Management System. Later versions of the dual purpose cask can adopt fuel consolidation, the WEDGE-LOC lid and other innovations to further benefit the Federal Waste Management System.

Early in the formative stages of the Federal Waste Management System cask development program, NAC offered, on a no-cost basis, to make available to DOE a truck cask design and a dual purpose cask design that at that time was also just in the preliminary design stages. To date, DOE has not responded to that offer for the dual purpose casks. Recently NAC has reiterated the offer to make available to DOE the dual purpose cask design that now exists. NAC hopes that DOE will accept this offer. Perhaps this Board could be a catalyst on this matter, performing its own independent evaluation of the integrated benefits of the dual purpose cask to the Federal Waste Management System. The technology exists today; the NRC review of the technology is underway. The NRC views on the acceptability of the design should be solicited by this Board.

A generic rule recently promulgated by the NRC under Part 72 has given general approval to certain metal storage casks and will also be applied to the dual purpose cask. This

general license helps utility users since they now know they can select a pre-licensed design without site specific licensing actions by the utility. Pursuit of extending this general license to the MRS or to lag storage at the repository would also benefit the program. Further more, endorsement of the use of such a license would signal the utilities that there is an incentive to using a pre-licensed dual purpose cask. This would promote the benefits of the cask system as well as define a lot of interface issues currently unanswered in the Federal Waste Management System.

In addition, this endorsement would minimize the proliferation of storage options being selected currently by utilities by which the Federal Waste Management System transportation segment will have to interface in the not too distant future. The standardization that would ensue in system design, system requirements, spare parts, tools, handling equipment, transporters and servicing would be a cascading phenomenon that would assure that the Federal Waste Management System was on a solid technical footing. There are many other successful technically-based industries that could not exist today if they had not made similar standardization decisions early in their life cycle.

Earlier, I mentioned two studies know as FICA and NSTI that NAC has conducted about the interface conditions and limitations both at reactor sites and in the transportation

infrastructure near sites. Both of these studies were commissioned by and paid for by DOE. In NAC's view, these studies provide a wealth of data that is not yet being used to the benefit of the program. For example, the present Federal Waste Management System program contemplates that as much as 45% of spent fuel shipments will be by truck, hence the existence of a truck cask design program underway at General Atomics and Westinghouse. The current program also has undertaken development of two rail/barge cask programs, one of which NAC is performing, the other by B&W, with a weight limitation of 100 tons. A review of the FICA data, however, shows that the optimum Federal Waste Management System cask fleet should consist of a high-end capacity cask in the range of 120 tons that could service approximately 65% of the plants as they now exist. A medium-end capacity cask of about 70 tons would be useable by about 30% of the remaining 35% of plants not able to currently handle the high-end capacity casks.

This cask fleet arrangement would result in only 5% of the spent fuel being shipped by truck. In addition, preliminary data recorded in the course of the FICA study suggest that plant upgrades such as crane capacity improvements could significantly alter the conclusions about the optimum cask fleet. Once again, I would like to point out to this Board, that given the prescriptive definitions of

which institution will consider which phase of the Federal Waste Management System, I believe it is unlikely this information will be used in the selection of the optimum cask fleet. I urge this Board to evaluate the FICA and NSTI program results and draw its own conclusions about the appropriate parameters for the cask fleet.

I believe that this Board could make a significant contribution to the Federal Waste Management System if it conducted a complete evaluation of these benefits of the dual purpose cask that I have enumerated today, and then pass its conclusions onto the DOE for incorporation into the Federal Waste Management System. It may be that this Board is the only public institution that exists that can look at the total Federal Waste Management System program, from beginning to end, unencumbered by the legislated divisions of responsibilities I have discussed here.

In summary, I believe this Board should look at the follow issues. 1) Fuel consolidation and it's optimum time in the Federal Waste Management System. 2) A PRA of the Federal Waste Management System using dual purpose casks. 3) The applicability of the NRC generic rule for casks to the MRS and the repository. 4) Review of FICA and NSTI data to determine the optimum cask fleet.

Thank you for this opportunity to share our thoughts and concerns. I would be pleased to answer any questions you

may have at this time.

DR. PRICE: Thank you. Dr. Carter?

DR. CARTER: Let me ask you a couple of questions primarily based on your lengthy experience and I believe you indicated that it was 28 years in this particular area or closely associated with it. Let me ask first your personal view on the waste confidence proceeding of the NRC where they determine that storage at the reactor site for up to 100 years is essentially a safe operation. Do you have any views on that that you would like to share with us?

MR. STUART: Yes. My view is similar to that in that I believe it is a safe operation. I believe the infrastructure in place at the reactors is such that storage whether it be in a cask of the type we have defined or in others could in fact be done for that period of time.

DR. CARTER: Okay. The other thing, would you agree with the statement that we already have an MRS and it is located in Morris, Illinois?

MR. STUART: Yes, I would.

DR. CARTER: Okay.

MR. STUART: In fact we have several MRS's in the sense that there is fuel stored in many, many reactor sites around the country.

DR. CARTER: Well it turns out that at Morris you've got reactor fuel from a number of reactors whereas most of the

others are either one or several plants that belong to a particular nuclear system.

MR. STUART: Yes, that is correct. That is the difference at Morris.

DR. CARTER: Yes. The other thing, again I'd like your personal views, you worked in this area a long time in terms of designing casks and related professional activities. What are your candid views now of the requirements of the NRC and the Department of Transportation as far as the standards and guidance involved with the storage and transportation of spent fuels, high-level waste?

MR. STUART: Well, first I would say that the requirements are very strict. They require a considerable sophistication and demonstration of the margins. I do not think that the requirements are unreasonable.

I believe that they demonstrate a significant safety margin, and an intent to protect the public appropriately. I believe there are certain inconsistencies between the storage and the transport requirements that could be changed or could be made more uniform and would simplify the licensing process.

I have been very encouraged, the NRC's recent generic rule which I mentioned, which permits a one-time licensing if you will of a design, without the repetitiveness or review. I would say that those are the major views I have at the moment.

DR. CARTER: And the other thing, I wonder since we've

heard discussion now of criticality issues to some extent on a very cursory basis, also with fuel burnup, and of course your concern with radioactivity in this sense in terms of the fact that you can have a criticality considerations, you've obviously got shielding considerations to concern yourself with in cask design, and also of course the dissipation of the heat that is generated. I think those are the major things although there are certainly many others. I wonder if you would take a couple of moments as a designer now to indicate for the record how you accommodate differences in criticality, for example, and how you accommodate differences in fuel burnup?

MR. STUART: Well, first of all in the criticality area, the designs that NAC has used and specifically those do not take credit for burnup. That designs that we have used assume fresh fuel. We don't necessarily feel that that is the only way to design a cask, but it is certainly one way to insert a considerable conservatism.

As I mentioned to you in my testimony we are developing a specific burnup meter that would provide much more than just an administrative control to assure that if you were designing a cask and loading it on the basis of the design being consideration of burnup, that you would then have confidence that the fuel was burned up prior to putting it in. And we believe that is an integral part of a burnup cask

concept.

DR. CARTER: I wonder if you could share with us the basic fundamentals of your burnup meter. Is this proprietary or can it be discussed?

MR. STUART: It is not proprietary. The burnup meter that NAC is contemplating is still in the formative design stages, so I cannot show you one today or bring you to where one exists. The technology involved is basically one of measuring different isotopes in the spent fuel and being able to infer from that because of known ratios what is the prior history of the fuel.

The uniqueness, we believe, in the equipment that we will be designing and manufacturing is that it will have very precise data to calibrate it because the measurement that will be performed of fuel will be very specific to the reprocessing of that same fuel assembly and the isotopic analysis that will be done later will be available for a one to one correlation. So we are not claiming in that regard that we are developing new technology per se, but merely that we are providing a very good calibration data to assure that the meter is doing what it is supposed to do.

DR. CARTER: What sort of accuracy do you expect to obtain with this in terms of burnup?

MR. STUART: Our plan is to shoot for about a ten percent accuracy.

DR. CARTER: The other thing, I wonder if you would give us some idea for example of what a dual cask costs these days? Approximate.

MR. STUART: I'm afraid that is the \$64,000 question, Dr. Carter. There are various costs that have been estimated by individuals that range all the way from about \$1 million to close to \$2 million.

DR. CARTER: So they are certainly rather expensive.

MR. STUART: Yes, they are expensive on a one-by-one if you will, but as I've indicated we believe that when you look at the dual benefits in the total Federal Waste Management Program, that they end up being a slight savings for the total program.

DR. CARTER: The other thing you mentioned in the design activities that you use a material called BISCO for the neutron absorbing material. Again, I wonder if you could tell us the nature of that material or is that a proprietary material?

MR. STUART: No, it is not a proprietary material in the sense that it is not NAC material. It is provided by another company. It is basically a poured-in-place polymer type material that will solidify and as it does it has very good and known neutron absorbing properties.

DR. CARTER: The other question I had or one question I had, I noticed in your NAC the STC, that capacity is primarily

based now on five year or ten year cool fuels.

MR. STUART: It is based on five year cool time.

DR. CARTER: Well there is some here that says if you take burnup credit, you can put more fuel elements in if they are ten year cool versus five year cool.

MR. STUART: That is correct. There are different versions of it.

DR. CARTER: Now, the question I have then, of course, a large part of our inventory at the present time is fuel that is considerably older than this.

MR. STUART: Yes.

DR. CARTER: What difference does it make in your cask design if this fuel is 25 years old versus five or ten years?

MR. STUART: The longer the age if you will, the more the radioactive materials have decayed, and the lesser heat load is imposed by individual assemblies and therefore a lesser heat load on the cask performance.

DR. CARTER: Okay, so essentially, you can take into consideration in a cask design, not only criticality differences in the fuel, but essentially also the ages of the fuel per se?

MR. STUART: Yes, that is correct.

DR. CARTER: A couple of other questions, again it might--you might have no direct involvement in them, but I just wondered based on your experience in the cask design, I'm sure

you would have an interest whether you have an involvement or not, what is your opinion and has NAC done any studies, for example on accidents that may have occurred either in handling or transportation of casks over a period of time?

MR. STUART: I'm not aware of any specific report that NAC has assembled on evaluating cask accidents. During the life of the company in that regard we are keenly interested in any that do occur. We have experienced some minor incidents of our own that have given us lessons to be learned, but nothing very dramatic. But, we do follow the literature and when any events do occur we are very interested in determining what we can learn from that.

DR. CARTER: What about any experience you might have had now in exposure studies involving fuel handling and transport.

I'm talking about radiation exposures to the people involved in the processing either in the transport side or the handling side? Again, has there been any involvement by NAC in such studies?

MR. STUART: Once again, I am not aware of any studies, per se. On further reflection, I might be able to come to across some that have occurred at NAC and if I do I will be happy to provide them to the Board.

DR. CARTER: All right, sir, that would be appreciated.

MR. STUART: I was just going to add, we of course when we are transporting fuel are measuring radiation levels

ourselves so we have our own experience to draw on in that regard.

DR. CHU: I just have a question on your references at several places to the separated responsibilities between the various folks who have a part to play in the Federal Waste Management System, and you said that there is no incentive for the utilities to do the evaluation as to what would be best for the whole system. Now, suppose the evaluation weren't done, and even it were, if your concept were to be proved to provide gains in both additional safety as well as efficiency, that there would be no incentive because again of the divided responsibilities of the management system for one player, i.e. the utilities, to adopt what may in fact be the best thing for the entire Waste Management System. Do you have any suggestions as to how that situation might change?

MR. STUART: Yes, I do. I believe that it would be in the interest of DOE to provide incentives to the utilities to encourage the utilities to look at a more optimum system that they themselves would not necessarily see. And two specific examples of that that I can think of is the fuel consolidation itself as I mentioned.

If there were a decision on the part of DOE that they wish to have fuel in the consolidated form, I'm sure they could convince the utilities to do that by the appropriate incentives. Likewise as we have mentioned the dual purpose

cask by its nature is somewhat more expensive on an individual basis, however, once again, the utility I believe could be encouraged to utilize such a device in the interest of the overall Waste Management Program by a cost sharing incentive, because certainly the Federal Waste Management System as a whole in our judgement will save by using dual purpose casks even though the utility itself may not see the savings directly as it purchases the cask.

So, I believe these are two examples of how this mutual working together could be encouraged rather than as it is presently where it doesn't appear to be encouraged.

DR. CHU: Now you are saying that the DOE is re-examining the use of dual purpose casks in the Waste Management System.

Are they looking upon the notion of cost-sharing of stored facilities at the utility sites and are they also re-examining that as well?

MR. STUART: I cannot say that they are re-examining that at the moment. We are just at the early stages of working with them on re-examining the value of the dual purpose cask, but some of the press statements that I have read seems to indicate to me that DOE is certainly open to looking at that possibility of cost sharing.

MR. CHU: Thank you.

DR. PRICE: At our last meeting with DOE, on October 22, we brought up to DOE the question of this somewhat

compartmentalization of jurisdiction and you got inside the fence and outside the fence and the repository being separate and we have expressed a concern in general about the lack of an overall systems evaluation, systems optimization approach which if I understood your testimony, you would share some of that sentiment at any rate that we've expressed to DOE. And we asked DOE then to consider carefully the issue of minimization of handling and have the possibility of a workshop in the minimization of handling. Do you have any comment on that idea, the idea of a workshop which would bring together people such as the people involved in the design of casks, people who have concerns in storage of casks, whether it is on-site or MRS or elsewhere, people who are concerned with the repository and bringing them altogether under one roof to discuss the issue of optimization through minimization of handling?

MR. STUART: Yes. I must say I am very encouraged that the Board has made such a suggestion. I believe that that is entirely appropriate and there is transport experience that needs to be included into the program. And I am certain that if such a program or seminar or workshop were put in place, there would be a very large enthusiastic response of the industry to participate in that.

DR. PRICE: When you have been going through the certification process, you have in essence had to follow two

paths, one for storage for this dual purpose cask and the other for transportation. Has that experience been such that you would like to make any particular comment about it? Is it cumbersome or burdensome to go two paths, or do you have any comment?

MR. STUART: Yes, it is quite cumbersome. If I had with me the two application documents we have to submit for example for each phase, I'm sure you would be quite impressed by its size. And to a large extent the material in both documents is duplicated. So it does become quite burdensome. And in my view there may be two licenses, but there is only one cask and it seems to me that both uses and both requirements could be reviewed at the same time. And I believe that the current situation is purely because of the NRC's organizational structure, not because it is the most efficient way to do things.

And I think perhaps our application which as I understand it is the first one for the dual purpose is bringing the two parts of NRC, the two branches together somewhat to see how they can reduce their review time and the duplication of their activities. So, I hope in the future that will occur.

DR. PRICE: During your testimony as we were following it, Page 7 was not brought out orally, and I didn't know whether that was because you didn't want to mention it or the

pages stuck together and you would like to go through Page 7 and present us that material. And if you would, we would invite you to do so.

MR. STUART: Well, thank you very much, sir. I did realize as I was about two-thirds of the way through my testimony that I had skipped a page and I couldn't quite understand it and they were basically stuck together.

So, let me just read that page and say that to put it in context again, we were looking at NAC's view of the Federal Waste Management System.

First, as we have been speaking here, we currently see no one or no institution looking at the nation's best interests by taking total systems view all the way from the generation of the spent fuel at the reactor; through its storage, transport, preparation for disposal, and finally its disposal. This is most likely a consequence of the governing legislation and related regulations that have compartmentalized the overall process, such that each institution looks only at its own defined scope or area of responsibility. There are no guidelines on what form the fuel should be in when handled in the Federal Waste Management System. Should it be intact or consolidated? No standardization exists, for example, about burnup credit for fuel storage versus fuel transport. Also, there is no envelope definition of the reactor interface, no standard

storage or transport cask, no reference Monitored Retrievable Storage Facility and so on and so on. Furthermore, there appears to be little incentive to bring the various players together, i.e. the utilities, the transport vendors, the DOE or the MRS host state, to develop a fulling integrated system.

As an engineer, I know that if such an approach to aircraft design were taken, we would never have achieved the highly efficient air transport system we now have. Closer to home, I know that today's successfully operating reactors could not have existed without an overall system approach to their design. Thus, on its present course, it is difficult to believe the Federal Waste Management System can be successfully implemented or if implemented that it will be viewed as the nation's best technical solution.

Many side technical issues also exist and seem to be begging for resolution, but so far without success. For example, as mentioned earlier, will the fuel be consolidated or not? If yes, where will the consolidation take place? Should ALARA be employed or is the Federal Waste Management System itself considered ALARA? Must the fuel be criticality safe under all conceivable circumstances including throughout the life of the waste package when buried? Can burnup credit be counted on at each stage of fuel handling and so on. In addition, the Federal Waste Management System started out with the intent to utilize available industry technology to

the maximum extent possible. Yet as we look at the current Federal Waste Management System, and those technologies that NAC and others have developed or are in the process of developing; we conclude simply that the Federal Waste Management System is not yet taking full advantage of this available technology.

Thank you for the opportunity to insert that page.

DR. PRICE: Yes. You are welcome. Question now, what is needed for fuel consolidation to become a mature technology?

MR. STUART: I believe it needs a program in the order of ten fuel assemblies to be real fuel assemblies, irradiated fuel, to be disassembled and consolidated into canisters. That that would convince the industry that the fuel consolidation itself can be done efficiently and also the non-fuel bearing components of the fuel need to be packaged in some type of container in a way that the overall process has in fact reduced the volume, that is consolidated the volume rather than increased the volume. That that is what it would take to convince the industry that it is a viable process and it can be done expeditiously.

DR. PRICE: On the non-fuel bearing portions, by your suggestion, would you be involved in some type of process, cutting and so forth to make it consolidated to meet your criteria?

MR. STUART: Yes, I believe that would be the case in

certain circumstances. In the system we are pursuing at the moment, for example, it is focusing on the BWR assemblies. It contemplates cutting certain portions of the non-fuel bearing components. It contemplates crushing and compacting other components in such a way that the finished pieces will fit quite nicely and neatly and compactly into a storage canister.

DR. CARTER: But the fuel elements themselves would be left in there.

MR. STUART: They would be left intact, but just consolidated in their physical location to one another.

DR. CARTER: And also the crushing and so, are you talking about the shrouds and pins and so forth?

MR. STUART: Yes.

DR. PRICE: Could you give us copies of the FICA report and the NSTI report since you have brought them up?

MR. STUART: I would certainly be pleased to do that with one caveat that they do belong to DOE and I assume they will say yes and permit us to give them to you.

DR. PRICE: Thank you. In your dual cask you briefly mentioned in your testimony about the dual cask, the possibility of it being used also in the repository. The idea of this universal purpose cask for storage in the ground, above ground and also transportation, those three areas, in the ground, above ground and transportation, some have referred to the whole concept. I think I read something about

an ugly duckling and referred to it as the flying car and that there are many things that ultimately will defeat the idea of this kind of thing. Do you have any comment on that.

MR. STUART: First of all, let me just comment on the ugly duckling that is a phrase that I think we coined at NAC in somewhat of frustration that we were having difficulty finding the industry giving it what we felt to be a serious consideration.

Regarding storage above-ground--

DR. PRICE: Excuse me, but you didn't call it a flying car?

MR. STUART: No. I don't believe we've given it that title. I'm not sure of the meaning of that particular term, but at any rate, the idea of storage at the repository for us it seems that the dual purpose cask is ideal for that in terms of lag storage if needed. And that's one of the benefits of that flexibility if there were for example no MRS, but a repository, the dual purpose cask would be equally valuable to the program.

In terms of in-ground storage, it just seems to us that the materials that we are using in our cask are well-known for their corrosion resistance, they are well-known materials, and while I don't believe I could give you the precise life of our casks if it were to be located somewhere, it certainly is very long and it is again made of materials

that are quite impervious to corrosion, and we just believe that once you have put the fuel in that cask it certainly would be the simplest thing to leave it there and design a waste package around it to make the repository a very simple facility rather than a complex facility.

DR. PRICE: The concept of placing the canister that would ultimately go in the ground rather than a cask, into a cask, such as a dual purpose storage cask, now instead of containing simply fuel rods, but containing fuel rods within a canister that ultimately would go into the ground so that the handling would take place for example at the site, the power site, and be placed in the canister and then placed into the combination storage transportation cask, have you considered this kind of a concept? Are there things which forbid such a concept? Is it something that might be pursued?

MR. STUART: Let me say on the bottom line, I certainly think it is something that might be pursued. We have our own experience in our current fleet of transport casks of putting liners in those casks to handle special fuel. So the concept of putting a liner in a cask is certainly something that is not exotic and could easily be done.

I would like to suggest though that my belief is that the liner if it is to be considered the waste package, the final waste package, that probably is many years away from being designed. Because, as I indicated, probably our best

scientist need to do some more thinking about what is the material of the final package.

At the present time, however, there is the dual purpose cask and other types where the fuel can be consolidated, it can be put into the cask, the cask can be loaded, sealed and you would be given a great period of time to design what is the final canister. And so in a cart before the horse kind of analogy I would say we can certainly do all that while we have yet to study whether or not there is a very exotic, very long life material for the final package. And I would urge not holding up to find what that design is, to proceed with the Waste Management Program as it is. And there is the ability even proceeding as I have indicated that the final package becomes the final container into which you put the cask. And so it seems to me you could proceed as we have indicated giving up practically no options for the future. You can always retrace, reload the fuel, put it in another canister or whatever.

DR. PRICE: In your testimony you refer to a--this is a different topic. In your testimony you referred to a safety factor of 5 upon one occasion. Is there anything in the cask design, the dual purpose cask design, similar to that which in previous testimony referred to as having a 5% safety margin?

MR. STUART: Yes, there is. I'm afraid there is quite a bit of misunderstanding in that regard. There are various

kinds of requirements placed on the casks, such as, for example, evaluating its structural integrity in certain events where the methods of evaluating the structural integrity are very prescriptive and very conservative. And so for example in the basket that is in the dual purpose cask which is the specific piece of equipment that I was referring to that saw five times the g-load, we are required to analyze that in a very, very conservative way. And when you do that analysis in certain stresses, you do show a very limited margin over the limitation, such as in the neighborhood of 5 or 10%.

However, when you take the actual piece of equipment and you subject it to a test as I have alluded to, you find that the actual piece of equipment as designed can take at least five times the design load. And in fact there was a piece of the basket because of its location that actually experienced 50 times the design load and it still survived intact with minor distortion.

DR. PRICE: There was a reference to a 100 degrees fahrenheit exposure, that someone was referring to, was it fahrenheit by the way, or was it centigrade?

MR. STUART: I'm quite certain that is what was being referred to. Once again that's a designed parameter that is selected whereby the assumption is that the cask is sitting in the direct sunlight in 100 degrees temperature day in and day out with no opportunity to see other temperatures. And that

is again a conservative way to evaluate the heat transfer properties of the assembled cask fuel and basket and so forth.

And while someone might argue that in a specific location the temperature can be higher than that, this is a designed requirement for continuous, all the period. And so when you look at it in that light, whether on a given day it might 120 degrees in the desert and 40 degrees at night is more like the real world, that the average is certainly not 100 degrees 365 days of the year.

DR. PRICE: So it would sound as if some of the requirements then that are given are not truly reflective of the actual situation.

MR. STUART: Yes, I'm afraid so. As I indicated earlier the NRC requirements are quite severe and quite conservative. Not entirely inappropriate for 100 degrees in this case, but unfortunately, unless you look behind that one number, you do not appreciate the degree of conservatism that is in that one simple statement that you shall assume 100 degrees ambient temperature.

DR. CARTER: One additional question, how many current companies, bona fide companies or viable companies are there that do cask design and fabrication for either high-level waste or used fuel elements in the United States?

MR. STUART: I don't have a precise number, but it's in the neighborhood of half a dozen, maybe ten.

DR. PRICE: If there are no more questions, of Mr. Stuart, we appreciate very much your testimony.

MR. STUART: Thank you, very much.

DR. PRICE: I was cold a little bit earlier, I am getting hungry about now, so I think we will take a break and come back at 1:15 p.m.

(Whereupon, a lunch recess was taken off the record.)

AFTERNOON SESSION

1:19 p.m.

DR. PRICE: All right. Let's reconvene at 1:19 p.m., and our next presenter will be Mr. Howard Shimon, representing the Edison Electric Institute and UWASTE program.

MR. HOWARD SHIMON: Good afternoon.

As you indicated, I'm Howard Shimon, Chairman of the Edison Electric Institute Utility Nuclear Waste and Transportation Program's Transportation Working Group. Sitting next to me today is John Vincent, who will be taking over the bearing of the torch effective January 1st, and I thought it would be helpful if we were both here today to answer questions and let you know who we are.

I appreciate the opportunity to be here today and present the utility industry's perspective on the status and scope of the DOE/OCRWM's Cask System Development Program.

This presentation is particularly timely, because the TWG has just completed its review of the preliminary design reports submitted to DOE/OCRWM by the five contractors working under the CSDP. Our perspective on the CSDP reflects not only conclusions from review of the preliminary design reports, but also the positions that we have consistently taken on the appropriate scope and pace of the CSDP and its integration with other OCRWM activities. For that reason, I think some background information may be helpful in understanding our current position.

Many of the items we are concerned about have been in existence for some time; EEI/UWASTE has raised these concerns repeatedly. We are encouraged that the new DOE/OCRWM leadership will heed these concerns and effect changes to the program.

Although the transportation program that is being developed by DOE/OCRWM plays only a supporting role in the national program for disposing of spent nuclear fuel and high-level radioactive waste, it is of vital interest to the utility industry. There are several reasons for this interest. First, the DOE/OCRWM transportation system is the only physical interface between utilities and the federal waste disposal system. Second, transportation will be the NWPA activity that is the most visible to the largest number of people. Third, development of the transportation system,

together with the rest of the NWP program, is being financed out of the Nuclear Waste Fund. We have an obligation to our customers to do whatever we can to ensure that their contributions to this fund are utilized cost-effectively by DOE/OCRWM.

I would like to elaborate on several of these points because of their significant influence in formulating the TWG's position on the CSDP. The first is the physical interface between the DOE/OCRWM's transportation program and utility facilities. DOE faces the task of developing a transportation system that can accommodate the unique spent fuel handling limitations that exist at each nuclear plant, such as cask weight limits, pool configuration, and vertical clearance. Several years ago DOE/OCRWM, through a contractor, initiated the Facility interface Capability Assessment, the FICA. The purpose of FICA was to create a data base on utility spent fuel handling facilities through use of existing sources of information. Recognizing that the data collected through the FICA should play a critical role in the cask designs and in planning the NWP transportation system, the TWG and its predecessor group took an active role in the FICA process to ensure that the DOE obtained comprehensive and relevant information. Although our review of the FICA process leads us to conclude that the data collection effort has been handled in a technically sound fashion, the more difficult

task has yet to be accomplished. DOE/OCRWM's management has a responsibility to be sure that the data collected is (i) summarized and made available in a useful format; (ii) updated as appropriate to assure continued validity of the data base; and, most importantly, (iii) incorporated into the cask designs and used for planning purposes.

The interrelationship between DOE/OCRWM's transportation program and utilities' at-reactor storage plans is another issue that plays an important role in our current position on the CSDP. This issue is becoming increasingly important in light of the repeated delays in the projected schedule for implementation of the NWPA program. Because of these delays, utilities are being forced to resort to interim actions to expand at-reactor storage capacity, employing such options as rod consolidation, re-racking, transshipment, or at-reactor dry storage. The particular storage technology choices made by the utilities will ultimately play a significant role in determining the efficiency of spent fuel handling and transfer operations when OCRWM removes spent fuel from the utilities' sites.

We believe it is essential for DOE/OCRWM to implement the NWPA program in a cost-effective manner consistent with statutory objectives. To meet this goal, DOE/OCRWM must seek to optimize coordination of its transportation program with the remainder of the spent fuel

storage and transportation program. For example, it is not cost-effective to develop a variety of transportation cask designs so far ahead of the date that they will be needed that the designs will have to be redone to take account of such factors as changes in spent fuel burnup, modified regulatory requirements, and interim storage systems that have been implemented at utility facilities. Nor, if there is no pressing need to proceed immediately with the development of various cask designs, does it make sense to do so before it is possible to integrate the data collected through the FICA and other efforts.

Given the importance of DOE's transportation program to the successful implementation of the NWPA, the utility industry has participated actively in the development of the CSDP from its outset. In early 1988, the industry sent a letter to OCRWM setting forth our position on the pace and scope of the CSDP. Based largely on the factors discussed above, the letter made two points: first, that OCRWM was proceeding more rapidly than was warranted at that time in developing from-reactor casks; and second, the OCRWM should confine its design development efforts to one legal weight truck cask. We urged OCRWM to implement our suggestions upon completion of the preliminary design stage, which was a contractual hold point under the five cask development contracts that were proceeding under the first phase of the

CSDP.

At the time that we first took this position, we believed that cutting back the CSDP to reflect delays in the repository development program would provide OCRWM the opportunity to factor the information developed through the FICA program and other data collection efforts into the final cask designs. It would also provide DOE and the utility industry needed time to ensure coordination of utility near-term storage plans with the OCRWM transportation system. On the other hand, given the potential for bringing an unlinked MRS into operation in 1998, there was some justification for proceeding with the development of at least one cask design. We viewed a legal weight truck cask design as the most appropriate for this purpose because it could be used to remove spent fuel from the pools of all reactors. In addition, the availability of a prototype legal weight truck cask of more efficient design than casks currently in use could be of value to both utilities and DOE/OCRWM during the period before large-scale shipments begin under the NWPA. Developing the legal weight truck cask design could also provide DOE/OCRWM valuable experience with respect to the Nuclear Regulatory Commission's cask certification process.

In early 1990, after reviewing the preliminary design reports for the five casks then under development, DOE/OCRWM announced its intent, given programmatic and

budgetary considerations, to redirect its CSDP contractors' efforts so as to proceed with final design of one legal weight truck and one rail/barge design at a full funding level, and one legal weight truck and one rail/barge design at a partial funding level, with these latter contractors' efforts being focused on certain technical issues. Our initial reaction to this announcement was mixed. Although we were pleased that DOE/OCRWM had decided to reduce the CSDP to a somewhat more manageable level, we were disappointed that it had not implemented all of our recommendations. Unfortunately, when DOE/OCRWM made this announcement, we had not yet had an opportunity to review either the preliminary design reports submitted to DOE/OCRWM by the five cask contractors or the DOE's Summary of Technical Review and Evaluation of Preliminary Cask System Designs and Contractor Performance. We have now had that opportunity, and I would like to share our conclusions with you.

EEI/UWASTE reviewed in detail each of the five preliminary design reports submitted to DOE/OCRWM. On the basis of this review, we concluded that, although we may not have made the same decisions that DOE/OCRWM made with respect to which cask development contracts to terminate or down-size, we do not have a strong technical basis for disagreeing with their decisions. Accordingly, we focused our efforts on identifying significant technical and operational concerns

raised by each cask design rather than second-guessing DOE's decisions. Moreover, we decided to identify and provide DOE/OCRWM with specific comments on each preliminary design in the event that DOE/OCRWM redirects the CSDP in the future. Based on these specific concerns, the TWG identified several major concerns that are generic to the cask development effort.

Time does not permit me to discuss with you all of our comments on the preliminary design reports, although I will make a copy of our comments available to you. What I would like to do today is address some of our major generic concerns with the cask design effort. After I have identified these concerns, I will explain how they have served to reinforce our position that the CSDP should be scaled back even further along the lines that we initially proposed in 1988.

First, it appears that the cask design teams do not have, or are not utilizing effectively, the fuel and transportation cask handling experience that is currently available within DOE, its contractor organizations and the electric utility industry. Close to 5,000 commercial shipments of spent nuclear fuel have been made in this country, and even more have been made internationally. Although the DOE/OCRWM is developing a new generation of higher capacity and more efficient casks than those that have

been used in the past, it will face many of the same operational problems that were experienced in past shipping campaigns. Thus, it would be to DOE/OCRWM's advantage to gain as much insight as possible from individuals that have experience in handling, shipping and receiving spent nuclear fuel. Many of these individuals are already involved directly in this program as employees or contractors of DOE. Unfortunately, however, our review of the preliminary cask designs does not confirm effective utilization by DOE/OCRWM of the experience of these individuals.

The EEI/UWASTE review team, which included individuals with substantial spent nuclear fuel shipping experience, identified many operational concerns that should have been apparent to anyone that has been involved in a shipping campaign. For example, the opinion of the utility review group, based on significant hands-on experience, is that a realistic, yet optimistic, fuel transfer time is approximately 30 minutes per assembly. The NAC Rail/Barge cask preliminary design report estimates four and a half hours to load 52 BWR fuel cells, which equates to 5.2 minutes per assembly. The Nuclear Packaging preliminary design report estimates that it will take four hours to load 31 BWR fuel assemblies, or eight minutes per fuel assembly. Total cask handling time estimated in the preliminary design reports for all but one cask were optimistic to the point of being unrealistic, particularly in

light of cask drying procedures and times.

This failure to recognize the realistic time frame needed to load a cask could perhaps have been avoided had DOE/OCRWM been able to avail itself of the significant fuel and transportation cask handling expertise that currently exists. DOE/OCRWM must develop a mechanism for doing so as soon as possible so that it can utilize this expertise for timely resolution of concerns with the cask development effort that have already been identified, as well as those that may arise in the future.

We are also concerned that the cask vendors may not have had an opportunity to factor the FICA data fully into the preliminarily cask designs. The purpose of the FICA was to provide DOE with the physical parameters existing at the various utility sites, such as crane capacity and facility headroom, so that it could develop a transportation system that is compatible with those parameters. The final and verified FICA data, however, was not available when the vendors commenced their preliminary design effort. To the extent that the cask designs require use of ancillary equipment at particular sites, it is important to check the FICA data to verify that the cask and ancillary equipment will still be compatible with the utility site.

The preliminary cask designs also do not take into account all of the requirements of the standard contract or

practical utility needs with regard to fuel that will be shipped; for example, shipments of irradiated channeled BWR fuel. For example Appendix E of the standard contract presents the maximum nominal physical dimensions for BWR spent nuclear fuel that must be met for it to qualify as standard fuel, given that all other contract requirements are met. Among these dimensions is a maximum nominal six-inch square cross-section. The present dimension of the BWR baskets for the BR-100 rail/barge transportation cask design is reported to be a 5.72-inch square, and that for the GA-9 BWR truck cask design is reported to be a 5.82-inch square. Thus, the dimensions of the BWR baskets for both of these designs are below the dimensions specified by the standard contract. This is a problem that must be addressed.

Aside from the contract, as a practical matter, there is a strong probability that in order to be acceptable for transportation of irradiated channeled BWR fuel, basket cell dimensions should be no less than a 5.9-inch square. Even though DOE/OCRWM has been aware for more than a year of the discrepancy between the CSDP cask designs and both its own contract requirements and the utilities' practical shipping needs, it is still not clear what corrective action will be taken. Because we are concerned that this problem may have a significant impact on the cask designs and their future utilization, we hope that the DOE/OCRWM will turn its

attention to this issue.

Another concern is the narrow margin between cask designs and regulatory or design limits. For example, calculated dose rates are extremely close to the regulatory limits. This could present a significant problem, particularly when one considers that (i) casks are only at the preliminary design stage; (ii) fuel with much higher burnup than initially anticipated will have to be shipped; and (iii) verification of compliance through field measurements will introduce significant variations associated with use of different equipment and personnel. Similarly, the cask designs appear to view NUREG-0612 requirements for single failure proof systems; that is, a safety of ten, in isolation, when utility experience has indicated that when the cask designs are considered in the context of the physical and regulatory constraints at a particular site, the NRC may require use of a higher factor in order to address both static and dynamic loads. Some cask designs also assume NRC acceptance of burnup credit when utilities have had difficulty in obtaining this allowance from NRC. We encourage DOE/OCRWM, if it has not already done so, to explore these issues with the NRC so that they do not become a significant problem at a late stage in the design development effort.

The narrow margin to design limits leads to a minimal allowance for design changes through the final design

phase. The related concern is that design changes would not allow a suitable fall-back position. For example, the designs should have sufficient margin to allow changes to accommodate shipment of higher burnup fuel while still representing an efficiency improvement over the current cask fleet.

As you can see just from the brief overview of our comments on the preliminary design reports, there are a number of significant technical and operational issues that have yet to be resolved, and it is likely that significant additional concerns will arise as the designs move toward finalization. Faced with these concerns and the continued delay in the projected schedule for the commencement of repository operations, we think it incumbent on DOE/OCRWM to make a fresh assessment of the appropriate scope and timing of the CSDP at this stage in the NWPA implementation process.

In our view, there are basically three options available to DOE/OCRWM. The first is to continue the current CSDP, as limited in scope by DOE/OCRWM. The second option is to continue the current CSDP, but to adopt the EEI/UWASTE recommendation that DOE/OCRWM proceed to final design at a full funding level only on one legal weight truck cask, and continue to gather and assess information on such matters as the compatibility between utility handling and storage configurations, and the DOE/OCRWM transportation system before completing final design of a rail/barge cask. The third

option is to put a halt to the entire CSDP, take the time to assess the concerns identified by DOE/OCRWM, EEI/UWASTE, and others who have reviewed the preliminary design reports, and start over again using a more comprehensive and accurate data base.

The only justification we see for continuing the CSDP, even on a scaled back basis, is the potential for locating an MRS site through negotiation with a volunteer host and bringing an unlinked MRS into operation in 1998. In other words, if there were not possibility that shipments to an MRS or a repository would begin prior to 2010, there would be no need to proceed now with a cask development effort. However, the possibility that shipments to an MRS could commence by 1998 or shortly thereafter is not sufficient justification for full funding of the development of a rail/barge cask at this time. Essentially, nothing has happened since 1988, which would cause EEI/UWASTE to reconsider its recommendation that DOE/OCRWM proceed with final design on only one legal weight truck cask. If anything, subsequent events now support our recommendation even more strongly.

For example, we still consider it extremely important that DOE/OCRWM not proceed to final design on a rail/barge cask until it has had an opportunity to factor the completed FICA data into the cask design effort. Similarly, our concern that DOE/OCRWM and the cask contractors need more

information about such issues as utility spent fuel storage and handling operations, and NRC licensing criteria, rather than being lessened over time, is stronger today than it was in 1988. With DOE/OCRWM projecting the commencement of shipments to a repository in 2010, and the status of the MRS uncertain, more and more utilities are being forced to implement various at-reactor spent fuel storage technologies.

Thus, by the time that DOE begins accepting spent nuclear fuel for shipment, a significantly larger percentage of the spent fuel inventory will be in dry storage configurations than was anticipated when DOE/OCRWM initiated the CSDP. The casks being developed under the CSDP are being designed under the assumption that they will be loaded with individual assemblies at the spent fuel pool. This could necessitate removing fuel from dry storage, and would introduce significant inefficiencies into the process. Although it has recognized that the storage options chosen by utilities will have a major impact on its transportation program, DOE/OCRWM has not followed this recognition to its logical conclusion by halting further development of a rail/barge cask design that is based solely on the assumption of pool storage of commercial spent nuclear fuel.

The concern that DOE needs more experience with the NRC licensing process, and therefore would benefit from going through the process and attempting to license a legal weight

truck cask, has also been strengthened by our review of the preliminary design reports. For example, the narrow margins allowed in the preliminary designs for changes due to regulatory requirements and unforeseen events demonstrate a naivete with respect to the cask certification process. While experience is the best teacher, there is no need to put two casks through the process to gain that experience.

Although we clearly favor proceeding beyond final design for only the legal weight truck cask, as opposed to DOE/OCRWM's intention to proceed with both the truck and rail/barge casks, the more difficult question is whether our technical concerns are so fundamental to the cask design effort as to warrant a total halt to the CSDP. If it is not likely that these concerns can be resolved satisfactorily in an economic manner, and there is no compelling need to move forward expeditiously to keep pace with the remainder of the NWPA program, then DOE/OCRWM, the utility industry, and the public would be far better served if DOE/OCRWM were to terminate the CSDP.

If it were to do so, DOE/OCRWM could better focus its efforts on the data collection and analysis that is necessary to determine the optimum design and mix of casks for this program. Time would also provide DOE/OCRWM the opportunity to integrate the cask development effort, both with the requirements of the Standard Contract and the needs

of the utilities, to take advantage of the cask handling and shipping experience that currently exists within the industry, to better familiarize itself with NRC regulatory requirements in the cask certification process, and to evaluate and avoid the problems that arose in the CSDP. If the Nuclear Waste Negotiator is successful in finding a volunteer host state for the MRS and Congress unlinks it from the repository so that shipments to the MRS could commence in the 1998 time frame, DOE/OCRWM could move forward expeditiously on a new CSDP. It should not take more than five years to design, certify and fabricate truck and rail/barge casks, especially if DOE/OCRWM has spent several years gathering data and evaluating the operational and technical issues that must be addressed in the cask designs.

In conclusion, I do not mean to imply that the TWG has firmly decided that DOE/OCRWM should cancel the current CSDP. What we have decided, however, is that this is an option that DOE/OCRWM needs to evaluate with an open mind. It may be that some of the concerns we have identified, such as the inability of the cask to ship irradiated channeled BWR fuel, cannot be resolved without a major change in cask design at significant additional expense. Consideration of these fundamental concerns, along with the other major technical and operational concerns that we have raised, may argue strongly against continuation of the current effort. DOE/OCRWM has an

obligation to the program, to the utility industry, and our ratepaying customers to engage in this analysis. As I stated earlier, we are encouraged that the new DOE/OCRWM leadership will make a fresh assessment of the CSDP, and we stand ready to provide whatever assistance DOE/OCRWM may need in this effort.

Moreover, whether DOE/OCRWM decides to continue the current CSDP or to cancel it, we urge it to utilize the fuel and transportation cask handling experience that is currently available within DOE, its contractor organizations, and the electric utility industry. By doing so, DOE/OCRWM will be better able to prevent problems that have arisen in past shipping campaigns and to anticipate new problems that have yet to be encountered. The end result will be a more timely, efficient, and cost-effective transportation program, which is to everyone's benefit.

Thank you for your attention.

DR. PRICE: Thank you.

Dr. Carter?

DR. CARTER: Yeah, I have a couple of questions.

One, for my edification at least, how do EEI and EPRI, if they do, coordinate activities in the high-level waste program? I know both of you have programs and active interests in it, so I'm curious about the coordination activity.

MR. SHIMON: That's true.

The most recent description of the organization is that both entities work for the--an organization known as ACORD, the Advisory Committee on Radioactive Waste Disposal. That's comprised of, I think, five utility CEO's, and they provide direction to the whole program. EPRI's functions are primarily related to research and technology development, and at least in its latest iteration of organization, EEI/UWASTE is providing direction for the utility industry efforts in the waste disposal program, with technical support from EPRI.

DR. CARTER: The other thing, how does EEI track cost-effectiveness in DOE? This relates to their expenditure of funds from the Nuclear Waste Fund. You indicated that you have a legitimate concern for whether or not they're cost-effective in what they do with these funds, but how do you, on a practical basis, track this; and more importantly, how do you do anything about it if you don't think they're being efficient in the use of those funds?

MR. SHIMON: Well, we have a couple different organizations within EEI/UWASTE that look at that. We have some consultants that analyze DOE's budget every year and try and determine whether or not their expenditures in any particular area are reasonable. If we feel they are not reasonable, we take opportunities--such as this meeting, or DOE's transportation coordination group meeting, or testimony

before Congress--to try and provide some external direction to the program. We also have frequent contact with DOE and try and provide direct guidance to them on areas where we think they're spending too much or too little in their pursuit of the program.

DR. CARTER: Let me ask you a little blunter question about that. Does EEI have any concern about the fact that they've already spent almost \$3 billion out of the \$5 billion or so that have been raised in the Nuclear Waste Fund? You're still 20 years, at a minimum, away from the opening of a repository, and we don't even have a hole in the ground.

MR. SHIMON: The answer to that blunt question is yes. If the question also is asking what can we do about it, I'm not sure we know. We, you know, we're sort of in a bind here because we, as utilities, need to see this program succeed, and we do think that there's been a lot of waste in this program and we're certainly dismayed at how much money has been spent and how little there is to show for it, but we would--our fervent desire is to see DOE succeed and not have the program fall flat on its face and die, because the task of resolving the storage and disposal problems is not a technical problem. I think it's become a political problem and we, ourselves, don't know how we can get the political problems out of the way without some assistance from Congress.

DR. CARTER: Okay. The questions I'm asking, though,

they're based on the statement in your report which says: "We have an obligation to our customers to do whatever we can to ensure that their contributions to this fund; namely, the Nuclear Waste Fund, are utilized cost-effectively by DOE and OCRWM."

MR. SHIMON: Yes, that's correct.

DR. CARTER: And so I guess I'm looking for a little more elaboration on what the group, or what, you know, EEI feels they can do about this if it is a problem. You can certainly identify it, which I presume you've already done in many cases, and indicated that there is some displeasure, or whatever word you want to use to categorize that concern, but I guess the real question, from a practical standpoint, is can you be effective in trying to change that if your assumption is correct and there are, you know, not complete cost effectivenesses within as far as the utilization?

And I gather, even after having all the experience you've already got, you still haven't come to grips with that on a practical basis, except the political route, perhaps.

MR. SHIMON: I wish I was able to give you a better answer on what EEI/UWASTE in total is trying to do. My responsibilities within this organization have been strictly limited to the transportation areas, and I believe that we have been out working with DOE and trying to get their attention, and blowing the whistle whenever we think that

needs to be done to get attention placed on this program, and I believe we have had some effect.

Now, unfortunately, the major expenditures of the program are on the repository, and we have very little to show for anybody's efforts in that area, be it DOE's or Congress's or the public's. I don't think we're any closer--actually, if you look at the schedule, we're further away from having a repository today than we were when we started the program.

DR. CARTER: Okay. The other thing, there's several interesting statements in here and I would like you to elaborate on a couple of them. One of them was found about the middle of page five in your presentation. It says: "The failure to recognize a realistic time frame needed to load a cask could perhaps have been avoided had DOE/OCRWM been able to avail itself of the significant fuel and transportation cask handling expertise that currently exists."

I guess the question is, why couldn't DOE do that, or why didn't DOE do that? Because I presume that the people that have that experience would be more than happy to share it with DOE, or perhaps anyone else.

MR. SHIMON: We asked ourselves that same question; why couldn't they or why didn't they? We have gotten a lot of interesting answers to that question. The one that keeps coming back to us is that the government procurement process doesn't provide DOE with the flexibility it needs to change

designs or contractual commitments once the project is in process, and we were sort of at a disadvantage here in that the only thing we had to review which would be an indication of the effectiveness of our input to the process, was the preliminary designs.

Now, I have found out recently--through unofficial and unconfirmed channels--that DOE has now taken the preliminary designs and they are submitting it to an operational review, and they are implementing some of the things that we're recommending and some things that their own people are recommending. I have no idea why they couldn't have brought that to bear earlier in the process. I can only presume that maybe our beating them over the head about it had something to do with them implementing it in this next stage, and I'm hopeful that the final designs that come out of this program will be a lot better than the preliminary designs.

DR. CARTER: Let me ask you another question. What is your normal, as far as your group is concerned, what's the normal interaction with the DOE? What is that process? I wonder if you could summarize that for us?

MR. SHIMON: Well, we are supposed to be informed by DOE of any major changes, any implementation of recommendations that we have made. They're supposed to provide us with studies that they think would be of interest to us. I think they've done that fairly well. The area where they've

probably been deficient is in telling us what they're doing with the suggestions we give them. You know, we provide them with information, and then it sits and sits and we wait for something to come back that says they're working on it, and we keep asking them about it, and they say, "It's under advisement."

Our group meets periodically--on the order of three times a year--in Washington. We ask DOE to come in and keep us updated on the progress of the program. We attend the TCG meetings to find out what's going on and what they're telling everybody else about the program. We, back in--I referred in April of 1988, we had a meeting that was scheduled at our request, where DOE brought in all of its--all of the cask contractors and all of the--all of its subcontractors on the cask program and we just sat down and talked out where we thought the cask program was going to be.

I don't know what the result of that meeting was. We thought we had done a good thing. They were very receptive to the meeting itself and to the comments we provided, and then they did nothing with the comments. So, you know, we have to wonder how effective the interface has been when it's so one-way at this point.

DR. CARTER: So what you're saying is they beat you to death with kindness, is that--

MR. SHIMON: They are very--yes. I think kindness is a

good word. They don't treat us with any disrespect. They don't tell us to go away. They sit quietly and listen to us, and respond to some of our concerns. I mean, I can't say we haven't had any responses. They did a fairly credible study on use of high burnup fuel in the casks that they've been designing, but I don't think they always take us as seriously as we think they should.

DR. CARTER: Let me ask you. You might want to look at it and see if I missed anything in the interpretation, but at the beginning--or at the bottom, I'm sorry--of page five, you're talking about the specifications in the Standard Contract, and they involve maximum nominal physical dimensions of the fuel.

Well, then if you look at the top of page six, that discussion continues. And it says: "Among these dimensions is a maximum nominal six-inch square cross-section." And the next statement is that the present dimension of the BWR baskets for the BR-100 rail/barge transport cask design is reported to be a 5.72-inch square, and that for the GA-9 BWR truck cask design is reported to be a 5.82 square inch."

MR. SHIMON: Yes.

DR. CARTER: Now, why is that not acceptable?

MR. SHIMON: Because there is fuel, BWR channeled fuel that is--the reason we established a six-inch cross-section is because that's what's necessary--

DR. CARTER: That's the maximum size.

MR. SHIMON: Well, that's--it is supposed to accommodate, the casks are supposed to accommodate a maximum nominal cross-section of six inches by six inches. What they have done is, they've designed casks that are only 5.72 or 5.82, which means that any fuel that's bigger than that, which meets the criteria for standard fuel in the standard contract, cannot be accommodated by the existing cask designs.

DR. CARTER: Well, I'm still missing something. The maximum dimension is six inches, and yet those dimensions are less than the maximum, but they aren't acceptable?

MR. SHIMON: The maximum--what that does is it establishes the maximum dimension that is permitted for a fuel assembly to be considered as standard fuel, and this contract is supposed to accommodate--CSDP was supposed to accommodate 80 per cent of all of the fuel that exists in the industry. So here they have designed two casks whose opening to accept fuel is too small to accept some of the fuel that's already been defined by the contract as acceptable for the program.

DR. CARTER: Okay, I understand now.

DR. PRICE: But does that fall within the 80 per cent, do you think?

MR. SHIMON: I don't think it does. John's got a--I don't have a BWR plant, so I don't have that problem. John does. What we've been told is that even if you look at the

exact physical dimensions of a fuel assembly--and I think this is where part of the problem comes from--after a fuel assembly has been irradiated, it's not longer going to be perfectly straight. During the irradiation, it twists or bows or whatever, and so if you design a cell that is designed to the nominal dimension of a brand-new fuel assembly, after it's been irradiated you're never going to get it in, and if you do get it in, you may never get it out again. So it's not good design to build something with such close tolerances.

DR. PRICE: So would you contend that it should even be greater than six inches, then?

MR. SHIMON: I think six inches--what did we decide? 5.9 would probably accommodate most of it, but they've only done 5.72 or 5.82.

DR. CARTER: Okay. Then on page seven, again, it's--it looks like a problem that you have and it's gone on for at least a couple of years, and this is your concern that DOE and OCRWM and the cask contractors need more information about what issues--such issues as utilities' spent fuel storage and handling operations, and NRC licensing criteria, and you indicate that you had that concern in '88 and it's become even stronger, not lesser, in the ensuing two years.

I wonder if you'd comment a little bit on that, because again, I presume that the utility experience is readily available to DOE and the OCRWM program, and certainly

the NRC licensing criteria are public information.

MR. SHIMON: Okay.

DR. CARTER: So I wonder if you'd elaborate a little bit? Again, what's--what do you think the problem is?

MR. SHIMON: Well, one of the things that happened when DOE made its selection of cask contractors, the main contracts are with Babcock & Wilcox and General Atomics. Neither of those companies have a substantial amount of hands-on utility shipping experience, or, for that matter, in transportation cask certifications.

One of the concerns we had about the casks is that they designed them to--they anticipate strict interpretation of the regulations. If it says the factor is ten, then it's going to be ten, when our utility experience tells us that that's more of a number for guidance than a number for--a number that assures you that you're going to get licensed.

We had a situation at our nuclear plant where we were trying to design a single failure-proof system which would be compatible with the single failure-proof casks that they're trying--cask and lifting systems they're trying to design, and NUREG-0612 does say a safety factor of ten. Well, in dealing with NRC, they said that because this is hanging over a spent fuel pool, we think we ought to address some other concerns, so we're not going to just worry about static loads, we want to address both static and dynamic loads. So

they imposed a safety factor of 11.

When we talk to the cask supply--the cask designers, they just don't--they don't have that kind of experience where they figure that they better be prepared for some contingencies. We look at the margins that they're working with. Now, earlier, we had expressed our concerns about margins from the standpoint of safety. We don't see this as a safety concern at all. We are concerned that if they design casks that are too close to operational margins and they deliver them to our site and we load them up, and then start taking the measurements at the surface that we need to take to get them out of the site, the margins won't have been sufficient and we won't even be able to ship the fuel.

I mean, if it's--if it meets the criteria for NRC licensing, then we think it's safe enough. But if it doesn't meet the operational criteria for allowing it to be shipped, then I think we have some serious problems.

DR. PRICE: But that, in and of itself, has safety implications; does it not?

MR. SHIMON: No, because I don't believe--it would not be shipped if it didn't meet the licensing criteria.

DR. PRICE: Oh, yeah, but if you were to ship it regardless, then it would have safety implications?

MR. SHIMON: Yes. But we--obviously, we would never ship it regardless.

The other thing I was concerned about is there's not just NRC criteria, but there are a lot of things that they could take into account at utility sites to address some of the storage concerns that we have. The truck cask, we think, can move ahead because it's a simpler cask to design and license, and the cavity is small enough that the only way you're going to ship in one of those casks is either intact individual fuel assemblies, or perhaps, with some interior configuration, maybe consolidated fuel.

But the rail cask has an opportunity to ship some of the storage configurations that are going to be out there. You heard Ivan talk earlier about dual purpose casks. The--it appears that the prevalent form of utility storage right now is to put the fuel into sealed metal canisters and store those in some type of a contract shielding structure; whether it's a horizontal vault or a vertical cask, and the plan for shipping those at some future date, given that DOE's locked into its rail cask designs, would be that we'd have to take those canisters back into our pools, cut through the weld, and ship the fuel as an individual assembly rather than shipping these canisters, and we just thought that if the time was taken to see if some of those canister designs could be accommodated, or if DOE could at least tell the utilities what types of configurations could be accommodated, we might introduce some efficiencies into the system.

So we're just concerned that they're going ahead with all of these programs and they might be forcing us into a more inefficient system than is really necessary.

DR. CARTER: Another question I had, you've got a statement in here to the effect that it should only take about five years to design, fabricate, and have approved not only truck casks, but also rail and barge casks, and I just wonder, what's the basis of that statement? Is that an interaction with the cask designers and fabricators, or is that just an opinion based on experience, or just what?

MR. SHIMON: That's an opinion based on experience. The --John is employed by GPU, and given the comment on the problem with the GPU core waste shipment, he probably didn't want that identification to be made, but there was a cask that was made to support that program, and I believe that it went from conceptual design to licensing in two and a half years, three years, something like that, and we have--

DR. CARTER: Yeah, but I've got an idea that may be the exception rather than the rule, because there was a lot of pressure to have that done by various groups, I suspect. I don't know that that's true, but I would imagine that's not a run-of-the-mill time in which--

MR. VINCENT: Well, there was a lot of pressure to do that, but it was still done under the auspices of the NRC, and DOE managed to do it through them, and it was a very short

period of time.

MR. SHIMON: Right, and I believe that--NAC is back there, they'd have to confirm this statement, but I thought they had been developing a new legal weight truck cask and they weren't--there wasn't any allowance of five years for development of that, either. You know, as I said, I could have said three years was enough, but I don't believe that's realistic. I think it can be done in five, and--

DR. CARTER: Well, I was just interested in the source of the, you know, that conclusion that you made.

MR. SHIMON: Yeah. I think the delays that we're seeing now are up-front delays where they have--if you design it right the first time, it shouldn't take you more than five years.

DR. CHU: I'd like to pursue the concern that you voice at the top of page eight, I mean, namely, that is, DOE's proceeding with the development program as being premature because it hasn't, A, taken into account all of the information that is being gathered by studies, such as FICA, and so on, and B, that utilities are now going ahead with dry storage plans, and so that--whereas the DOE cask procurement assumption is that everything that it will do will have to go back to the pool, whereas, this may not necessarily be the case, and earlier we had heard about one concept as being the dual purpose cask. Another one you just mentioned is

something that is a canister that's going to a concrete bunker.

Okay. And so, if one did nothing, then that, too, would in a way lock technologies into place, just because people act and behave in their own self interest, and not only lock technologies into place, but lock, perhaps, a variety of technologies into place. Now--so you think, on the one hand, that the cask procurement program is premature and, therefore, it should be halted because it--something should take into consideration of developments that are occurring.

Do you propose anything that should be instituted in place of that program so that, indeed, as you say, the system can operate efficiently; that is, the entire waste management system can be operated efficiently?

MR. SHIMON: Well, we don't want to stop the program altogether. What we're saying is go ahead with the truck cask. Get that thing licensed and out there. Let--instead of having two programs running parallel, let them run somewhat sequentially. Let the truck get ahead of the rail/barge cask, because there aren't as many unaddressed issues on the design of that truck cask. Let them move ahead, a year in advance, two years in advance, whatever it takes, and leave the rail/barge casks to trail behind and do some generic types of studies which would address our concerns about how do we transport these canisters.

DOE has already agreed to undertake a cooperative program for demonstrating that these sealed canisters can be licensed for transport. That's being done by Duke Power and NUTECH. They're doing a program with NRC that show that these can, in fact, be licensed. Well, if that fails, then obviously our concern about transporting them is not something that needs to be addressed anymore. But I just think that if we were to--and I'm not saying stop the rail/barge development. I'm saying just let it slip behind schedule so that it can benefit--the FICA data is going to be in fairly soon. The NSTI, near site transportation infrastructure data is due to be in, I believe, the middle of next year.

I mean, there's all that information out there. There's the utility progress on implementing dry storage designs. I don't think DOE really knows what's out there for it to transport at this point. I just think sometimes that you can be in such a hurry to get done with something that you deny yourself the opportunity to do it right.

DR. CHU: I--it certainly wasn't my intention to imply that you were taking a negative attitude about the DOE program and that it should stop. My question was more a positive one, as to what steps should DOE take, okay, if it were--that is, suppose it did follow your advice and halted something that is premature and not totally thought through, what kind of program would you recommend for it to go forth with, which

would, in fact, take into account of developments that are taking place, events that are taking place which would make the whole system more efficient?

MR. SHIMON: Well, basically, what we would like is for them to not complete final design on the rail/barge cask, because that's going to lock things in. During that period of time where it's delayed, take a look at what really is out there and what needs to be transported. See if the cask that they have in design is really going to be efficient in transporting that type of material or those configurations of spent fuel, and if it's not, then terminate that program and start one that will work efficiently and use the lessons learned from the previous effort.

We're not saying that this--that the cask that's out there can't meet these criteria. We just don't know if anybody's looked at whether it will, and if it's going to be cost-effective and result in an efficient system. Because if those two criteria are not met, then they ought to do--design a different cask.

DR. CHU: Okay. Thank you.

DR. PRICE: I believe you made, in your preliminary design review, three main points--and correct me if I miss one or the other--just as illustrations of the design review content that you looked at. First of all, that DOE was not utilizing the experienced people that were available to be

utilized; and the second thing was that the vendors may not have had an opportunity to factor the FICA data fully into the preliminary designs--

MR. SHIMON: Right.

DR. PRICE: --and then the third had to do with the very narrow margin between cask design and regulatory or design limits. Those were the three principal points you presented to us; is that correct?

MR. SHIMON: That's correct.

DR. PRICE: On the second point, did the selection--as you read through the PDR reports, did the selection of the finalists in any hinge on any of these points, particularly with respect to the timing of how long it would take to load one of these? Do you think there was preference given on the basis of how long it--in the final selection of who survived, and so forth?

MR. SHIMON: That's an interesting question. Actually, the four that were carried over, in one form or another, to the final design all had fairly short total cask handling times. The one that had the length of time that we thought was most realistic was the design that was eliminated from the five. We think that the overwhelming consideration in DOE's evaluation was capacity. We think that they were most interested--that the capacity and license-ability in their assessment.

Now, with the truck they had a design that would have done 3 PWR's. They picked one that went to 4. I don't think with the rail they picked the one that was the most efficient. I think it was--I'm almost certain that that was not the most efficient one, the B&W, but there were other things about it that they liked.

When we read through their analysis of their selection process, we really--it wasn't like we said, yes, yes, yes, we agree with all this. It was more like, yeah, there's really--we really don't see anything in there that was outrageous or that was indefensible. If we were left to our own devices we might have come up with a different decision, but the decision they made was not necessarily inappropriate, and they really didn't share with us all of the considerations that they brought to bear on this decision.

DR. PRICE: Well, it would seem hard to defend if the portal for entry--I'm talking about basket size--is such a size that you anticipate, with warpage or other things, you're not going to be able to use it, that doesn't sound defensible.

MR. SHIMON: No, and I'm trying to draw on my memory if the other casks--most of the casks that were designed did not have a six-inch nominal square section for BWR fuel. I think it was a deficiency in virtually all the designs, wasn't it, John?

MR. VINCENT: I believe so.

MR. SHIMON: It was fairly consistent.

DR. PRICE: How critical do you think this dimensionality is to the overall usefulness of the cask?

MR. SHIMON: Well, we think it's very critical, and I guess DOE must agree with us to some extent, because we've been told that they're working on that one. But the objection we had was that it took a year of telling them about it before they would work on it, when they should have worked on it right away, should--we shouldn't have to battle with DOE to get them to comply with the terms of their own contract with us.

DR. PRICE: If capacity was their principal consideration as far as you can tell, how about from the utilities' viewpoint, what fuel are you going to ship and how does that affect capacity? For example, you'll probably be shipping directly from the pool rather than from storage.

MR. SHIMON: That would be our preference.

DR. PRICE: And how would that affect capacity?

MR. SHIMON: I think that's something, you know, there's a process going on called the ACR process, the annual capacity report, where we deal with issues that are not totally clear in the Standard Contract, or we talk about things that might benefit the program or the utilities that aren't clearly spelled out.

Now, in this particular regard, we, as utilities,

would prefer to ship our oldest fuel in the pool rather than our oldest fuel on site. DOE might take the position that it's--that all they're obligated to take is the oldest fuel on site. So that's something that's got to be worked out among reasonable people.

The hard line position on their part would be to say, you know, "We want your oldest assemblies, and if that means bringing your fuel back in from dry storage into the pool to load the casks, that's what you're obligated to do under the contract." The longer term result on that is that we would probably be trying to ship fuel that was--I think we could still probably meet the cooling criteria, but it would probably have higher burnup than the 35,000 limit that's in the basic design report. So it might reduce capacity somewhat if we had to ship fuel that had been burned more.

DR. CARTER: One question. What's the official position of the Edison Electric Institute as far as the disposal of spent nuclear fuel versus high-level waste?

MR. SHIMON: You mean as far as--

DR. CARTER: Do they have any--well, do they have any reservations about putting spent fuel or disposing of spent fuel versus eventual reprocessing of that fuel to recover things with energy value, inherent energy value versus going to--and coupled with high-level waste disposal?

MR. SHIMON: Well, reprocessing is an idea that makes a

lot of sense as long as you don't attach any dollars to it. There are a lot of attractive efficiencies that you introduce into the system if you reuse a large volume of the waste, and then just put classified waste into a repository. One of the things I had been told was that even--and I don't know if I believe this, because it's a little tough to accept--but I've been told that even if you reduce the volume and concentrate the waste, you don't really affect the size of the repository that much because you have--you still have the same heat generation that you have to deal with in the site.

The other problem we have as utilities is that we need to try and cost-justify anything we do, and the price for front-end fuel cycle components--uranium conversion and enrichment--is so--it's so low right now that there really--it would be almost impossible to justify reprocessing, you know.

One of the concerns we have is here we're going to take a resource that has some value and put it in the ground forever and never get at it again, but at least the projections we've seen for the availability of resources to use in place of what's in the spent fuel suggests that we've got a long way to go before we can cost-justify reprocessing.

DR. CARTER: Let me ask you another question. I guess both of you are connected with nuclear utilities, in addition to the EEI, but I've heard the statement recently, for example, that if the U.S. could have continued to use the

nuclear option it now had instead of 110 or whatever operating reactors, if we'd had more on the order of 200, the statement being that if we had of done that, taken that alternate choice some years ago, we might be in the Middle East today, but it wouldn't be because of our concern with oil. It would be for humanitarian or perhaps other interests.

I just wondered if you two would like to comment on that.

MR. SHIMON: You haven't said much, John. I'll talk-- I'll give my opinion, too, but here's your chance. You actually have some oil, don't you, in your system?

MR. VINCENT: Yes. We use a little bit of oil generation, not much. We're down in the 2 or 3 per cent now, as a portion of total generation, so we don't use very much of it. By the way, I do work for GPU Nuclear Corporation as a-- responsible for all of their external fuel cycle activities.

I think, recognizing where the future of my career lies, the answer to the question is obviously yes, but I think we've got some work to do. We're currently, as an industry, working on future reactor designs to try and prove those things and get public acceptance of what we're trying to do in terms of streamlining the whole design process and the operational capabilities of plants with regard to safety and a number of other issues; primarily with regard to safety, and I think we are going to be able to do that.

I guess, yes, I'd like to see some more of them and I think we would--you're probably right in that assessment. We might not end up being there on the basis of looking at oil, but you also have to recognize, I think, while we might like to see some additional nuclear generation, there's--the total amount of oil fire generation in this country has dropped rather dramatically, so replacement of oil, per se, with nuclear on a one-to-one basis is not what would actually happen.

MR. SHIMON: Let me just add to that. I think that most of the loss of nuclear generation was picked up by coal rather than oil, so I'm not sure that more nuclear would have solved the problem. We really have a very minor dependence on oil for electrical generation. It's more for automobiles and transportation that I think we're concerned about it.

DR. CARTER: And petrochemicals?

MR. SHIMON: Right. Now, more nuclear plants, I think the time's going to come. We have always fought the urge over the years to point out all the deficiencies of coal, hoping that that would allow us to build more nuclear, so we never did take that position. I think you're seeing right now that the concerns for air quality and global warming and greenhouse effect and all that stuff that can be attributed to coal is starting to make nuclear look better. So, you know, we did back off.

I think that a lot of changes were made. I don't know if we've made the facilities safer. There seems to be a perception that they--they're certainly more regulated than they were. I'm not sure if they're safer. I thought they were safe enough, but a lot has been done to rebuild the public trust and confidence in the nuclear industry for generating electricity, and the sad thing is that, you know, here you've got this resource. There really isn't much else that you use it for, you know. When you're talking about--it kills me to see us burning oil and natural gas to produce electricity, when you have something like uranium that has no other significant use, and you could be producing energy from that resource.

DR. CARTER: Well, I appreciate the comments. Like I say, this is a little bit off of transportation. On the other hand, it does deal with nuclear activities and, like I say, both of you have that particular background, and it does, indeed, have a bearing, of course, on whether or not the United States has a energy policy and whether this sort of thing has a role in that, and obviously, it involves strategic decisions that are made by the government from time to time, so thank you.

DR. PRICE: Just a short follow-up on one of Dr. Carter's questions. You indicated that the cost of--front-end costs on uranium were very low, and therefore, not justifying

reprocessing. If you looked at 10,000-year economics and perhaps the possibility of these costs inflating over 10,000 years, the dollars spent now for reprocessing to minimize the amount of spent fuel that needs to be put into a repository, how do you suppose that would come out if you did a 10,000-year analysis, a cost analysis for this?

MR. SHIMON: Well, my experience with doing analyses that have up-front payments for long-term benefit, given the structure--at least from a utility standpoint, the way we have to justify all expenditures--I don't think we'd ever be able to pay it back.

On the other hand, if the idea was--and I hesitate to do this, but I want to give you a truthful response--if the idea was to store the fuel until such time as the economics were justified in a retrievable status, you might be able to do it because the cost of storing is so low compared to the cost of reprocessing right now. You might be able to put it in some--you know, basically, when you put something in storage in a dry storage cask, it just sits out there. You paid your money and it sits, and you just--you watch it every once in awhile. I don't know what's supposed to happen, but you do monitor it, and the costs are fairly reasonable, much more reasonable than paying the full costs of the reprocessing and then storage and disposal of the wastes up front for some future unknown benefit.

DR. PRICE: Thank you very much.

MR. SHIMON: Thank you.

DR. PRICE: Our next presenter will be Mr. Conan Furber, Association of American Railroads. Presently, Mr. Furber is President of CMF & Associates Consulting Services.

MR. CONAN FURBER: Thank you.

Thank you for this opportunity to present some of the concerns of the railroad industry. Since you have copies of my testimony, with your concurrence, I'd like to just go ahead and expand upon some of the points within there instead of reading the testimony verbatim.

There is usually some confusion as to just what the AAR is, so I'd like to explain that briefly first. The AAR, Association of American Railroads, is the trade association for the railroad industry. It is funded 100 per cent by the railroad industry, and answers to a board of directors consisting of the presidents of the major railroads.

It is unique in several respects, as trade associations go. One is, is its size. It has over 500 employees. Another is that it sets standards for the industry, sets standards for interchange of rail cars. Without a transcontinental railroad, it is impossible to ship a carload from one coast to the other without it passing over a number of different railroads. The AAR performs the function of setting standards whereby if a car meets the

interchange rules, the next railroad must accept it. It is the basis for our whole industry.

Another important part of the AAR is their research and test department. It is the largest single division within the AAR and it has three divisions; one out of Washington, a second in Chicago, and a third in Pueblo, Colorado. Through the AAR R&D department, we're able to do basic research and testing. The Chicago division has a very large testing facility, and at Pueblo, we have a full scale laboratory where we're able to test on a large amount of track, and have capabilities, for example, of putting a full locomotive onto a dynamometer. I would like to offer an opportunity for the Research Board Review Board to visit the TTC facility at your convenience.

With regards to the transport of nuclear materials by rail, the railroad industry does not have nuclear expertise. We have some experience in transporting nuclear materials, but our basic experience comes from over 160 years of transporting goods by rail. This has occurred under all conditions, and occurs 365 days a year. Contrary to what you may have heard, the railroads are willing to move nuclear materials. The reality is, we can't refuse. We are common carriers and we must carry such materials if tendered to us.

Then what is the problem? The basic problem is, is that through this knowledge that we've gained in moving other

materials, we have asked a number of questions. We started asking those questions over 20 years ago, and we still haven't received answers. This frustrates us and makes us nervous.

It started in the early 1970's when a number of railroads became concerned that a railroad accident might exceed the mechanical and thermal forces that a cask was designed to withstand. A special group was put together to look at it. They came up with recommendations, and passed those recommendations on to the board of directors, who then adopted them for the AAR. We believed at that time, and still believe, that the operational constraints that were recommended for use by the member roads do keep the thermal and mechanical forces in a train wreck beneath that which the cask is designed, therefore allowing us to transport the material safely.

But our trials didn't end there. Not too long afterwards, we were taken before the ICC, and charged with requesting excessive rates for the special trains. We went through lengthy ICC hearings. The bottom line was we lost. The Administrative Law Judge ruled that safety was the domain of the Department of Transportation. DOT was very conspicuous by their absence. They did not participate in the hearings whatsoever, and without the basis of safety, we could not justify the rates. Therefore, the ICC ruled that we could not charge more than regular train rates for the transport of

nuclear materials.

This hinders us to this day, even with the Staggers Act, where we're able to negotiate rates. That is still a sword hanging over our heads, and definitely influences the negotiations.

After the ICC hearings, we worked with DOE on several occasions, many, many hearings, a couple of workshops --one on emergency response. We've worked on the peer review group for TRUPACT. We worked very close in the early years of OCRWM setting up a standing committee at the AAR to--on transport of nuclear materials by rail.

In the testimony, I grouped it into four different categories: accident prevention, cask integrity, accident response, and liability. I'd like to just expand upon those a little bit.

Under accident prevention, we--the railroad industry spends a tremendous amount of money trying to prevent accidents. Nobody wants one, but they do occur. In looking at railroad accidents, the causes are usually grouped into three primary categories: human error, track defects, and rail car mechanical problems. We believe that the dedicated nuclear train, with the operational controls imposed by it, aids us in reducing human error. There is additional supervision on those trains. They're smaller, easier to handle; many other reasons.

As far as the rail car mechanical problems are concerned, experience has taught us that new rail car designs sometimes have problems. What we strongly recommend is, is that these new rail cars being designed and built for DOE be taken to TTC and tested. We have procedures out there. We have the track. This is full-size, full-scale testing. We can test the car loaded. We can test the car empty. Through those tests, we would have greater confidence that it will serve safely in operations.

As far as the cask integrity is concerned, yes, we are very familiar with the cask tests. I personally have witnessed a number of the scale model tests. Our problem comes down to we still do not know or understand the relationship between the test criteria and a real-world accident. What is the relationship between a 30-foot drop onto an unyielding surface and a train wreck? If we knew this relationship, then we'd be a little more confident.

DR. CARTER: Let me interrupt you if I might, if it's agreeable with you?

MR. FURBER: Yes, sir.

DR. CARTER: What about the tests that have been done basically with at least part of a train with casks? They've been done at Sandia, and they've also been done in England, and perhaps other places. Now, if those aren't train wrecks, they're certainly simulated ones, and they're a little bit

different than the abstract of dropping a cask from 30 feet or whatever, so--but there is something in between, and I just wonder if you'd comment on this?

MR. FURBER: I'd be more than willing to comment on the first one, the test run at Sandia. I happen to have been present for that test.

That test was set up, according to Sandia, to evaluate instrumentation in a model. It was not intended to be a test of the cask. Now, in reality, yes, that locomotive, which was, I believe, a 1952 Alco, was going at about 82 miles an hour when it hit the cask, which was on a truck. But in hitting it, it skimmed the bottom of the cask like this. The cask then went upwards. It went up through the nose of the locomotive, hit the top and bounced off.

A locomotive looks very massive, but in reality, the nose on that has essentially the same metal in it as in your fender on your car. The cask did not hit anything. It was not a test of the cask. Spectacular accident? Yes. Test to the cask? No. If that was a modern locomotive, it would have anti-climbers on the front that may have caught it. It has collision posts in there, but a 1952 Alco switch engine...

In fact, I was standing beside the vice president of engineering for the Missouri Pacific during that test, and he looked at that locomotive and said, "I could have it back in operation this afternoon."

DR. CARTER: Let me ask you a facetious question. What's a modern locomotive, one without a cow-catcher in front?

MR. FURBER: No. We did away with the cow-catchers a long time ago, but a--

DR. CARTER: What about the English test? I presume it was quite a bit different than the one in the U.S. Are you familiar with that one?

MR. FURBER: I have seen the movies of it, but I can't really comment on it as to--the cask is different.

DR. CARTER: I think theirs was to be a specific test of the cask.

MR. FURBER: Theirs was to be a test of the cask. The movies of the Sandia test are spectacular, but not a test of the cask.

DR. CARTER: Okay. Thank you.

MR. FURBER: So we're still concerned or uneasy about the relationship of the 30-foot test, drop test, real world, the 30-minute fire. We would also like to know the mechanical and thermal failure thresholds. What does it take to break a cask, and what's its relationship to an accident? Can we safely carry them at 35 miles an hour or at 50 miles an hour, or what speed can they be carried at?

The next area entitled accident response, you might have expected it to be emergency response, but for us accident response goes way beyond emergency. Emergency is our

paramount concern; the safety of the crew, safety of public. Incidentally, the first responder is not normally the first one on the accident. We--the crew is usually the first to show up on the scene of the accident.

Our other concerns, on emergency response we have considerable experience in handling hazardous materials. We've spent millions of dollars training our crews, training locals, local fire departments, emergency response areas. Fortunately, we do not have much experience in nuclear. There's been very little of it put on the ground.

We're concerned about what will happen in the future, who will pay for it, what quality, will we get adequate emergency response to an accident, but our other concerns get into such areas as public perception, shut down of the line.

You heard this morning an official saying, "We can shut down a railroad line." You have to realize that a railroad is different than the highway system. A trucker can detour. We are stuck. You shut down our line, we're out of business. We lose lots of money. The industries that are depending upon the delivery of our goods lose. We do not--we cannot recoup from it. We cannot afford to have main lines, branch lines shut down.

Another area that I may not have included in my paper or testimony is a concern--put it in category of wonder,

if you will--but if we did have an accident where the rail cars, locomotives got contaminated, the dirt got contaminated, where would this be disposed of? How would we dispose of it?

Where do we find crews that are willing and capable of cleaning up such a wreck? We know that they're available for cleaning up laboratory-type accidents, shipping docks, but for a major wreck, are such people available?

The last area was liability. Since we started, 1970, Price-Anderson has been changed and some of our concerns have been alleviated. Initially, it was set up for the reactors. Transportation is now definitely covered in some parts, but not all. As we understand it, if there is a release of product, then we're covered. But what happens if there isn't a release? What happens if we roll the cask down the main street of a town and it's evacuated, without a release? Who pays for the evacuation?

Now, Three Mile Island taught us a lot of lessons; taught us that the utility got stuck with a lot of costs. We, the railroads, do not want to get stuck with such costs unnecessarily. The loss of line, loss of time out of production, particularly if there is absolutely no way that we can recoup those through the tariffs.

So in conclusion, our basic problem is, is that we're asking the same darn questions that we asked 20 years ago, and we're still not getting answers to our questions. We

do remain willing and welcome an opportunity to continue working with all of the public agencies, particularly if it will ensure that we'll end up with a transportation system that will meet the requirements placed on it for safely moving spent fuel, and that adequate emergency response capability is in place, and the questions of liability are resolved.

I'd be glad to answer any questions, and I thank you for this opportunity to speak to the Board.

DR. CARTER: Yeah, a couple of things. I guess as far as I understand it, most of the experience of American railroads in transporting radioactive materials have involved the transportation of LSA, low-specific activity materials in general, uranium ores, things of this sort, and these are normally large volume and small amounts or small concentrations of radioactivity, and much lesser experience, I'm sure, in transporting used fuel elements and things of this sort--although I suspect you've done some of that as well.

MR. FURBER: We've moved quite a few loads of spent fuel. We've moved the Three Mile Island material. We were, at one time, a large mover of TRU wastes.

DR. CARTER: Okay. Now--

MR. FURBER: And we've also moved a considerable amount of defense, the white trains, the Naval routes.

DR. CARTER: Yeah. I was excluding those, but that's

fine.

Okay. Another difference there, you pointed out some of the differences between trucking and railroads, and I'm sure there are a number of other ones, but certainly one of them is the fact that you folks own your own property, so you have railroad property that you move the railroads over, if you will, or the goods over. The trucking system uses public areas, in essence.

MR. FURBER: That's correct.

DR. CARTER: So that's a big difference, and I would imagine that that enters into this business of liability, and so forth. I guess the question remains--and still, I'm not sure that I can answer it and obviously I'm not in the railroad or the trucking business, but as far as I can tell, there's always been a chasm or a wide gulf, in general, between those that have radioactive materials to ship and the railroads in comparison, now, with the same shippers in the trucking industry. There's still a large difference between the amounts of material or the numbers of shipments, for example, by truck and by railroad, and I'm still not sure that I understand that.

You mentioned the business of differential rates, for example, special trains, and so forth, and that, to me, is sort of a management concern. It might be a very legitimate management concern, but I think that--at least in the

beginning--was one of the differences that led to this dichotomy, if you will, between railroads and trucking and their acceptance of radioactive materials, and whether or not they would try to impose differential rates, for example, and the same concern, I presume, amongst the unions.

I understand originally that some of the rail unions, I guess, to handle radioactive materials were interested in hazardous duty pay and things of this sort.

MR. FURBER: I'm not aware of that part of it, the unions.

DR. CARTER: Well, that's old history.

MR. FURBER: On the rate issues, the AAR is not involved in rates, per se, so I can't address that. I would suggest that perhaps you ask that question to one of the shippers, the utilities. They might be able to shed more light on it than I could.

DR. CARTER: Okay. Well, do you feel that there is this difference? I think it's a very pronounced--

MR. FURBER: In numbers of shipments, the trucks undoubtedly have carried more loads. In terms of the amount, I'm not sure, because we carry so much more per shipment than a truck does.

DR. CARTER: But I guess in my discussions at various times--and I've done this a number of times with both railroad folks and also with trucking folks--the trucking people seem

to have been able to accommodate this, whether it's, you know, accidents, liability, or whatever, they've been able to accommodate it, I gather, since they transport these things rather readily versus the railroad, so there's still this distinction. And the question that--if that's true, is why one can accommodate to this and the other has not been able to.

MR. FURBER: I'm not sure of the answer to that.

DR. CHU: I'd like to get some better feeling about the discomfort you feel about the cask integrity and cask criteria. We've heard from a number of people this morning who also have discomfort about casks and their survivability, but I think most of them, it would be fair enough to characterize as skepticism about whether people can always behave one hundred per cent perfectly, and whether or not that designs, as intended, can be carried through and not mistakes made along in the manufacturing process, whereas what we're hearing from you is that you have doubts about the very criteria themselves, which is something different from what we were hearing earlier today.

I mean, is that accurate, that--

MR. FURBER: That is correct.

DR. CHU: --you do have doubts about the standards themselves?

MR. FURBER: Yes, sir. We question. We wonder.

DR. CHU: Well, I mean, do you--

MR. FURBER: We do not know the relationship between a 30-foot drop test, for example, and an accident.

DR. CHU: Well, I'm missing something.

MR. FURBER: So we're not able to say that the drop test is a more severe test than an accident or is less. We don't know whether the--

DR. CHU: But I don't understand. Imposing special conditions in the operation of a train doesn't clarify that relationship.

MR. FURBER: Well, at the time of impact, that cask is doing--is traveling at about 30 miles per hour when it impacts the surface. We believe that by reducing train speeds, that we're keeping it--the mechanical forces that it would experience would be kept--would be reduced.

DR. CHU: For the train?

MR. FURBER: Yes.

DR. CHU: Right. But there could be some other impactee to have a different velocity?

MR. FURBER: That's right.

DR. CHU: Now, you mentioned that the history in the 1970's when this case was brought up before the ICC and the ICC opinion was that what the railroad industry was talking about was a safety question, and therefore, safety questions should be brought before the DOT and the NRC, and you made the

observation that the DOT was absent from those proceedings.

MR. FURBER: They were absent.

DR. CHU: Did the industry petition for rule-making on its own in front of those regulatory bodies?

MR. FURBER: No, sir. We considered, we considered going before NRC as intervenors. Our problem is one of limited resources. We did not have the money available to gain the expertise necessary to present such a case before NRC.

Perhaps it's important to understand what we didn't do at this time. We did not go before the NRC. We elected not to go before Congress. We elected not to go before the-- to go public before the concerned citizens. I spent an awful lot of time at that time trying to keep Ralph Nader off. What we elected to do, recognizing the forces that we had available--which were very, very limited--was to try to work with DOE to see if we could not come to some kind of reasonable understanding.

DR. CHU: With the DOE, sir?

MR. FURBER: With DOE, with the nuclear industry as a whole. That's why we set up these workshops and many, many, many meetings, yet we see very little progress in trying to resolve any of the issues. That's why we're still here today.

DR. CHU: Would you be proposing for some kind of change in the regulations so that it would resolve some of your questions?

MR. FURBER: We would be happy for any--we would be pleased if any regulations were set, but we're not trying to be obstructionist. This is a point that I'd like to make--be very emphatic about. We believe that the dedicated train is a solution. Taking the other commodities off of the train reduces the thermal, the threat of thermal; hence, means a dispersion of the material if the cask should be breached, and the operational controls reduce the risk of an accident, and hopefully, would reduce the mechanical forces that could be involved in the accident if it should occur. So we see it as a solution, a solution that possibly could even be cost savings, present cost savings to the nuclear industry.

DR. CHU: Well, you acknowledge in your written testimony that the new re-authorization for the Hazardous Materials Transportation Act requires the Department of Transportation to do a study on this whole question as to the safety and merits of the dedicated train, and perhaps maybe within the study some of your questions will be answered, and I will defer.

Thank you.

DR. PRICE: Just a couple of quick questions here.

When you were going over the transportation issues of accident prevention, you mentioned some of the steps taken in the area of human error and in the area of mechanical problems. You didn't mention anything about track defects,

and among the three areas of accidents you went through, that was one of the three. So I wondered, since you left that out, how come it was left out? And I realize that there's individual roads involved and it's one of the questions that comes up about the safety of rail transport, in that over highways we have some public control over the infrastructure and the maintenance of the infrastructure, and so forth. So I wanted to give you an opportunity--

MR. FURBER: Track defects would be addressed through routing. All track on a--in a railroad system is not equal. We have, in effect, a mainline track that would be equivalent to the interstate system, but as you come down through, you can get--well, at the bottom of the line would be a siding that's seldom used that would be equivalent to a gravel road; perfectly safe for the conditions it's being--the service, type of service that it's being used for. Let's say it's a siding that's receiving grain, gravel. Consequently, there is a difference between this line and that line, and when the question of routing comes up, we would hope that the railroads would be very involved, because you cannot do adequate routing just looking at a map. All the lines look the same. They are not the same.

You need the operating railroad to assist in any routing endeavor, to tell you the present condition of the track, what's contemplated for maintenance on it, and so

forth. So the track defects would be addressed through routing.

DR. PRICE: And at this time, there are no federal routing requirements?

MR. FURBER: No, sir.

DR. PRICE: Second question I'd like to ask you has to do with the drop test, 30-foot drop test. Drop tests are typically used as the basis for packaging integrity in general. These drop tests, though, are considerably different from the kinds of drop tests that you might find ordinarily in determining whether or not a package meets a certain ASTM standard or ANSI standard or some other kind of standard.

If we're talking about a 30-foot drop test, it's to an unyielding surface. Do you have any comment about how you feel about the unyielding surface, and how it relates to the question that you have about the adequacy of the test?

MR. FURBER: We fully understand that a drop test onto an unyielding surface is more severe than if it was to drop onto this floor or asphalt, concrete, but it still does not answer the question of the relationship between that test, that set of design criteria, and an accident.

What are the forces generated in a train accident? We don't know. We just know that they're very severe. We've cleaned--the railroad industry has cleaned up many wrecks. We see things. When you're carrying over a trillion revenue ton

miles a year, things happen.

DR. PRICE: Let me interrupt at this point. If you don't know what the forces are, then how can there be an adequate test?

MR. FURBER: Well, as I said, we have very limited resources. We would hope that DOE, NRC has looked at this, know what the forces are in a train accident, and can tell us that the 30-foot drop test is more severe. To date, they have not.

DR. PRICE: From the railroad--

MR. FURBER: Do they know? If they know, why don't they tell us? If they don't know, that's as bad as not knowing.

DR. PRICE: Have they come to the railroads, or have the railroads offered to DOE a worst case scenario?

MR. FURBER: We have offered many, many scenarios.

Whether they're the worst case or not, we don't know. We don't recommend a full scale train accident test. Simply assure us that they will survive.

In '76, at the ICC hearings, we were told that the cask could survive any accident. It was impenetrable under any conditions. Now, as an engineer, this is very difficult for me to swallow. Now we're being told that, yes, the casks can be breached, but they're a very small hole. Now, that's a step in the right direction, but things are changing. We were told that the 30-foot drop test and the test criteria exceeded

any conceivable accident, yet today, the Lawrence Livermore study shows that there have been a number of actual accidents that would have exceeded those design criteria. Our Livingston fire, for example, on the railroads was worse.

DR. PRICE: If you're uncomfortable with any conceivable accident, I think I can understand that discomfort. On the other side, I felt a little uncomfortable last hearing that we had in Amargosa Valley when this was used as a basis for saying that we don't feel we can transport these casks at any speed greater than 35 miles an hour. That just--from a gut reaction to me, my own gut reaction to that was that's not realistic.

MR. FURBER: That's our present recommendation from the AAR.

DR. PRICE: Is it realistic?

MR. FURBER: That it not be transported more than 35 miles an hour? Based on the information that we have available to us today, I think it's a reasonable assessment. Why aren't we provided with better information? Why aren't we given information that says--reasonable information that provides us with this information? To be facetious, we know that the test would pass the 30-foot drop, but would it pass the 31? Yes, of course, it will, but at what point doesn't it pass?

We're asked to carry the burden and to assume the

risks. We need to know.

DR. PRICE: Another question--and this is one I think you can provide me with some information on the Mississauga evacuation in Canada, which was the largest peace time evacuation of personnel and based upon a railroad incident, and what were the costs related to that evacuation to the railroad? I recognize it's in Canada, but what were the costs and how does that relate--if it does--at all to your concern about having to evacuate people without support from--assured support from the Price-Anderson?

MR. FURBER: I can't give you the costs from memory. I'd be glad to try to look them up for you and give them to you, but in that particular instance, the fire chief or the person responsible publicly announced that he was going to try to set a record for evacuation, and he did. There was no need for it. It was a chlorine spill which was very local, but it does go along with what we're saying, that we're concerned about public perception. The public treats nuclear materials, radioactive materials differently than they do a lot of the regular hazmats, and we end up getting stuck with the costs, and we're concerned that an item with an radioactive placard shows up in somebody's backyard, that there will be overreaction; that there will be large evacuations, unnecessarily.

DR. PRICE: Do you have specific recommendations about

how Price-Anderson ought to be modified, or should there be additional legislation to provide some kind of Good Samaritan protection? Is this part of your concept?

MR. FURBER: It would either be through Price-Anderson or DOE. We've either--the railroads are in business to make a profit. We can estimate the cost of transportation of a given article. We know what we need for profit. We don't always get it, but we know what we'd like to have. Then we've got to have something that covers risk.

If we were covered for evacuations, for example, under Price-Anderson, then that cost does not have to be into the tariff, into our price. If not, then one possibility would be DOE, as the shipper, to cover that cost if it should occur; otherwise, we have to factor it in. How do we factor this in to recover it? If not, we lose money on the shipments, we have to go out of business.

Price-Anderson, a change in Price-Anderson which would recover costs incurred without release would be one answer, yes. The other possibility would be the DOE, under their contract, would agree to hold us not liable, indemnify us.

DR. PRICE: Okay. Any other questions?

DR. CARTER: Yeah, one question.

Are you familiar with accidents, either involving railroads and/or trucking barges or whatever, in terms of

casks used for either high-level waste or used fuel elements?

I presume there have been a number of accidents. How many of these have ever breached, and has the cask lost its integrity that you're aware of?

MR. FURBER: I know of no instance where a cask has been breached.

DR. CARTER: And that experience goes back to when?

MR. FURBER: As far--from the first casks on. Now, part of that we take credit for, for having carried it under controlled circumstances through dedicated trains.

DR. CARTER: But there have been accidents?

MR. FURBER: Very, very few.

DR. CARTER: Certainly there have in the trucking industry.

MR. FURBER: There have been more in the trucking industry.

DR. CARTER: And I think the bottom line is the same. There's been no breach of a cask.

MR. FURBER: I cannot remember any casks in the railroad industry. We've had uranium oxide, uranium hexafluorides. We've had TRU wastes. I cannot remember--recall any cask accident.

DR. CARTER: Well, I think that's true, and, of course, this is the argument a lot of people would use, that we've had, indeed, a considerable amount of experience and all of

these, you know, untoward things have not happened.

MR. FURBER: But we've always carried--

DR. CARTER: It doesn't say they won't happen, I understand that, but the experience is useful for something.

MR. FURBER: Yes, but we've carried them in special train, or dedicated trains.

DR. CARTER: Yeah. I'd argue that the trucking has not done that.

MR. FURBER: Trucking is a smaller cask, smaller forces involved.

DR. CARTER: Well, you don't know what the forces are in the railroad. You just told us that.

MR. FURBER: Yes, sir, but I know that a truck cask is much, much smaller than a rail cask.

DR. CARTER: I grant you that, but you've not defined the forces. Apparently that's a bugaboo that the railroads have had a long time and still have, and I'm not being facetious.

MR. FURBER: No, we haven't. We asked. We asked for them to be defined.

DR. PRICE: Dr. Chu has one question.

DR. CHU: I just have one question. I mean, I realize that the transport experience with spent fuel casks has been limited and so therefore, you know, if there were meaningful statistics about breaches of casks, we're in deep trouble. But--so let me ask a broader question vis-a-vis more general

commerce and more general freight, okay, for which--about which you have a great deal of experience.

And that is that, see, when something hits an unyielding cask--unyielding surface, that says that in this case, under that impact, the cask is asked to absorb all of the energy of the impact. In your experience, how often in a train accident do you have an impact where your vehicle--be it the locomotive, the tank car, and so on--is asked to absorb one hundred per cent of the energy, and the other partner in the impact is totally unscathed?

MR. FURBER: I'd probably have to answer that that it's-- under no circumstances would that happen. I just wonder, if I go into a bridge abutment, side of the mountain, two trains meet, you're correct, I'm not absorbing one hundred per cent, but if I exceeded the forces that that cask saw when it dropped the 30 feet onto the unyielding, this is what I don't know, and I also get into multiple impacts, and it's possible that the first impact doesn't take it--doesn't breach it, but it takes up into the yield point, and then the follow-on impacts exceed. This is a part of my concern.

DR. PRICE: Thank you very much.

I think we have coming up next the next presenter, Mr. Wilkinson, but before we do I believe we ought to have a break here of just a few minutes, so let's take a break and be back here at three-twenty-five.

(Whereupon, a brief break was taken.)

DR. PRICE: Let's go back into session at 3:27 p.m., and we have three presenters from Citizen Alert. We have Bob Fulkerson, who is president--

MR. FULKERSON: Executive Director.

DR. PRICE: --Executive Director of Citizen Alert; Paul Rodarte, and J.R. Wilkinson, who's an administrative assistant with Citizen Alert.

MR. BOB FULKERSON: All right, thank you.

My name's Bob Fulkerson. I'm the Executive Director of Citizen Alert. Citizen Alert is a statewide citizens' organization. We were founded in 1975 in response to public concern about the first nuclear waste dump that was proposed for Nevada. Back then they called it the retrievable surface storage facility, and since then, we've branched off into a variety of energy, environmental, public lands issues of concern to Nevada and the Great Basin.

We have 2,000 members spread throughout the state, and our primary objectives are to research and provide information on nuclear, military, and environmental issues, and to promote public participation in these issues.

I'm going to speak briefly on our concerns about high-level radioactive waste transportation, and then Paul's going to speak about the Native American issues involved in radioactive waste disposal and transportation, and J.R. is

going to touch on our radioactive waste tours that we've been doing.

Between 1971 and 1982, there were only 5100 shipments of high-level radioactive waste, of spent fuel, in this country, and we're envisioning up to 140,000 such shipments to Yucca Mountain over a 30-year period, so to say that because there have been no accidents in the past or no releases of radioactivity in the past, doesn't mean that there won't be in the future with this kind of huge increase. And the idea that there has never been a radioactive release with any radioactive cargo transported across the country is also false.

Between 1971 and 1985, there were a thousand accidents involving low-level radioactive waste shipments, and 90 of these did leak radioactivity into the environment. And then the Department of Energy also runs a nuclear weapons transportation fleet, and between 1975 and 1987, there were 173 accidents associated with these kinds of shipments.

Now, these accident rates correspond to the standard accident rate for heavy interstate trucks, which is 4.5 accidents per million miles traveled, and based on the amount of transportation that is likely to come to Yucca Mountain-- and applying this 4.5 accidents per million miles traveled-- it's calculated there would be about 500 accidents over a 30-year period. Some of these would just be fender-benders.

Some of these could be severe.

But the--what we're hearing is that the casks should be robust and that they will prevent a release of radioactivity because, for instance, they have to survive a 30-minute fire at a temperature of 1475 degrees. The Caldicott Tunnel fire in 1982 sustained a temperature of 1900 degrees for 45 minutes, and so this does not--this standard that the casks have to adhere to does not begin to reach what's already happened in our experience in this country.

The drop test is a 30-foot drop, which is supposed to simulate a 30 mile per hour crash into an unyielding surface. According to the Department of Transportation, half of the accidents with heavy interstate trucks occur at speeds greater than 30 miles per hour, and 15 per cent of the bridges in this country are higher than 30 feet. No cask in service has been physically tested for a 30-foot drop; in fact, there have only been computer simulations and scale model testing. We'd like to see a cask physically tested to the point of destruction so that we do know just how much it can withstand.

According to a DOE contractor study in the Yucca Mountain environmental assessment, a worst case accident involving irradiated fuel in a rural area could contaminate 40 square miles, require 460 days to clean up, and cost in the hundreds of millions of dollars, and a Nuclear Regulatory Commission study for an urban worst case scenario amounted to

\$4 billion to clean up.

The fact of the matter is that large scale transportation of high-level radioactive waste envisioned with the Yucca Mountain shipments has never been done, and presents major public health and safety problems for this country, and particularly for people living along the routes. And if you combine this with the fact that the final destination for the spent fuel, which is Yucca Mountain, is also fatally flawed with its own set of problems, then it makes the most sense, in our view, just to leave the waste sitting where it is, but move it in above-ground dry cask storage containers to where we can develop the social, the political, and the technological maturity to deal with these wastes in a safe and rational manner.

And I want to thank you for this opportunity to speak today.

MR. PAUL RODARTE: Hello. My name is Paul Rodarte and I'm the Director of the Citizen Alert Native American Program.

I'm here to address some oversights of the Department of Energy concerning the proposed siting of a permanent nuclear waste repository at Yucca Mountain and the transportation issues such a siting will have.

Yucca Mountain is within Western Shoshone land, which they have occupied since their creation on this Mother Earth. These land and human rights are God-given, which means

that only he can relinquish them. These rights are documented in the Ruby Valley Treaty of 1863. In spite of this, the DOE fails to recognize the Western Shoshone as being a directly affected tribe by the proposed siting of a permanent nuclear depository at Yucca Mountain, and the transportation issues involved.

The DOE also fails to recognize any indigenous tribe in North America as being directly affected by the proposed sitings and the transportation issues. This is very unjust because every route used to transport nuclear waste to Yucca Mountain will pass through many reservations. Each of those indigenous tribes will certainly be directly affected. It will be especially dangerous because of the inadequate training and equipment needed to respond to an accident of the nuclear waste shipments.

Due to the very poor conditions of the roads on many reservations, the question of if an accident will happen becomes when will it occur. These transportation issues will directly affect every indigenous tribe in the Great Basin.

I see that the DOE, like many agencies in the United States government, are unaware of the indigenous tribal concerns for the environment. We, as indigenous people, believe that as humans, we are caretakers of our Mother Earth.

This includes everything in the environment; the land, air, water, plant life, as well as other living beings which were

placed here by the Creator for a specific reason.

The decisions made today need to take into consideration the effects of these--what the effects of these decisions will have on the generations to come. These are the laws of nature, and they are in effect whether they are recognized or not. Digging a hole to bury nuclear waste in our Mother Earth, along with the transportation issues involved, is against the natural laws, and the result of such crazy actions will be disastrous for the whole world.

As an alternative, the Citizen Alert Native American Program, like many other people and organizations concerned with nuclear waste issues, proposes that the first--that first, the nuclear waste should stop being made. We also offer that the nuclear waste that exists today be placed in above-ground, monitored, dry cask storage. This will allow enough time for a safe way to handle nuclear waste to be developed. Such development can be funded with the money for the proposed siting at Yucca Mountain, as well as the money used to fund the NWTRB.

As a result of this statement, the Nuclear Waste Technical Review Board can no longer claim to be ignorant of some of the important issues and concerns of the indigenous tribes of the Great Basin, and since you are no longer unaware of these issues and concerns, you as humans are responsible for your actions as to the proposed siting of a permanent

nuclear waste repository at Yucca Mountain in southern Nevada, and the transportation issues involved.

Thank you for allowing me the time to present these issues to you.

MR. J.R. WILKINSON: Good afternoon. My name is J.R. Wilkinson, and I'm the Administrative Assistant for Citizen Alert here in Reno.

Citizen Alert is a member of the National Nuclear Waste Transportation Task Force. We are a coalition of over 70 organizations spread throughout the United States. We cover all the regions of the United States, plus some major national groups. It is the basic belief of these organizations that the shipment of high-level nuclear waste will place the corridor communities along the routes to Yucca Mountain at uncalculatable risks, with tremendous costs.

To complete the charge of the Steering Committee, I was told that I was going to conduct two tours. The tours were going to be involving a life scale, a life-sized scale mock radioactive waste shipping cask, a GA-9, which we had built out of fiberglass. The real ones weigh 25 tons unloaded. Ours only weighed 450 pounds, so the logistics were a lot easier to be dealing with, but along with our cask, we also featured nationally recognized speakers.

Our California tour was in April. On April 16th, we left Reno. We had stops in Sacramento, Oakland, San Luis

Obispo, Los Angeles, UC-Irvine, Las Vegas, and back to Reno. In July, we left July 9th from Reno and went to Elko, Salt Lake City, Rock Springs, Wyoming, Cheyenne, Boulder, Denver, Sante Fe, Albuquerque, Flagstaff, Las Vegas, and Reno, and even--I used these major population hubs as an indicator of the route, but we stopped at a lot of the rural communities, and it is the rural communities that the Task Force is really concerned about in being able to adequately protect human life and property against the hazards associated with this waste.

Now, the Task Force is also planning a couple more regionally-focused tours next year, and we are in the process right now of putting together a national tour later on.

The whole focus of the tour, then, is basically to assess the ability of first responders to adequately protect the corridor communities from the hazards associated with--from transportation incidences involving a high-level nuclear waste shipping cask. Now, the only way that we can really figure out or extrapolate what's going to happen, since we haven't really experienced the volume of shipments that we're going to see in the--from the nuclear industry to Yucca Mountain, is to see what has happened not only with the hazardous material shipments, but also what has happened with WIPP. We have to get a feeling for what is occurring right now.

And we've taken our display model, basically, from

what DOE has been doing with the Westinghouse/DOE/WIPP display that they've been using to go into the various communities with their propaganda to see--to basically educate people about what is happening with the WIPP shipments, to basically tell everybody that everything's okay.

So I'd like to make three broad points, that we're dealing with DOE's credibility problem here as it relates to dealing with public health. They have an abysmal record, at best. I'd also like to address DOE's and Westinghouse's training program as it relates to WIPP. Then I'd like to share with some of my experiences along the two routes, but primarily focusing on the southwest route, about how first responders feel about this whole shipment scenario.

So down to DOE's credibility problems, which is obviously under fire in light of some of the chilling evidence that we are seeing that it has contaminated 126 out of 127 of its facilities where it uses radioactive materials. The economic and emotional costs relating to transportation and public health and long-term environmental contamination cannot often be quantified at these facilities, much less rectified and somehow recovered and compensated.

If we're dealing with known realities--in some cases, fuzzy realities--at these various facilities, how can we allow this Department to put this material on the highways without adequate oversight? And as Bob mentioned, we've got

to take that cask to the limits. We have to see what it can stand and what it can't stand. In essence, we have to make sure that we are investing in a Mercedes-Benz here, not a '66 Volkswagen. We cannot afford to make a mistake with this material. We could potentially create a nuclear sacrifice zone somewhere along this route, and if we're looking at a volume of shipments in the dimension of 60,000 shipments or even more, we are looking at tremendous random potential here, and as Bob said, we could be having--dealing with fender-benders, but as we saw with the Exxon-Valdez, there is only 11,000 shipments through Prince William Sound. Does that mean we have six Valdezes running around out there? So we really see that we have to make sure that we are running a very credible program from the get-go, that we have done everything absolutely imaginable to this cask to see exactly what it can stand to protect our corridor communities against these risks.

And as we found along these risks, often people confused the WIPP shipments with the high-level. They didn't really understand that difference. The low-level, everything tends to get blurred together, and these high-level shipments represent an additional risk above and beyond the transuranic wastes. DOE admits that the transuranic WIPP shipments are going to contain alpha and some beta emitters, and we'll see a full spectrum coming out of these GA-9--well, whatever proposed design that they finally accept.

And if these--the GA-9 is a 25-ton cask, it's only going to hold two tons worth of material, so we're looking that they recognize that this is going to be a tremendous amount of shielding to adequately protect, and it's our understanding that even at six feet, you'll get a chest x-ray's dose worth of radiation in an hour.

At 60,000 shipments or more a year, what is going to happen to the toll booth worker? What is going to happen to the person working along the highway on a daily basis? If this is going to occur over 30 years, what is the accumulative effect to the school buses that are running along these routes next to these shipments? What happens to the pregnant mother sitting next to one of these canisters on a highway, waiting for an accident to get cleaned up? Where are these trucks going to sit when the snow storm has shut down a pass? I mean, these are all issues that have to be figured out from the get-go.

So, in essence, the Task Force and all the organizations that it represents demand that these corridor communities have their public health and safety come first before any other considerations, and we believe that includes costs. We are dealing with future potentials. We have no way of modeling what those--what is going to happen if something--if we do have a breached container somewhere along the route.

Do we have the adequate means to go in there and pick up a

27-ton cask that is breached? How are we going to do that? Who is going to be the person to go in there and do that?

Are we going to have the robotic ability to go in there, lift that cask up, reseal it, put it back on a truck, clean it off somehow, and then put it--and get it back on the road? How are we going to do that? Nobody seems to know, and this is where--as we saw in the major population hubs, yes, some of these population hubs do have monitoring equipment, but still, the same problems emerged.

As we found out in our interview with the head of the Hazardous Materials Division for the City of Denver in Colorado, they only have one alpha counter. What happens when that's being calibrated? How are they going to be able to tell that that container has been breached? As the fire chief continued on to talk to us about it, he said, "I can't even get an apartment building to evacuate. What am I going to do with Denver?" And we held a press conference at the Mouse Trap in Denver to highlight that problem, as we saw with the Navy bombs that fell off the truck in '82--'83.

So we really feel that we have to have this program and these corridor communities aware from the get-go of what we're talking about here. One of the stops in Flagstaff, we had the mayor and the fire chief there, and a city council person there through our whole presentation procedure, and who--the mayor came up to me afterwards and expressed his

amazement that this thing--that Flagstaff is right on the route. There is no way to get around Flagstaff to bring this material into Yucca Mountain. "How am I going to be able to protect my people in this community?" He had some very valid concerns that this volume of shipment--five-six a day for 30 years--it represents a tremendous random risk along these routes.

Along with the Westinghouse/DOE credibility problem, if DOE had their wishes, they would have been able to already start transporting the transuranic wastes to the WIPP site already, and it was only last year that they began--or within about the last year and a half they actually began their first responder training program. Why has it taken this long to get out here? Why has it taken so long for DOE to figure out what to do with the first responders? Is it because they understand that they can't protect public health and they wanted to wait until the end to hand out--and I must say that it was enjoyable being part of their training program, because I could watch as they handed out their paper suits to the first responders, to see the look on their face, to say that, "I'm supposed to put on a paper suit, 200 feet of duct tape, a hood, rubber gloves, rubber boots and a respirator, no eye protection whatsoever, nothing to really adequately cover the ears, and go into a radiation scene incident and actually determine--", basically, their program was to determine if

there was a breached container, and to remove the shipping papers. That was all that they were trained to be able to do.

But the problem with these paper suits--and this is right in their training manual--is you can't wear it in the rain. You can't wear it around sharp objects. You can't wear it around toxic fumes. You can't wear it around a gasoline fume. Show me a transportation accident that doesn't involve at least one or two of those items. Does this mean if it's raining outside, we have no protection?

Many spaces along the route are cities, and especially the rural towns that we found--or that we stopped and interviewed the first responders in, it was the predominant response in dealing with any type of--this includes the WIPP shipments. Nobody really knows what's going to happen in a high level. Nobody has any idea what to do yet. Their rule of thumb was exactly that. If the incident scene is bigger than my rule--bigger than the end of my thumb, held out like that, then I'm too close.

The fire chief of the Trinidad Fire Department said that, "If I have a WIPP accident out on the highway, I'm going to put a sign on the back of my fire engine that says, 'Follow me, folks, and we're going the other way.'" Now, this is not the type of emergency first responder sentences that help lay my fears to rest.

And what are we going to do with the communities?

Some of the issues along the routes is, "How do I evacuate my community, when it's hard enough if I have a toxic fume source, how do I evacuate my community?" There is nothing--the toxic fume situation, if there is--if you have a colored cloud or you have an odorous gas, people readily understand that. But if you have a breached container with it leaking, people don't understand that. They don't really have any idea of what is--what can happen with these particular type of containers.

During this WIPP training, after the training session and standing around talking to a number of these people, they said, "This is a joke. Am I--they actually think that I'm supposed to put on a paper suit and that's going to protect me?" They don't understand these risks. They don't understand why they're being asked to take these risks, and some of the fire chiefs said, "I'm not going to send my men out there. All's (sic) we're going to do is evacuate towns. We're going to clean out the people," but as we saw in, say, Springer, New Mexico, a town of 800 people--basically a land-based people--what are they supposed to do? They have no concept of these issues associated with transportation hazards.

Also, along the route, one of the things that we wanted to do was to try to give people the chance to speak out against these issues. We collected 3600 signatures on a

petition that I'd like to read into the record, and it's a petition to President Bush and to Secretary of Energy Watkins to terminate operations at Yucca Mountain and at WIPP:

"We, the undersigned, out of deep concern for future radioactive waste contamination of the western United States due to transportation hazards associated with nuclear waste products, call on President Bush and Energy Secretary Watkins to terminate operations at both Yucca Mountain and WIPP, and to commit the federal government to a policy of safe on-site storage of high-level and military radioactive wastes until a technically sound, permanent disposal solution can be found and attendant transportation issues are resolved, consistent with democratic concepts," and that's the one we collected 3600 signatures, and we're getting this on a continual process. We've sent this out to about 160 organizations. We get them in from as far away as Georgia and Massachusetts.

The other petition that we received a lot more signatures on--we collected about 5400 total signatures on--is basically focused on a state-by-state breakdown, and this one is--I'll use Nevada's as an example. This is a petition to Nevada's Congressional delegation to support legislation to hold hearings in corridor communities affected by radioactive waste transportation shipments, and it goes on that:

"We, the undersigned, residents out of Nevada, out of deep concern for future radioactive waste contamination of

the western United States due to transportation hazards associated with high-level and transuranic radioactive waste shipments, call on our local, state, and federal legislators to ensure that public hearings are held by the U.S. Department of Energy in all locations that are affected by the shipments of said products."

And as I said, we received 5400 signatures on these petitions, and it was kind of interesting that most people did sign the state petitions and not the other one, and I think it reflects a deep concern that these people want to know what is going to be happening with these shipments.

So the other thing that we'd really like to see come out of that in order to get into a public hearing process is to have an EIS system set up, and distribute copies of EIS's on the actual transportation hazards, and not just hold hearings in Albuquerque and Flagstaff, but have one--have hearings in Springer, Raton, all the small rural communities so that land-based peoples and the people of the rural areas are not excluded from this process. It's absolutely and necessary, we feel, that people understand these risks.

And in conclusion, I'd just like to highlight that we cannot afford any errors here. We do not understand the potential that we're dealing with here. People need to understand these risks. People need to understand what these potential problems could be if they need to evacuate a town.

Fire chiefs said repeatedly, that, "If I have to put over the radio that we need to evacuate town, people need to understand that it's because we have some radioactive material out here, and if people can't see it or smell it, they're less likely to adequately leave."

And also, one of the things that the WIPP person--it was actually--they knew we were going to be meeting the DOE/Westinghouse training program along the route, so they sent their head of the public relations department for WIPP, and I asked him, "Well, if you do have a breached container of a transuranic material somewhere along the route, how do you--going to clean that out? You going to give everybody fuzz dusters and go out there--fuzz busters and have them vacuum it up?" And after we got through chuckling about that, he told me, "What we're going to do is just bring in some bulldozers and we're going to bulldoze the top six inches of dirt and we're going to put it in barrels and ship it on down the road."

But what are we going to do with high level? What are we going to do with the high-level material if that happens? And so, you gentlemen are sitting in a very precarious position. We are dealing with Yucca Mountain as a political decision. It's not a scientific decision, but we have to have community protection along these routes.

Thank you.

DR. PRICE: Thank you.

Dr. Carter?

DR. CARTER: Yeah, a couple of questions.

Paul, I'd like to ask you--if I understand correctly, that the Native Americans or native populations are opposed to storage of spent fuel in water pools at reactor sites, for example, or other places, but have either no objection or less objection if these are stored above ground; is that true?

MR. RODARTE: Well, as an alternative to--see, one of the natural laws that we recognize is that you can't contain water forever. If it's in a pool, it's going to evaporate or it's going to leak, and that's radioactive water when those spent fuel rods are in there. So if you have it in dry cask storage above ground, you're not going to have to deal with the problem of--that you can't contain the water forever, and that's one of the things that we recognize, the power of the water, and that nobody can guarantee that.

DR. CARTER: Okay. I was just curious what that was based on.

The other thing I wanted to ask Bob, Bob, on all these statistics that you quoted--and you quoted quite a few of them rather rapidly--do you folks put out reports on any of these that deal with the--these deal with accidents in terms of the statistics; how many leaked, if there were leaks

involved in them as far rates and this sort of thing? What about exposures, radiation exposures of people? You know, you can have leaks without necessarily exposing anyone.

MR. FULKERSON: Yeah, that's a really good point. You know, not even the Department of Energy keeps records on the emergency responders, for example, who have to go in and mop up a low-level radioactive spill, and so it's real difficult to get a hold of that, to get a hold of that information.

DR. CARTER: But what information you do have, we have here, or could it be made available if we don't have it?

MR. FULKERSON: We have it in some sheets in the back of the room, yeah, and I'll get those to you.

DR. CARTER: Okay. Then I wanted to mention a couple of things to J.R. I think he appreciates that this Nuclear Waste Technical Review Board does not have any responsibility for the WIPP site. It's entirely different, and I'm sure you also know that there's significant technical differences between transuranic waste and between high-level waste, so they're quite different.

The other thing, whether you think it's frivolous or not, or hilarious or not, paper suits are worn to do certain radiological operations every day in the United States and a lot of other countries, and these things are, of course, disposable and that's one of the reasons for using them. In some cases, they're very appropriate for the job at hand; in

other cases, they could not be used, obviously, because they involve different considerations and different circumstances.

So I just wanted to mention that to you.

These things are used and, by the way, they are used for transuranics, because you're concerned primarily about contamination of items and the transfer of radioactive material from one place to another.

MR. WILKINSON: Right, but how often are these suits used out of a controlled lab situation, out in the field where you do have broken glass, toxic fumes potentially, gas spills, or whatever around there, or even in the rain, how often are these suits used in the rain for this type of rescue? I agree that we do have, you know, that these suits are being used, but often in DOE labs.

DR. CARTER: Yeah, I'm not addressing the other issue.

MR. WILKINSON: Right.

DR. CARTER: I certainly wouldn't want to wear one in the rain if it were me, let's put it that way.

MR. WILKINSON: Yeah. And in terms of like the WIPP, I understand your concern about that, and we ran into that quite a bit.

DR. CARTER: No, it's not a concern, it's just a fact.

MR. WILKINSON: Yeah, it is a fact, but in terms--we need some way to gauge how DOE is going to act with the high-level program. We have no other gauge than to try to extrapolate,

from our point of view, what DOE has done with WIPP, which has been abysmal.

DR. CARTER: Yeah, and I have no problem with you using your experience. I just want to make sure the record shows what our responsibilities are and what they aren't.

MR. WILKINSON: Okay, great. I appreciate that; thank you.

DR. CARTER: The other thing, I get the impression that you think the earth--the sky is falling so that we should shoot everybody else for their own safety; is that true?

MR. WILKINSON: Well, that's kind of--well, I wouldn't accept that wording from my mouth, but no, we have to, you know--

DR. CARTER: I didn't say it was, but it sounds like it.

MR. WILKINSON: Right. We have a problem here. I mean, we all have this particular type of problem, and the thing that we are seeing along these routes--and it's working on a grass roots level--is that more and more states are recognizing that they need--that there are transportation hazards and that they should be taking deal of that within their own borders. And I think what we're seeing with the issues with the compact states and with other solid waste issues and stuff, that more and more states are recognizing, I don't want that guy's garbage. I better learn how to take care of my own, and that's the same that's coming out with the

high-level program, and that's where the dry cask storage that Paul mentioned really comes about, and that is proven technology that can get us by for the next hundred years. Let's take that \$2 billion they spent trying to get Yucca Mountain in, and let's put that into R&D and see if we can figure out some other more creative way to deal with this problem, other than going down the road that heads off over the Grand Canyon.

DR. CARTER: Well, the other thing--and I'm sure you're aware of it--is the fact that that is basically relatively new technology, or at least it's been put into--been implemented recently, the dry cask storage.

MR. WILKINSON: Right.

DR. CARTER: So whether it's been known or not for a long time, it's only recently been used to any extent.

MR. FULKERSON: Yeah. I understand there's 5,000 of those containers in use throughout the world today. I mean, there's a lot more--there's no high-level nuclear waste dumps, you know.

DR. CHU: I just have a question about the emergency response, and again, recognizing that the WIPP program is different from civilian and that this Panel, the Board doesn't have privy over the WIPP, but nonetheless, it is a model or a possible model, and so--

MR. FULKERSON: Let's hope not.

DR. CHU: Well, that's what I was going to ask you. I mean, is it your feeling that it's irreparable in terms of what is being tried from the point of view of a federal government agency trying to do something vis-a-vis the state and locals, or it's just that right now it ain't there?

MR. FULKERSON: Yeah, I think one of the problems with this--that this Panel inherently has is the fact that you had to come in after the damage was done to try and fix a bad deal, and the bad deal was done, you know, three years ago this December when one site was chosen because of its political reasons, and now what the Congress and what the federal agencies are trying to do is justify it on its technical merits, and it's kind of trying to make it fit the mold.

And it's--there's not a right way to do a bad thing, and that's what you're charged to do, or trying to provide an independent oversight over that process, which was--is flawed from its inception, and so it's going to be no surprise that it's going to result in a flawed site, which is Yucca Mountain, and in an unsafe way of getting that waste there.

DR. CHU: The answer you gave, the scope of which is way too big for my hands. I was just wondering about the--that the initial attempt at training for emergency responders, from the experience, from what you have seen, is it--it's clear to me you were not satisfied with what you have seen, but is it

fixable or--

MR. WILKINSON: Well, it comes down to funding. It was my understanding of the relationship between DOE/Westinghouse and the State of New Mexico that Westinghouse would provide 25 trainings per year, plus the paper suit bags, to appropriate departments, and that that department was supposed to supply those suits and decide where these trainings were actually going to be held and who gets them. And we just feel that it has to be, you know, all the teams down the road have to have this training, not just 25. I mean, we're dealing with funding problems, we're dealing with equipment problems.

What we saw almost all along the route, those people that did have the appropriate type of counters to see if there is a breached container, most of those were 1950 Civil Defense stuff. Is that equipment capable of actually detecting a breached container from an appropriate ring of first responder isolation? And, you know, that--what we're dealing with is, again, dollar values. Are we not--are we missing the boat here by not adequately defending our first responders, and creating a nightmare from the get-go? And that's what our--my experience is, and Bill Rosse was with me on the southwest tour, and I'm sure that he'll be expressing some of his concerns about that program, also.

But, again, we have to make sure from the get-go that what we're doing is appropriate, and 25 trainings per

year, or 25 suits, that's what it was, is 25 suits and trainings throughout the year is not appropriate, especially if we're dealing with the scale of the high-level program.

I mean, as you can see on this map on my t-shirt, I mean, we've got shipments coming all the way from the east coast and all of it gets concentrated on a few corridor routes. What are we going to do? Give everybody lead loincloths and pray? I mean, it's just--we have to be absolutely careful, and this training program shouldn't be initiated concurrently with the beginning of the transportation of the wastes. So it has to be--start much earlier in the game so that people understand these risks.

Does that address it, or did I editorialize?

DR. CHU: I just want to say one thing. When we began this morning, our Chairman was very concerned that when witnesses were naming places, that he wanted to be sure to know what the witnesses were referring to, so we have little maps, photocopied.

MR. WILKINSON: Oh, great.

DR. CHU: But what we really needed was to have you standing around in front of us all day.

MR. WILKINSON: There's some maps back there and, you know, still, it's--we've got to buy the high-priced Mercedes-Benz here. We can't afford no '66 Volkswagen Bugs with this program.

DR. CARTER: How about a Pinto?

MR. WILKINSON: No Pintos, or an Edsel. Maybe we've got an Edsel.

DR. PRICE: I think the Panel shares your concern about the increased nature of the shipment campaign; that is, we have a very limited experience, and I think we recognize that, that we are looking toward a much greater level of activity than we have in the past, and I think we share that concern that the record which has existed for safety certainly not be worsened in any sort of way, and we share that concern with you.

With respect to the cask being physically tested to destruction, what would you hope to learn from testing it completely to destruction?

MR. FULKERSON: The limits, the limits that it can stand up to. I mean, that it can survive a 1375 degree fire for 30 minutes, what about for 40 minutes? Those kinds of questions. What are the limits? How robust is robust?

MR. WILKINSON: And what would be the result of that. I mean, what is--how is the container going to react? It's my understanding--and please correct me--but wasn't some of the cask designs dropped because of potential for criticality, they would have gone critical?

DR. PRICE: Not to my knowledge.

MR. WILKINSON: Okay, so then drop that. Strike that

from the record, would you, please?

DR. PRICE: Can't do that.

The destruction of a cask, of course, involves one means at a time. For example, you could destroy it by fire, but then you don't have a cask anymore. Then you could destroy it by some corrosive, and you wouldn't have a cask anymore. You could destroy it in one direction by a crush test, and you wouldn't have a cask anymore; or you could destroy it in another direction by--it seems like there might be an infinite number of potential tests that you would have to do to--and where would the appetite be satisfied completely in this, because it's an expensive process.

MR. FULKERSON: Yeah. Well, what about, you know, there's the immersion test, the fire test, the drop test, you know, just using basically the four tests that are used right now, but carrying those out a little bit more, carrying those out to the limit and really seeing how tough is tough, and dropping them from higher than 30 feet onto a spike, and things like that. It's a, you know, not to figure out a hundred different ways that it could happen, but at least for the four different tests that they have to undergo, increasing those and seeing with every test--increasing the amount of pressure or the amount--the temperature of the fire, the depth of the water or whatever that they have to undergo until the thing caves in.

DR. PRICE: Um-hum. I just wonder if you were to do such a protocol, how, in fact, you would be able to carry it out. You can't increase from 30 feet now to 40 feet because you've already dropped it from 30 feet, which it affects the drop at 40 feet, which affects the drop at 50 feet and you have cumulative damage, and so forth, and what does it mean when you get done? And, of course, they have dropped them from higher heights than 30 feet, and some considerable heights, but not necessarily onto an unyielding surface, as I understand it.

But nevertheless, just working with the protocol, I think it would be--it would--it wouldn't be a casual thing that we'd be able to come up with as to how to go about doing this.

MR. WILKINSON: Well, again, you know, had Ford done more testing with the Pinto, maybe some lives would have been saved out of that whole program. I mean, we have to do some--we already have a credible worst case scenario on fire that is higher than the test standards. I mean, we have to really--we have to design a set of criteria that is higher than credible worst case scenarios.

DR. PRICE: But there is--yeah, for example, there's more than one--I'm not trying to debate, I'm trying to understand.

MR. WILKINSON: Right; right.

DR. PRICE: There's more than one credible higher

scenario of fire, and the Caldicott Tunnel is an example of the fact that fire gets hotter than 1475 degrees, and I think every one of us knows that, and that there are different kind of scenarios and there's differences between being totally enveloped in a flame and in being locally affected by a flame, and there's just all kinds of things that the fire testing alone, it would seem to me, is--would be very, very involved if we're talking about really finding out with going through to destruction on everything. Difficult, is what I'm saying.

MR. FULKERSON: Nobody said it was going to be easy, you know. It's a--it is, it's extremely difficult and it's the nature of the beast, and if we want to do it right, let's exercise all these options and let's put the money down on the table and spend it, and really, you know, really do the best job we know how instead of like we did for the site selection for the nuclear waste dump, making it simply adequate. You know, let's do it the best way we can do it.

DR. PRICE: And finally, I take it from your comments that you feel very comfortable with the present storage above ground distributed around a wide variety of sites with the control problems that are associated with--quality control problems that are associated with the wide distribution--this is what I'm always hearing about, the wide distribution above ground, is how do you maintain control from such a variety of sources over what's going on?

MR. FULKERSON: Well, the quality control certainly couldn't be any worse than what we've seen down at Yucca Mountain; and secondly, in the contract between the Pacific Gas & Electric in California and the Redwood Alliance, the waste, the spent fuel has been agreed to sit on site at Humboldt Bay, and the same, you know, and there's--utilities on the east coast have also pioneered above ground dry cask storage. The waste--they're on large amounts of land. You could simply build these containers right where they're at and let them sit there. It couldn't be any worse than traveling them, you know, taking them across 45 states to a technically-flawed site in Nevada.

DR. PRICE: What I suspect is--and this may not be an accurate view of what's going on out there, so I'd appreciate your response to it--is if, for example, a repository were not being considered at all at this time and the tactic was to store this at this time while we mature our technology--as we are storing it right now--that there would be a great deal of active opposition to that kind of a tactic, so I'm wondering if there's not opposition in this direction, there's opposition in that direction, and this happens to be where you fall in your understanding between the trade-offs.

MR. WILKINSON: Well, I just returned from five days of a state environmental leadership conference held at Robert Redford's ranch in Utah, where they brought state leaders from

groups that are working on issues. There was 38 states represented, and I pushed Yucca Mountain and the fact that all--they had hearings on--or workshops on incineration and solid waste and the compacts and everything, and what it's coming down to is people are not accepting the fact that other states are bringing trash into their states, and this is actually one of the--I actually got an award there for pushing Yucca Mountain, because people are starting to recognize these transportation hazards and what it is beginning to represent, and yes, there is a lot of opposition out there from the other grass roots organizations, but we really feel--and at the beginning of the conference there was a little opposition to discussing Yucca Mountain, but by the end of the conference, a number of states have turned around--at least those individual people and, hopefully, their groups--to pushing Yucca Mountain in their state. So, you know, I think there is--it's changing.

DR. CARTER: You really need to qualify that. You're pushing opposition to Yucca Mountain.

MR. WILKINSON: Yes, that's right.

DR. CARTER: I wanted you to make sure the record showed what you wanted to say.

DR. PRICE: We certainly thank you for your presentation.

MR. FULKERSON: You bet.

MR. WILKINSON: Thank you.

MR. RODARTE: I wanted to know your response to the fact that the DOE doesn't recognize any tribe in North America as directly affected by these issues.

DR. PRICE: I guess I have no response. Do you have anything you want to say about it? Because I'm not really involved and into that at this point. We can look at it and try to find out.

MR. RODARTE: Okay. To me, it would be like saying that Las Vegas or any other city that's on the transportation route is not directly affected by transporting nuclear waste through it.

DR. PRICE: We've heard a few counties who were concerned about not being on impacted, you know, lists, or being on the unimpacted, yeah, and I think there's some general concern beyond just the tribes in that area, but we understand what you're saying.

MR. RODARTE: Right.

DR. PRICE: Yeah, and haven't heard much about DOE's position in regard to this.

MR. RODARTE: Well, their track record there as far as the law and saying that they're going to educate Nevada tribes about nuclear waste issues is really poor already, and they're just side-stepping the issue all the time. They had a nuclear waste symposium in Phoenix, Arizona to educate Nevada tribes last September, a year ago last September, and three people

from Nevada showed up. I think that they're never going to stop side--

DR. PRICE: Would you repeat that again? They had it where?

MR. RODARTE: In Phoenix, Arizona.

DR. PRICE: In Phoenix, for Nevada tribes.

MR. RODARTE: Right, to educate Nevada tribes. And surprise, there weren't too many Nevada tribe leaders there. But they're going to keep side-stepping the issue until somebody stops them, and I don't know, maybe you guys could do something with that. I don't know.

DR. CARTER: Well, I'd like to make two comments. Of course, we certainly are appreciative of the fact that the land issues, land ownership--like the Treaty of Ruby Valley, and so forth--that these things, I presume, are either before the courts or involved with the Interior Department. Of course, we have no responsibility in those, but we can be sympathetic towards them, but we have no responsibility.

But the other thing, those meetings that you're talking about in Phoenix, DOE certainly has public information meetings at various places around Nevada, or various cities and locations. Now, how many they have, I don't know, but I just happen to have read a notice recently that there were two or three. There was one in Hawthorne, as I remember, recently. There was one other one. There is to be one, in

fact, tomorrow night in Henderson, Nevada, for example, and I presume they have those at various places and I certainly don't know why one of them couldn't be arranged in Duckwater or wherever. Now that's, you know, that's just based on what I happen to have seen recently, so they do have these and, certainly, people don't have to go to, you know, Arizona to participate in such things.

DR. PRICE: Thank you, gentlemen.

MR. FULKERSON: Thank you.

DR. PRICE: We now are going to go into the second aspect of our hearing today, which is for walk-in testimony. The opportunity at this hearing was for those who would like to be scheduled and would provide written testimony--and by the way, Mr. Wilkinson, are you going to provide a written statement to go into the record?

MR. WILKINSON: Yeah, I can get something drafted and send it to you.

DR. PRICE: Because that was sort of a condition for the scheduled testimony, and we'd appreciate it.

MR. WILKINSON: Right, and I do apologize for some changes in that, and I'll also make some photocopies of materials in that notebook that I referenced and you can take a look at that.

DR. PRICE: Thank you, sir.

But for those who would like to do the walk-in

testimony, the notice indicated that we would have a time limit on the walk-in testimony, and that time limit is roughly about five minutes. I think we have six people who have indicated that they would like to provide walk-in testimony, and I think if that's the case we can be a little bit loose on the time limit, but bear in mind that that was the original way in which we were set up and advertised our public hearing.

We would appreciate any comments, by the way, that you might give to us afterwards. This is our second hearing.

We are learning the process of conducting the hearing, and we want to accomplish the objectives of the hearing as efficiently and as well as we can, and this being a public hearing, these particular hearings being public hearings, we want to be sure that we hear from the public as fully as we possibly can.

So our first person--

DR. CHU: Excuse me, Mr. Chairman. Do you want me not to do the timing, then?

DR. PRICE: No, I think we can do the timing, and he'll probably provide a signal around five minutes, and we ask for you just to be aware of that signal and we will keep it in mind, okay? I don't want to be in a position of cutting someone off who may feel they really have something they need to say.

DR. CHU: So I will just wave.

DR. PRICE: So when he waves, you know what's happened and don't just wave back, all right?

So our first--

DR. CARTER: But the second time he waves means goodbye, is that right?

(Laughter.)

DR. PRICE: Something like that, maybe. But, no, we don't have a hook.

The first person on the walk-in testimony will be Abby Johnson, the League of Women Voters of Nevada.

MS. ABBY JOHNSON: Thank you very much, Mr. Chairman.

For the record, my name is Abby Johnson. I am speaking today on behalf of the League of Women Voters of Nevada. Your introduction about how the hearing is conducted is essentially what I'm going to address today, and I have some additional remarks in addition to what I've prepared, but I think I'll run through this first.

Don't take this too hard. Most of my remarks are prepared based on my experience of attending the last hearing on environment and public health. This hearing has been conducted in a kinder and gentler fashion than that hearing was, but I still think the--overall, my remarks are to the point.

The League of Women Voters has had a longstanding interest in the nuclear waste issue at the national level,

which has included the publication of the Nuclear Waste Primer, and a project two years ago to convene regional meetings on nuclear waste. The League is also committed to an open process, with full public involvement in the siting of nuclear waste facilities.

Here in Nevada, League members are deeply concerned about the Yucca Mountain project. We believe that the selection process that led to Yucca Mountain was based primarily on political science, rather than geology or hydrology. The reason we are testifying today, however, is because of our interest and concern in the process that this Board is using in holding public hearings.

Congress has asked this Panel to be the watchdog for DOE, and Nevadans have high hopes that the Nuclear Waste Technical Review Board will take every opportunity to question the DOE to ensure that public health and safety are protected now and in the future.

I was present on October 15th in Reno for the environment and public health panel of the Nuclear Waste Technical Review Board, and was greatly dismayed at its conduct. I personally found the process of interrogation of members of the public to be intimidating, and my impression was confirmed by a newspaper article in the Carson City, Nevada Appeal by Ed Vogel about this hearing, entitled, "Scientific Panel Challenges Nevadans' Objections to Nuclear

Dump," which I've included. I wish to make this clipping part of my testimony and have it entered in the record of the Board.

At the hearing on October 15th, members of the public were cross-examined, belittled, and lectured. Members of the Panel requested the educational credentials of those who testified, leaving the impression that the testimony of those without a scientific background, or those without higher education would be discounted. It is my opinion that members of the public and those who are not being paid to testify at the hearing should be treated with respect and deference. Members of the public are entitled to their opinions, even if members of the NTRB do not agree with them.

The concerns that we have regarding the public hearings of the NTRB are related to perception and credibility, two problems that you may find yourselves sharing with the Department of Energy. I realize that this is not the panel that conducted the previous hearing here in Reno, as I said, and that only one individual from the panel is also on this panel today. However, from the standpoint of the public, the panels are the NTRB. If one panel mistreats members of the public, the entire board will have that reputation, deserved or not. We would like to send a message back to the full board that the conduct of each panel reflects on the credibility of the entire Board.

My comments related to transportation also deal with perception and credibility. For years, the DOE has been unwilling to face up to the many weaknesses in its transportation program, the most evident being that it proposes to move the waste over 2,000 miles from its origin. As with other aspects of the Yucca Mountain project, the public's concerns about transportation need to be addressed. The public must be confident that the DOE know what it is doing, that the DOE has public safety as a top priority. The public knows how many things can go wrong in the design and construction of casks, in the systems that will be designed to ensure that the waste is packaged, loaded and shipped properly, and in the precautions that must be taken to ensure that drivers and the public do not receive exposure to levels of radiation from the casks.

The point we want to make is that even if all these factors can be addressed and done right, without public confidence, the DOE will not be able to succeed in its mission at Yucca Mountain.

To summarize, the DOE lacks credibility with the general public. One of the purposes of this board is to bring credibility back to the DOE by performing a watchdog function.

If the board is perceived by the public as an agent or partner with DOE, the board loses credibility. Without credibility, the project will fail. It is in the self-

interest of this board, the DOE, and the utilities to have public hearings that do not intimidate the public. We encourage the board to review its processes so that the public will be encouraged to engage in productive dialogue with the board in the future.

And I'd like to add a couple of comments, and I have a couple of suggestions. This is a public hearing. You're supposed to want to hear from the public. I've been here since nine o'clock. I didn't sign up three weeks in advance.

I didn't send 50 copies. I wrote my testimony last night, and it seems to me that there's other people that might be in the same position, that want to say their five minutes, and then leave; they have to go back to work, they have schedules, things like that.

One suggestion that I have is you might want to consider setting aside 15 minutes or half an hour every two hours so that walk-ins can be accommodated, rather than expecting people to sit for six or seven hours until they can be heard. I know that some people did sign up to speak today and have since said, "Well, forget it, they won't get to me," and I think otherwise this ends up just being a meeting where the public can come and listen to what's going on, but, really, you know, it's four-thirty. Anybody that came here at nine and thought they were going to get a chance to dialogue with this board, it just isn't happening. I mean, you missed

a lot of opportunities.

So that's basically what I think, and I also think that the requirements for the public of 50 copies three weeks in advance, it just means no one is going to sign up in advance. That's why I didn't sign up, is because I hadn't written my testimony. I didn't really know what I was going to say three weeks ago, and so that's the position that those of us that are in that care, but don't have the time, the preparation time to do all that work to sign up.

Thanks for listening.

DR. PRICE: Yes. I think your suggestion to set aside an opportunity for two or three people to speak every couple of hours is something we can sure take under serious consideration. It seems like something that we can do.

MS. JOHNSON: Good.

DR. PRICE: Any comments?

DR. CARTER: Yeah, I have a couple. First, we appreciate very much you being here. I would like to ask you a few questions and make a couple of comments, because I was obviously involved in the environment and public health panel.

Certainly, there was no intention of not paying respect to anyone that came to the hearing, and I certainly hope we did not give that impression, you know; and if we did, certainly, I would apologize very humbly and very specially. Like I say, certainly that was not intended.

I'm a member of the public in many instances myself, my family. I've got five children and a wife. We're members of the public, too, and, you know, I'm like you. When I go to something like this, I certainly expect to be respected for my opinion, and we want--we welcome all opinions. It's got nothing to do with what they are, you know; whether they're left, right, in the middle or whatever. We've never taken a position as far as a Board concern on a high-level waste repository as far as being for it or against it. We're still collecting information, opinions, and so forth from a variety of people, not only those in the technical trenches, if you will, and we've heard from a number of those today, but certainly, from members of the public, and we've heard from a variety of those.

Now, you've certainly given us some interesting suggestions, but, you know, we were criticized for several things before. One was to find out, you know, a little bit about the background of the people that were addressing was. Well, certainly, the intent of that is not to intimidate anybody, you know, but we would like to know a little bit about what you, you know, where you come from and what you do and that sort of thing, and I really see no problem with that.

Like I say, the purpose is not intimidation. It's just to get a better understanding of the views or the position that you bring before the panel or the Board.

We were also criticized, if you were here for the whole thing, for the fact that we had suits and ties on, and for--somehow or other that was intimidating. I don't really understand that.

MS. JOHNSON: I missed that portion.

DR. CARTER: Well, we heard it several times, so--in fact, I even offered to disrobe. That's really getting serious about things.

(Laughter.)

DR. CARTER: But you'd be interested in knowing that very recently, when I found out that we had a requirement of 50 copies of presentation, I, in fact, called our Executive Director and I also wrote him about the fact that I thought that was a very onerous burden on members of the public, and if there was anything we could do about that, then we certainly should do it.

MS. JOHNSON: Great.

DR. CARTER: So we are still formulating the way we do things, and so forth, so that suggestion I'm pleased to hear, because like I say, I've made it myself. So that would be the comments that I would make, and we appreciate you, as well as any other member of the public--not only here in Reno, but anywhere else--coming and presenting views, and like I say, you've got our fullest respect. We want to hear what you have to say, and certainly, we have no intention of intimidating

anyone, or even trying to intimidate anyone.

MS. JOHNSON: That's good to hear. Thank you.

DR. CHU: Yeah, I have a question. You raised one question which I, myself, have struggled with--and certainly, my colleagues in government have struggled with in different agencies--and that is the notion of taking the public's concern into the consideration as far as risk is concerned. I mean, there's so many different things that a government program does as far as incorporating public concern. Let me just narrow this down to the business about talking to the public about risk and communicating with the public about risk, rather than the program as a whole, because that's way too large, okay.

And here's something where we are talking--I mean, transportation of nuclear materials is a very visible thing. People are concerned about that. The professionals in the business have one view. The experts, the scientific people in academia have one view. They generally are not coincident with the view of the public, to be very frank about the whole thing, and--that is, because the public concern is quite a bit higher than what the professionals think the actual risk levels are.

Now, it may very well be that the professionals' estimates of the risks are underestimates, but that doesn't explain the--still, the huge gap that remains, okay. The

League has been in the business of communicating with the intelligent and the lay public. You have given us--the Board just now some very good advice about how we should go about our business.

Do you have any advice as to government bureaucrats at large as to how they can improve their performance vis-a-vis this, I think, really quite important task in carrying out its program, and it does have--and, in fact, it addresses the credibility question. It's very difficult and it's something that people have been struggling with for a long time.

MS. JOHNSON: Well, I think, basically, the problem--I think in transportation specifically, that the DOE has pursued a strategy of a lack of information will keep the public at bay; that is, if we don't fully disclose transportation routes, emergency preparedness plans we've heard a lot about today, you know, what--when are they going to start training people, that kind of thing. Well, they say, "Well, we're working on it, we're working on it. It all takes time." And that translates to the public into they don't know what they're doing, they don't have a plan, they don't want to tell us what they're thinking, which translates into: Are they being straight with us? Are they really telling us the truth?

And so I think communication is a key part of it, and I think that there hasn't been enough of that. I think that there has been a--this is my personal opinion, not the

League's opinion--that they really have pretty much deliberately tried not to talk about transportation routes very much because once people in 45 states discover that they're affected and that taking it to Yucca Mountain didn't leave them out entirely, that they're going to have more political problems, which doesn't answer your question, but I think that's a good reason for why they want to do it.

DR. PRICE: Thank you very much; appreciate it.

MS. JOHNSON: Thank you.

DR. PRICE: Next walk-in testimony, William Rosse, Senior, Chairman of the EPC Western Shoshone National Council.

MR. WILLIAM ROSSE: Thank you, Mr. Chairman.

I don't have too much to say today, it's more or less what I said last time that I think I met with some of you folks there, and it's the fact that the Western Shoshone nation is opposed to the transportation of nuclear waste over our lands and stuff, and other like that.

Although we know there's been a lot of nuclear waste transported over the lands without people knowing about it, it's been transported over here to the test site so they could test it in some of that--some of those test holes they had there to see what the effects would be when they test those bombs, then I understand they got caught moving it out from there, taking it off to Idaho someplace. They was going up through Highway 6 there, out of Tonopah, between Tonopah and,

what is it, Windover in there someplace, they got caught. Anyway, the governor raised Cain with them and everything, but that's all there is; just slapped their hand a little bit and they go on about their business.

This is where we get the fact that we don't trust DOE's statements too much because of all of the stories they've been telling us. Like J.R. Wilkinson said, I was on this tour with him, on this nuclear waste tour through the southwest here, and it was a privilege to be on that tour and to meet with a lot of people, and the biggest thing that I picked up from that was the fact that most of the people were concerned about this high-level stuff that's going to be transported down the highway coming from the east coast; mainly, about 86 per cent of it is going to be from the other side of the United States, coming clear across down to this dump site that they're proposing here at Yucca Mountain, which we hope it doesn't get in because it's also on Shoshone land.

And a lot of the things that I heard in that tour was the fact, "Well, why don't they stop producing this nuclear waste and stuff and other right now, and concentrate on finding a way to get rid of this stuff they got on hand before they produce too much of it, so much of it that there's no way to get rid of it?" Actually, it's almost that bad right now because we got, what, they say maybe 70 metric tons of this stuff out there that needs to be put in Yucca

Mountain, and we had the privilege of using one of these mock casks, which is a GA-9. We didn't feel that was a very safe cask. I understand they've had a lot of other casks they tried, I think maybe about 11 of them so far, and they proposed this one because it would carry a smaller payload and overall weight with the thing would be--the cask itself is 25 tons, plus two tons payload, which would be 27 tons.

We feel that would have to have a special truck to have those things out there on the highways, and stuff and other, but the thing of it is, how many more loads are they going to have to carry just to get what they got there now down here, whenever they get started at it? We don't know, see, because it's only a two-ton load that they carry, even though they're traveling with 27 ton on this vehicle.

That is another one of the things, and you get a vehicle that heavy, there's a lot of places they could have accidents and it's very dangerous. The cask itself, it just looks like a dumbbell, actually, and they get those there big fancy things on the end, which is buffers and stuff and other, but what's to protect the center part where the material is carried? It wouldn't take too much to breach that center part, especially if it happened to roll off of a truck someplace and hit one of these there girders or a tree or something there. Something's going to buckle.

And most of the people we talked to, they did not

have any method of really testing, other than--I think it was Denver. They said they had one of these here Second World War monitors to monitor some radioactives, some kind of radioactivity, but I don't know whether some of the other radioactive nuclides that's coming off of this, they wouldn't have any method of testing it, and there's no place that we've been that they have any kind of method of testing this.

And most of the people, like J.R. was saying, they had a fear of this stuff. There was one fellow said--one police officer, after he had gone through this here training with the Westinghouse group, and he says, "Well, all I'll need is a tank of gas. I'm heading that-a-way," he said. "I'm not coming nowhere near that site of the accident or anything else."

Well, you can see their point in feeling that way because you don't have anything to monitor it with. You don't know how much radioactivity's coming out. The other thing, DOE has been telling us how safe all of these things are that they're producing, and we feel anything that man has touched, you better think twice about the safety of it. We find so many different things that's a accident. If the Creator has handled this stuff, we wouldn't have to even worry about it, but when man touches it, it always messes it up. First thing he did, started digging up this uranium, produced this monster that they're trying to get rid of now underground again, and

it's not the same thing that they dug up out of the ground. It changed, and this is the thing that makes it real dangerous.

Also, the most native people I've spoke to, they have the same feeling, that the stuff should be stopped at the mining source right now. Why produce more? There's no-- really no need for that there nuclear energy. As far as we've heard and seen, nuclear energy is not really producing as much cheap power as they claim to produce, and also, we've heard so much about the oil and coal that we have to use for it, but nobody ever speaks about the alternate energy that's there; solar power, wind power. Why? Because there's no money in it, just the one time deal that you buy these here solar energy panels and stuff, and then there's nobody else there to collect off of, see.

Where they insist you have to have this nuclear energy to clean up the environment, they're saying that the nuclear energy is not going to really clean up the environment that much because of the radioactive particles that'll come off of these power plants and stuff and other, and then the stuff that they're going to have to transport to get rid of somewhere. And just like I say, I think they, what, spend maybe \$2 billion there at Yucca Mountain, haven't turned a shovel full of dirt yet, and so where's all that money gone?

There was a hole dug, we know, but the method they

used, they said, "Oh, yeah, we got this here. We're figuring this out just right. We know exactly where these core samples are from," but when they came down to it, they couldn't say, "Yes, this core sample is from this here, 100 feet down here, or 200 feet here, or 106 feet down here," or anything. They was all mixed up. So who's to say they're not going to do the same thing again?

And who's to say they're not going to push this here transportation of nuclear waste down our throat like they did Yucca Mountain? See, they're at the point now that they told the State of Nevada, "You cannot sue the government about this and you cannot keep DOE off of it," and yet, we need to do something, but any time it comes to that point, we're gagged; says, "No, you can't do nothing."

I do thank you for the privilege of allowing me to speak for this time.

DR. PRICE: Mr. Rosse, when you sat down you said you didn't have much to say, and you seem to have--

MR. ROSSE: Well, I didn't think I had.

DR. PRICE: And you said quite a bit. As I noted, you are generally opposed to nuclear waste being transported over Indian lands, and there's a general distrust of DOE and assurances of safety expressed in several statements. You're concerned about the number of loads; that is, the increasing traffic. You're concerned that the casks can be breached

easily, particularly in the center of the--as they're suspended from either end. You have a concern that those people involved in emergency response are not equipped to provide tests if there's a loss of containment, and aren't prepared to respond with a determination to respond. As you indicated, one said he'd go the other direction, and then you're concerned that we need to stop the production of this waste and turn to alternative sources of energy.

MR. ROSSE: Right.

DR. PRICE: That's quite a bit.

MR. ROSSE: I guess it is at that. I didn't realize I had that much there stuck away in there, there's so much that goes on.

DR. PRICE: Thank you very much.

MR. ROSSE: Thank you very much.

DR. PRICE: Our next responder is Steve Kralj. Did I pronounce it right; K-R-A-L-J?

(No audible response.)

DR. PRICE: We'll try again.

Richard Schmidt, with a note on this he probably can't be here.

(No audible response.)

DR. PRICE: Okay. Pete Mastin, a note on it saying he may not be here.

(No audible response.)

DR. PRICE: Okay. Thomas Tabacco. Did I pronounce that correctly?

MR. THOMAS TABACCO: You're the only one that has.

Yeah, this will be very short. It may not be in the purview of this Board, but I was curious on the air quality aspects of the transportation equipment, of the PM-10 monitoring that would be required for the increased traffic of the trucks as they're transported across the roadways, the EPA requirements for air quality standards, the prevention of significant deterioration of the air quality. Is that in the purview of this Board?

DR. CARTER: Well, we'd like to hear your comments, yes.

MR. TABACCO: Well, I was curious if this is the proper forum for it, if that is under this--if the air quality is under the purview of this Board?

DR. PRICE: Well, yes. Go right ahead. Make your comments.

DR. CARTER: It's certainly within the purview of the Board, not necessarily this specific panel of the Board.

MR. TABACCO: Okay. I was curious, if that--I have not been able to find any information that DOE is addressing this in the Las Vegas office or any mailings that--I am on the mailing list, and any mailings that I've been getting. I have not seen anything being addressed to the deterioration of the air quality for the trucks that will be transporting equipment

through Nevada.

We're going to have, apparently--I didn't realize the numbers were quite this high--from what the environmentalists had brought up, that there's going to be quite a few trucks going through the state. I didn't think it would be quite that number.

DR. CARTER: Let me ask you a question, if I might. Are you concerned now about the emissions of the trucks themselves from running the engines, or whatever?

MR. TABACCO: Yeah, there's a lot of different, you know, things come up; one, the dust that's raised by the trucks. The EPA has a PM-10 standard. The other is the vehicle emissions that will be created. Are we going to create an area that is considered EPA non-attainment, by having a high-volume traffic corridor in what is now a pristine area? I don't know one way or the other. I don't know if that has been addressed. That's what I'd like to know.

DR. CARTER: Okay. The DOE, I guess, would have to address that. There may be someone here that could do that, but certainly, from my reading the--some of the plans that DOE has and some of the programs that they have begun, they certainly are concerned about air quality that would be--could be affected at the site itself, at Yucca Mountain, and that concern is fairly broad. It pertains to visibility problems.

It pertains to just the quality of the air, per se, as far as

dust is concerned, and, of course, any radiological characteristics it might have, and so forth, so there is a program there. But I do not know whether there's one associated with the transportation aspect of the high-level repository program. I personally couldn't answer that question.

MR. TABACCO: How would I find that out?

DR. CHU: I think the quantities that you're concerned about; that is, the amount of emissions that--this is not normal transportation just because trucks carrying nuclear waste is going up and down the--that's what you're concerned about?

MR. TABACCO: Yeah, the trucks carrying the nuclear waste, the increased traffic due to the jobs that will be created out there.

DR. CHU: Right. I believe that the numbers that you're concerned about; that is, the increased amount of air pollution because of the combustion products, the increased amount of dust, and so on, all of that have either been calculated or can be calculated. They have--the Department of Energy has this model which which--

MR. TABACCO: Yeah, K-94.

DR. CHU: Is that correct? Yeah, and so I'm going to do my facilitator bit and introduce you to someone in the room, and you can talk with them later.

MR. TABACCO: Okay.

DR. CHU: It can be calculated. One can get a handle on it, and it's--

MR. TABACCO: Has that been calculated? How do I get that information?

DR. PRICE: It will eventually have to be; will it not?

UNKNOWN SPEAKER: I believe it eventually has to be part of the overall process, but to date we've concentrated primarily on the carcinogenic effects of the exhausts and that sort of thing. That's part of the--

DR. CHU: Right, and I think it's safe--I mean, the feeling is, is that these quantities are relatively small compared to all of the transport activities that go on in our daily life.

DR. CARTER: Let me interrupt just a moment. I'm going to do this in spite of whether I'm criticized or not, but anybody we have speaking from the audience, would you please identify yourself either now or later for the record? We'd like to have that on the record. We have no intent to intimidate you or anything of that sort, but we'd like that information.

DR. PRICE: That was John Cashwell, and he's not easily intimidated.

DR. CARTER: Good.

DR. CHU: And that's the fellow over there, so you can see him later.

DR. PRICE: I've already tried to intimidate John unsuccessfully, so...

MR. TABACCO: And he's with DOE?

DR. CHU: He's with Sandia National Laboratories.

MR. TABACCO: Oh, okay.

DR. CHU: And he's sitting over there.

MR. TABACCO: Okay. The other comment I had was I came in here, to this meeting, firmly assured within myself that the "cask" was what was considered best available technology and had been--all the prudent and reasonable perils had been addressed. After listening to some of your comments when the environmentalists for asking for a test to destruction, some of the points you brought up, now I have some questions about that.

You know, are all reasonable and prudent perils being addressed with this "cask" design?

DR. PRICE: I think the key word there is reasonable and prudent, and these are words we intend to carry to DOE, and continually press for that assurance.

MR. TABACCO: Okay. Thank you for your time.

DR. PRICE: Thank you very much. We appreciate it.

Now, we have some names which I'm going to repeat to see if these people have come in. Steve Kralj, K-R-A-L-J. I may not be pronouncing that correctly. Richard Schmidt. Pete Mastin. If not, is there anyone else in the audience who

would like to make a comment, address anything to the Board, regardless of your affiliation or specific interest; just whatever you might like to bring before we adjourn?

(No audible response.)

DR. PRICE: Dr. Carter says he has one comment he'd like to make.

DR. CARTER: Yeah. What I'd like to do is certainly support some of the advice given to us earlier by Abby Johnson as far as scheduling the comments. I guess it was just before noon a gentleman introduced himself to me. His name was Harold A. Rogers. He's the Northern Nevada liaison for the American Nuclear Society. He resides in Carson City, Nevada, and he had come to make a presentation and said that he had to leave and go return, so he's one that would have appeared before us if he had been on the schedule earlier in the day. So we missed hearing from Mr. Rogers for that reason.

DR. PRICE: Yes. We conducted this hearing similar to that--to the conduct of the hearing in Amargosa. That was not a problem at Amargosa. Of course, some of you, knowing where Amargosa is, might understand why that's not a problem, I don't know, because our schedule wasn't quite as full, I think, with presentations, and we certainly are taking these suggestions to heart.

We also wish to acknowledge the presence of Senator Hickey here, and we want to thank you for being here, and if

there are no more comments--yes?

UNIDENTIFIED SPEAKER: Do you have any further meetings scheduled?

DR. PRICE: Yes. We do not at this point. We scheduled two of these, this panel did; the one in Amargosa Valley and this one, and then we wanted to sit back and take a look at it and you've given us some things to look at, and then we'll consider where to go from here.

One of our concerns is that we feel that perhaps in the future we need to tap outside of Nevada into some of the corridor areas and give them an opportunity to express themselves. These are the kinds of considerations we'll be making with respect to our next public hearing.

UNIDENTIFIED SPEAKER: Well, will there be public meetings by any of your other panels in Nevada any time soon that you know of?

DR. PRICE: Helen, do you know of any that are scheduled by any panels at this point? None scheduled. We're facing the end of this year and looking toward next year and making our plans through next spring right now.

DR. CARTER: In fact, I would add one thing. It may well be that the environment and public health panel and maybe one of the others will have a meeting in the spring somewhere in southern Nevada, but that's not been established yet. So there's a possibility.

DR. PRICE: We've got plans that are just too--it's premature to announce them at this time.

Well, it's just coming up on five o'clock. Uncanny, I'm terminating it at five o'clock. Again, we thank you very much. We appreciate your comments, and we'll stand adjourned.

(Whereupon, at 5 p.m. on November 19, 1990, the hearing was adjourned.)