NUCLEAR WASTE TECHNICAL REVIEW BOARD

ENGINEERED BARRIER SYSTEM, TRANSPORTATION AND SYSTEMS
JOINT PANEL MEETING

TECHNICAL CHALLENGES OF INTERIM STORAGE OF SPENT FUEL

Dallas, Texas
November 1, 1993

BOARD MEMBERS PRESENT

Dr. John E. Cantlon, Chairman, NWTRB
Dr. Dennis L. Price, Session Chair, Morning Session
Dr. D. Warner North, Session Chair, Afternoon Session
Dr. Donald Langmuir, Member
Dr. John J. McKetta, Member
Dr. Ellis D. Verink, Member

STAFF MEMBERS PRESENT

Dr. William D. Barnard, Executive Director, NWTRB
Dr. Sherwood Chu, Senior Professional Staff
Dr. Carl Di Bella, Senior Professional Staff
Dr. Daniel J. Fehringer, Senior Professional Staff
Dr. Leon Reiter, Senior Professional Staff
Mr. Russell K. McFarland, Senior Professional Staff
Ms. Paula Alford, Director, External Affairs
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Ms. Linda Hiatt, Management Assistant
Mr. Frank Randall, Assistant, Public Affairs
Ms. Karyn Severson, Congressional Liaison

I N D E X

P R O C E E D I N G S

(8:30 a.m.)

DR. PRICE: Good morning and, on behalf of the Nuclear Waste Technical Review Board, welcome to this morning which is jointly sponsored by the Board's Panel on Transportation & Systems and the Panel on the Engineered Barrier System. I am Dennis Price. I am Chair of the Transportation & Systems Panel and I am Professor of Industrial & Systems Engineering, Director of the Safety Projects Office at Virginia Polytechnic Institute & State University.

Let me now introduce other members of the Board who are here today. Ellis Verink, Chair of the Engineered Barrier System Panel. He is distinguished Service Professor of Metallurgical Engineering Emeritus at the University of Florida. John Cantlon, the Chairman of the Technical Review Board. He is Vice-President Emeritus for Research & Graduate Studies at Michigan State University. His field is environmental biology. Warner North, a member of the Transportation & Systems Panel. He is Consulting Professor in Engineering & Economic Systems at Stanford University and a principal with Decision Focus, a consulting firm. Donald Langmuir, a member of the Engineered Barrier System Panel. He is Professor of Geochemistry, Colorado School of Mines. John McKetta, another member of the Engineered Barrier Panel. He is a Joe C. Walter Professor of Chemical Engineering

Emeritus at the University of Texas. I should note that Ellis Verink and I reciprocate. He is a member of the Transportation & Systems Panel and I am a member of his Panel.

Also in attendance today are our technical staff. I would like to specifically introduce Bill Barnard, the Executive Director, and Woody Chu, and Carl Di Bella, who provide staff support respectively to the Transportation & Systems Panel and the Engineered Barrier Panel.

As most of you know, the Nuclear Waste Technical Review Board was created by Congress in the 1987 amendment to the Nuclear Waste Policy Act. The Board is charged with providing an unbiased source of expert advice on technical and scientific validity of the DOE's work in high-level nuclear waste management.

The theme of this meeting is on the technical challenges of interim storage of spent fuels. The Board believes that interim storage is an important component of the storage, transportation, disposal, waste management system. The Board also believes that these functions are strongly interconnected and has long urged the DOE to view them in a total systems context. That this is a joint panel meeting and that Ellis Verink and I are members of each other's panels underscore this point.

The Board devoted a substantial part of its winter

meeting last January to the subject of interim storage. This meeting will provide an opportunity to explore some of the technical issues in a more detailed level than was possible at the January meeting. Our concern encompasses all of the fuel that would be generated and not just that part that may be accepted by the Federal Government for storage. The aim of the meeting is to identify important technical issues related to long-term storage that need to be addressed. Some of them may include questions of system compatibility of diverse storage technologies and standardization, containment integrity and transportability after prolonged storage, and risks of multiple handlings and transfers.

We have allotted a day and a half for this meeting. It separates nicely into three sessions. This morning session sets a stage. We are very fortunate to have Dr. Chauncey Starr, a world-renowned expert in risk analysis as a keynote speaker. As you know, Dr. Starr is the Emeritus and Founding President of the Electric Power Research Institute. He will be followed by Bob Bernero of the Nuclear Regulatory Commission who will give the NRC perspective on some specifics relating to the safety and security of interim storage. After a break, we will hear from the Department of Energy led by Lake Barrett. We've asked him to provide us with some details that relate to DOE's management strategy and plan for the interim storage of spent fuel including

research and development plans and an update on the status of the multi-purpose container concept.

While the intent of the meeting is to explore technical issues, the Board is mindful of the significance of institutional issues associated with interim storage and the potential effects on the implementation of technical decisions. Therefore, there will be a session this afternoon devoted to some of these institutional issues. This session will be chaired by Warner North. In addition to formal presentations, this session will feature a round-table discussion at the end. This morning's speakers are invited to participate in the round-table.

Tomorrow morning, we'll concentrate on technical issues and we will delve into the specifics of a variety of technical topics. That session will be chaired by Ellis Verink. There will be time at the end of both days for comments from the audience. I know some of you have to leave today, but I hope most of you can stay. It is a full agenda.

It is my pleasure now to turn the microphone over to our distinguished keynote speaker, Dr. Starr.

DR. STARR: Well, it's an honor to be invited to give a review talk to such a distinguished board that's been working for so many years on this problem and probably knows more about the details of it than I do. I've been working, however, in this field for 47 years since its very inception

and I probably know more about the history and the skeletons in the closet of what's been going on in this whole field of the interim storage of spent fuel. And, I thought since the Board asked for it, I would give a general review of the main features which I believe ought to be considered in the technical aspects of planning out the nation's spent fuel strategies.

Interim storage is a high-priority public safety concern. It involves a moderate degree of technical complexity, but is a very foreseeable need for the nuclear power utilities. Let me give you a little picture of the perspective and, let me just say, I don't have a written speech, but I've left an outline with the secretary of the main points I intend to cover which is, I'm sure, available.

I'm going to draw on the experience we had in handling the whole problem of nuclear powerplant safety issues as it might be relevant, what we might learn from this in handling the problems of interim storage of spent fuel and its issues. I'm going to draw on the experience which I've had and others have had and some on the committee in the field of risk analysis which is a very general field of how you handle public risks and the social decision making. And, I'm going to draw on my experience with public perception because any of us who have been in the business of nuclear power this long have learned the hard way about public

perception and what's involved.

Let me talk a little bit about the framework for the strategy for the interim storage of spent fuel. The issue is not strictly technical. That's a lesson you learn very, very quickly. The reality of the issue is embedded in institutional doctrine, Government policies, and public perceptions all shaped and constricted in the formation of technical options and priorities. The technology is, therefore, not independent of all these non-technical frameworks, and we in this country and in every country are not free to have the best technical choice. We have to find something which meets all the other constraints. An inherent problem in all long-term projects that cover decades is that any system now planned assumes that we know the performance requirements for the useful lifetime of the system. At least 50 years for spent fuel interim storage system would have to be looked ahead and a millennia for an eventual repository. Anyone who thinks that they know what the public criteria are going to be 50 years from now or 1,000 years from now is a bit of a visionary.

History suggests that such persistence of a performance criteria is very rare and I'll give you a very interesting historical example for those who want to look at it. Read the history of the early concepts of the railroad systems of the United States 100 years ago and see what

people thought railroads would do in the development of the country and then see what happened and what interfered. And, you will find that the people who planned the railroads of the country thought they knew what was going to happen and it didn't. And, we face the same problem here. Trying to make decisions on meeting the criteria for a system that is going to be effectively in operation 50 years and 1,000 years from now requires a different kind of approach than one that says we know all the specifications right now.

Let's talk about the general system objectives that meet this kind of framework. The first one, obviously, is flexibility. For the reasons I've mentioned, every one of such systems, long-range systems, are developmental in nature. The first use of the system which we've set all the criteria and the engineers build it and inspectors say it's working--the very first time you use it, you end up with a list of modifications. So, you've got to be able to start changing this system right from the beginning. And, changing priorities, changing loads, changing policies always lead to continuous modifications. So, the system has to have the capability of flexibility; a system that doesn't permit flexibility is essentially going to run into a dead end.

The second major point--these are major lessons--is that the initial demonstration and technical performance monitoring of these systems is very key. These systems

require scientific and engineering data collection throughout their lifetime. There's no such thing as having all the science and all the engineering planned out to the last detail before you start. The very first decade has a tremendous amount of scientific and engineering data collected and then it continues on indefinitely, but on a diminishing basis as time goes on. And, the reason for it is you learn how to both prevent things that you don't want happening and to correct things that you find aren't doing what you thought they would do, and finally, things that you assume the public would be confident about and the public isn't confident about and you have to demonstrate these. So, the public's point of view on this stuff is also a variable. It changes as time goes on.

Well, those of us who travel back and forth on airplanes all the time--I'm sure, there's committee members--their point of view of safety on the airplane, if you think back 20 or 30 years what you worried about and you think back now what you worry about, they're quite different. Well, for myself, I'm happy when we got off the ground, I'm happy when we land, but while we're flying, I don't have any problems. Thirty years ago, that was a big problem. I was always wondering about the engines giving out in the middle of flight. Now, we don't worry about the engines--rarely worry about the engines giving out in the middle of a flight. We

worry about that bump on the runway and we land and that little rumble on the takeoff, whether he's going to make it before the end of the runway. Your points of view change.

Let's talk about risk analysis, in general. I'm going very rapidly because I'd like to leave time for the Board members to ask me questions. The field of risk analysis is very complex and Dr. Bernero on the Board is one of the experts and so is Warner North and so I'm going to be giving some summary things that they are fully aware of and can fill in.

One of the things you learn in risk analysis is there's no such a thing as dropping a problem. All problems eventually lead to outcomes, whether you do something about it or you don't. Time and social processes can't be stopped. Time goes on; society moves to do things whether you do anything about it or not. Neglect leads to unplanned and ad hoc short-term responses that are unpredictable and usually undesirable. I think one of our famous senators talked about benign neglect. There isn't any such thing as benign neglect. There's neglect, but it isn't benign. Action provides control. That's one of the reasons we look for actions. We want to be able to control the extent of what's going to happen based on foreseeable knowledge. Neglect may also be a conscious strategic decision, but it's a decision not to control a situation; to leave it uncontrolled. I make

this point because the evasion from facing up to finding a solution to a foreseeable risk is a conscious decision to keep hands-off, but that's also a conscious decision to invite a completely uncontrolled response.

Second, no solution is perfect in all respects. There isn't any solution to a public risk that's perfect for all kinds of reasons. I'd be happy to talk about that further, but one seeks the best balance of what; the benefits of doing something, the cost of doing something, and the risks that remain. There's always some kind of risk remaining. In the benefits, you include all the social benefits, as well as economic. In the costs, you include all the social costs, as well as monetary costs. And, the risks, you assume not only the tangible ones, but the intangible ones. And, we can give all kinds of examples. I don't want to digress on that one because it's too interesting. If I start talking about that, I wouldn't have time for other things.

Every end-objective has several strategic planning paths from now until then. So, if you look at an end-objective, you say, well, there's any number of different ways we can get there. The problem is to compare these different paths and what is needed in the risk analysis is a comparative risk of the benefits/the costs of the alternatives. Focusing on any one approach can usually get

you into trouble because you squeeze that one approach and put blinders on the other approaches which, on balance, might be a much more desirable course.

In the nuclear power industry, what was developed to get the engineering number game as one of the inputs, but at least to get it so that it has a minimal argument, one develops a Probabilistic Safety Analysis called a PSA. Very commonly done and is now routine, every nuclear power installation. This was started a long time ago and I won't give you the history on it, but what it does is collates all the engineering technical judgment, including the uncertainties on the technical side and the engineers work this through in terms of the probability of all the things that could fail failing and it gives you a picture of what's important, what's unimportant. You need to do that for every one of the alternatives and it provides you a basis for getting a comparative risk perspective and it also shows up what it is you need to worry about in terms of the important risks and the trivial ones.

The next point, there should not be a zero risk target. It's impossible, literally impossible, to develop a zero risk target for any public risk. A very hard point to get this across. Unfortunately, politically, it's a wonderful cliche to get a public zero risk. Those of you who are following the history of the Delaney Amendment, which I

have been fighting personally in writings and everything else for over 20 years, is this is a political amendment that said certain things should be done to give the public zero risk. It's a technical, scientific, and practical impossibility. In the case of anything involving radioactive materials, it's certainly an impossibility.

So, what do you look for? Realistically, individuals worldwide commonly have an annual probability of death from nature-induced accidents (insects, snakes, lightening, that kind of thing) ranging between 10^{-6} and 10^{-7} --that's one in a million and one in ten million per year--or a lifetime risk of $7x10^{-5}$ to $7x10^{-6}$. What that says is--incidentally, this is true all over the world. I collected the earliest statistics. You can go to the darkest Africa, remotest Asia, anyplace you want, and you'll find these numbers are in that range all around the world. Nature sort of sweeps out a certain fraction of us every year on things that we don't control; lightening being a typical one, insect bites being another. It just turns out to be in that range. So, if you're running an insurance company, that's the minimum risk you can foresee for your clients.

Now, it's therefore excessive for society to invest resources to reduce any man-made risk very much below this magnitude, even accounting for the statistical accumulation of such low-level risks. So, if you start making social

investments to try to reduce risk much below that number, you're essentially wasting society's resources. It may make you psychologically feel good that there's a risk hanging on the wall, you've removed that risk, but there probably--that risk is, say, 10^{-9} and you're walking around all day with a risk of 10^{-7}, you're really wasting your money because there are a lot of other things we face where the risks are very much higher and that's where the resources ought to go.

So, anyone who tells you that in order to reduce a risk, he wants to get it down to zero or some remarkably low number because the public couldn't afford that many fatalities, for example, in 10,000 years or something of that sort, somebody has to look at what that resource would do in removing a much higher risk. Society does not have unlimited resources. The allocation of resources in an effective manner is a very important key issue and I could talk to you about that.

So, you end up then with the picture that public risk is comparative and not absolute. And, therefore, as I go through the literature which all of you have been exposed to and I see numbers coming out from the agencies like 10^{-9} and so forth and so on, I mentally shudder at the lack of comparative public risk with everything else that those resources ought to be applied to.

Let me go on. A system analysis of each

alternative should be undertaken to disclose the cost/ benefit/risk relationship of each and their dependence on a range of public safety and inter-generational criteria. Now, this is how you take care of the 50 and 1,000 year problem. You have to look at what could happen to public criteria 50 years from now or what might happen 1,000 years from now. I'll give you a quick example. I just came from a meeting which involved a lot of bio-technology people and, depending on who you talk to, their range of confidence--for example, of having not an absolute cure for cancer, but one where 99% of cancer-induced growths could be managed or cured--their confidence of doing this in the next 50 to 100 years are very high. There's some who say, well, it's going to be very difficult, but you know, recognizing about 50% are being handled now, if cancer suddenly in the next 50 to 100 years becomes just a treatable ailment, then the public's almost neurotic concern with radiation-induced cancers might disappear and does not become a very high fear element in the public. If you believe that the human race is not going to go to the dogs in 1,000 years, but it's going to continue to grow intellectually, it's certainly likely to be the case. Well, that's one of the possibilities.

The other possibility--let me go on to a few, there are many of them--is suppose the global warming issue which I don't think is at the moment the most pressing public issue,

but suppose it turns out to be a very pressing public issue in a practical sense. You know, we really get a solid signal that global warming is imminent, we're got to do something, and we go all fossil fuels. Then, there are very few alternatives. You can dream all you want about all the other things, but the only big source we have is nuclear power. I might also point parenthetically--I'm not trying to sell nuclear power on this issue; I'm just trying to point out the spectrum of things you have to look at--it turns out that in Europe today nuclear electricity is the cheapest form of electric power sources. In fact, if you read the newspapers, in Germany today--today, this calendar day--there's a big debate going on. The coal industry is concerned that if nuclear power isn't shut down, the coal industry in Germany will go out because coal power in Germany costs twice as much as nuclear. And, France, as you know, is supplying huge amounts of nuclear electricity to England, Spain, Belgium, Switzerland, Germany, and Italy because it's the cheapest form of electricity. Now, in this country, nuclear power is in a dormant stage as far as growth is concerned for all kinds of reasons, but the basic costs are not high. So, if the global warming issue were to become an issue in 50 years or less, the whole framework changes. So, you can't take the position that the system you're going to put together is a system that's on a temporary basis. It may not turn out to

be. You have to be able to handle a flexible change in criteria.

Now, let's talk about public acceptance. Public acceptance of risk has been argued about. There are huge books written on this. Myself and Dr. Bernero, I know, and others have written on public acceptance, but I've come to one conclusion. It's sort of a general one. That is that the public really wants effective management of a risk. They really want to believe that the agency that's responsible for it can do the job competently. The public wants visible assurance that it can be monitored and that remedial steps can be taken. You know, the notion--I'm not trying to now change all the directions for spent fuel storage, but the notion that burying things underground gives the public confidence is naive. The public wants to see where the hazard is, wants to see that it's being monitored, and wants constant assurance that it's being monitored. They assume that the technical people involved know what they're doing, but they want to know that it's being done. If you'll notice, the airline people always give you pictures of what a wonderful maintenance shop they have taking care of their engines. That's to give you confidence. And, that's what the public wants. They want confidence that it's being managed. Of course, they want a lot of other things. They say, well, if it's well-managed, the risk isn't going to be

very high and so on. But, unless they can see visible indications of management, the public confidence is always the question.

Now, those are generalities on the risk analysis. Let's come back to your problem for this morning on interim storage. Let me tell you how these generalities connect with the your particular issues. First, the spent fuel flow in the U.S. during the coming decades must be stored. You can't neglect this problem. The spent fuel is accumulating, it's going to continue to accumulate, it's going to accumulate. Even if no more nuclear plants are built, it's going to accumulate for another 20 years and it's got to be a large amount and you've got to take care of it. If you don't take care of it, it'll get taken care of in some other way. If it gets neglected, it will go into one of those ad hoc solutions and then we'll be unhappy about it because it really wasn't a good solution. The foreclosure of nuclear powerplants would not remove this need. If you stopped all the nuclear powerplants today, all you would do is get your spent fuel problem all at once.

The issue is the choice of systems among the three now being considered; the ultimate repository, the interim storage in a monitored retrievable storage system and on-site interim storage. Each of the three can be risk acceptable. They serve different needs and time horizons; decades, a

century, and millennia. Obviously, you can have on-site storage for a decade or so, you can have a monster of retrievable storage measured in centuries, and when you talk about millennia, you want a permanent repository.

The spent fuel flow may continue indefinitely. The present notion that the absence of new nuclear plant orders caps the amount to store in the repository is based on regulatory and cost factors that can change in the coming decades. I've explained before why. If natural gas price moves up substantially or the global warming that penalizes fossil fuels, nuclear may become a direction of choice, as it is already in several industrial countries. Thus, near-term schedule accomplishment, while vitally important to the nuclear utilities, is secondary to adequate long-term performance of the system. So, my message there is I wouldn't worry about the schedule in terms of Year X or Year X+1, or Year X+2. Much more important that it be done well and properly so that it can last over periods of decades and a half a century or so.

The system chosen must be flexible. Every engineer knows what that means, but I have to tell you that as soon as you start writing specifications, you've removed flexibility. But, you need to write performance characteristics and let the designers come out with what's required to meet those performance characteristics. And, after the initial trial,

everyone should expect that desirable modifications will become evident and should be made.

Finally, the system chosen must place a high priority on public concerns, as well as on technical issues. Public worries are different than engineering worries. I've worked with engineers and I've worked with the public and it isn't that the language is different, it's that the worries are different. An engineer looks at the failure modes, he looks at probabilities of failures, he looks at the human specifications, choice of materials, this type of thing. The public doesn't worry about that. The public worries about other things.

The engineer almost never listens to what the public is saying because he never talks to the public. The real problem is to find out what the public is really concerned about or at least put yourself mentally in the position of being a member of the public and what would your wife and children and mother-in-law and father-in-law, what would they worry about? They worry different things. When I talk with my wife--we've been married 58 years. When I talk to my wife about these issues, she says, well, I believe you because I trust you, but that's not what I'm worried about and then she gives me a long list of what she's worried about.

So, I think that the public needs reassurance and

it has to be somehow their concerns have to be taken care of and how it's done. I have to tell you, as a technologist, I know that any one of the systems you're talking about has a quantitative risk to the public that's immeasurably small. I don't think there's a real technical risk in any of the ones I've seen in the literature. The real difficulty is that you have not been able and will not be able to make the public believe all that unless you take into consideration what it is they need to believe it and give them that reassurance.

Now, let's talk about the interim storage alternatives. Interim storage at a monitored retrievable storage, an MRS, or at an on-site storage are technically very similar. They differ primarily on the centralization of responsibility. It's a little much--you know, we've had experience in this. We've always had a choice of storing the nation's gold bullion, of which we have billions, in the many bank vaults around the country and storing it in Fort Knox. Somebody decided to store it in Fort Knox. I've never heard anybody worry that Fort Knox is going to be raided by a terrorist group and all the gold in the United States taken away. The public has confidence that Fort Knox is a secure repository. If you put it in the individual vaults of banks, I don't think the public would have that confidence. But, that's a choice; the gold could sit in either one. And, that's the difference between on-site storage and the

monitored retrievable storage. On-site storage at the utilities disperses the storage in many, many places and the public confidence in that being secure may not be as great as the public confidence in a visible monitored retrievable storage. And, I think that's the biggest argument for monitored retrievable storage. Technically, they're about the same. The other aspect, of course, is that utilities come and go. They can even go bankrupt. We, I guess a little naively, assume our Government will never go bankrupt; so, therefore, the Government runs a monitored retrievable storage. It's safe and perpetual.

The difference between an eventual repository, such as Yucca Mountain, and an interim storage is the series of barriers between the radioactive sources of the public. That's a real technical interest, that difference. It's not a trivial one; in fact, probably the most important. The eventual repository is a mix of natural geologic barriers which are site-sensitive and man-made engineered barriers which are site-insensitive. That's a key fundamental point on the difference between a permanent repository and a monitored retrievable storage. The interim storage depends only on engineered barriers and on a short-term basis has less uncertainty in the estimate public risk. It also has less uncertainty from the point of view of public visibility. The fact that you don't have to worry about the

uncertainties of nature which occur in a permanent repository is a real plus for the monitored retrievable storage.

The proposed multi-purpose canister, the so-called MPC, embodies engineered barriers based on present knowledge and predictable performance for at least a century or more. As a technologist, I think that's probably one of the easiest of all the technical design problems is to build a multi-purpose canister that can last 100 years or more.

All three systems share in common a need for transportation some time. That is the so-called problem of moving these multi-purpose canisters around the country in vehicles. That problem is the same. They occur at different times whether you have on-site storage, a monitored retrievable storage, or a permanent repository. But, eventually, they all have to be moved over the country. So, that problem has to be faced. From a technical risk point of view, it's trivial. From a public concern, it's a major public concern and one which has to be addressed.

An eventual repository like Yucca Mountain must be considered initially today as a development program because the natural geologic barriers are complex, only partially predictable, and their long-term interaction with a man-made system may reveal characteristics that require physical re-engineering or accommodation. Thus, for the first century, the eventual repository should permit access, measurement,

and retrievability. The multi-purpose canister would permit this and its design could substantially reduce dependence on the geologic barriers.

What I'm really getting at here is the multi-purpose canister is going to be a must anyway, whether you have a monitored retrievable storage or not; that it's not a technically difficult job to put together to meet all the safety criteria and all the transportation criteria; that even if you go to a permanent repository that for the first 100 years or so that permanent repository is going to be itself a developmental exploration even if you think you know most of the answers.

Let's talk about the technical aspects. The multi-purpose canister and the monitored retrievable storage are traditional engineering, design, and fabrication projects. They obviously should be able to meet all the current public risk criteria. Public perception that it does so can be supported by physical demonstrations of its integrity. For example, you set up railroad collisions, explosive detonations. The CEGB did that some decades ago to show that their transportation canisters in England stood up. They had great tv exposure of a railroad train going full speed into one of these canisters. The engine got totally demolished, the canister didn't, and the public began to believe that the canisters could hold.

The key long-term question relates to the eventual interaction of the multi-purpose canister outer shell with the geologic repository and, thus, the appropriate choice of materials for its longest life and integrity. This is a flexible choice if the multi-purpose canister is retrievable from the eventual repository for a century or more, which I believe it should be. It is not an issue for the interim monitored retrievable storage where materials, such as the Ductile Cast Iron or the equivalent provide a core enclosure of extreme durability. This is a very minor technical question. However, it would be useful to have a specialized research facility at the monitored retrievable storage to study the spectrum of outer shell possibilities for the geologic repository. Those of you who are familiar with design know that the canister has got a strong cylinder and then an outer coating can be put on of any number of materials to suit the geology that's found--the chemistry of the geology that's found in the permanent repository. And, there ought to be some research done on the options for handling these things over very long-term. As you know, this is being done in other countries of the world and other choices of outer shells have been made.

The capital cost of both the canister and the retrievable storage is unlikely to be as significant as the continuing cost of spent fuel handling, monitoring,

supervision, and institutional administration. Plus, a design objective should be to minimize these long-term operating costs. Based on my own experience with handling spent fuel and fuel elements in nuclear power stations, I would say that the cost of operation and handling far exceeds the capital costs of the equipment that would minimize that continuous operating cost. So, I wouldn't worry too much about saving money on the canister, for example, or on the construction of the monitored retrievable storage. Although I know it's the capital cost that always looks high on the budget, the operating cost gets buried somewhere. But, I think that's the wrong distribution in terms of long-range application of funds.

The interim storage combination of the canister and retrievable storage can be designed, constructed, and placed in operation in a relatively short time scale compared to the implementation of a permanent repository. Forget about the past history. Even if you started from scratch, you still would have a long time problem with a permanent repository because of the unknowns that do exist in the geological barrier. If you went to the monitored retrievable storage, it would thus provide time for exploratory studies of the geologic repository and also meet the foreseeable needs of the nuclear utilities. The nuclear utilities wanted to have the monitored retrievable storage as a way of getting it off

their sites and you'd be able to do this in a reasonable time scale.

Most importantly, it would provide an opportunity to establish public confidence in the program strategy. The impression the public has now is that the Government doesn't know what to do with the stuff. And, if there were a strategy that said this is our plan and this is how we're going to handle it, I think the public might feel differently. I want to repeat the public wants to know that you have a strategy for management.

Because interim storage in an MRS would substantially relieve the performance requirements of a subsequent geologic storage, it would have a permanent value in any eventual spent fuel system. Now, I've read enough of your literature to know that a lot of the questions being asked on the permanent storage, the geologic storage, has to do with temperatures, the heat dissipation, and so on. These are the things that are amenable to design and engineering while the casks or the canisters are in the monitored retrievable storage and, if the right choices are made, it can reduce the physical demand requirements on the permanent storage. So, there's a system flexibility. What I'm talking about, of course, is looking at the total system problem, starting with the spent fuel coming out of the nuclear reactors, then going all the way to the permanent repository,

but looking at how you optimize the design of that whole system, not just one piece of it.

Now, I'm going to end up with the importance of the nuclear industry. The disposition of spent fuel has obviously become the Achilles' heel of the nuclear power industry. Some nuclear utilities are facing this issue today and eventually all must. It is both an economic and managerial issue. It cannot be avoided, even though it may not be as immediately urgent as current operating costs and regulations. There are many nuclear utilities that really believe the Government is going to take this off their hands in the next few years. I don't happen to believe that, but many nuclear utilities believe it. They're much more worried about their daily operating costs, not about this issue. I'm giving them a message saying they're going to have to worry about it and worry about it soon; they might as well recognize that.

The performance of other countries in implementing spent fuel repository systems suggest that our difficulties are institutional rather than technical. You're going to have a session on this later on. I read this report of the Board that was put out last year about its visit to other countries. If you read the details, you find everybody has got headaches, but they're going about managing these headaches without going through the dance that we're going

through in this country. And, not all their solutions are perfect, but most of them are along the lines I've indicated. They're going in for retrievable methods and they're going in for methods which are probably good for a couple of hundred years.

The present Federal Government commitment to assume this responsibility unilaterally has been difficult to fulfill. As you know, that's an understatement. The split of responsibility and authority among the several Federal agencies involved has resulted in discordant views, objectives, and implementing tactics. While the agency is sympathetic to the utilities' needs, realistically they have only weak political pressure to meet schedules or operating targets. Their only persuasive client is Congress and its committees.

I've worked with the Federal Government over these 40 years and all the changes that's gone on in the nuclear business staring with the Atomic Energy Commission's early days, and once you get a bureaucracy set up in the Federal Government with the best of people and the best of intentions, their real boss is Congress and the Congressional committees. It's not the public, it's not the members of the industry, it's not the individual people concerned with radiation hazards. They try to do all these things the best they can, but finally the rules are being set by Congress and

its committees. And, this makes it very difficult. One of the obvious things, I think, is that I would hope that the new Secretary would consider working with the other agencies and finding some single group in the Government to which this problem could be addressed.

As the most vulnerable stakeholder, the nuclear industry should now seek an active participative role in this program to protect itself against the real possibility of an indefinite lack of progress while the industry bears a continuing burden. I was involved in all the discussions that went on when the tax on nuclear power was established to pay for these programs. I, on record, argued against it on the basis that the industry should not abrogate its responsibilities. It's no hidden secret that the industry was glad to have the Government take this off their shoulders. Some of us, myself, said in that way the industry lost control of getting the job done. I think the industry now has to do something to at least become an active participant. That may be beyond the recommendations of this Board.

Now, my final comment are the ideological issues. Nuclear power continues to grow worldwide. The eventual storage of spent fuel will be a global necessity for the foreseeable future as a key part of the back end of the nuclear fuel cycle. It is relevant that most nuclear power

countries have incorporated interim storage in their total spent fuel system. This topic has been subjected to much ideological debate based on imaginative scenarios of potential environmental security threats. Regardless of their merit, these concerns must be allayed in the political debate establishing a U.S. national strategy for the next half century.

Well, these are very general comments. I'm sure many of the members of the Board are familiar with any or all of these matters and I'd be happy to answer any questions you have.

DR. PRICE: Thank you. Questions from the panel members?

DR. CANTLON: I'd like to have you comment on two issues I didn't hear you touch on. One is the desirability of standardizing the MPC as opposed to having several different types. And, the second one you didn't comment on is the perceived linkage between a viable repository and the problem of both on-site storage and siting the MRS; the perception that on-site storage is forever or that an MRS might be forever. Could you comment on those?

DR. STARR: Yes. Let's talk on standardizing first. I believe that it is important for economic reasons, if nothing else, that there be a standardized canister. I would suggest that the utilities who have to handle these things and the

various proponents of different designs get together and come out with one. As a technologist, I think that's a simple problem. To put in a canister that would last several hundred years, knowing what spent fuels are like, what their leakage rates are and their failure modes and so on, this is really technically very, very easy. You're dealing with a system which has no inherent stored energy. It's a sealing problem. I think that's almost routine. So, I say standardization is right because if you don't have it, then just the economics of the system and the fact that the monitored retrievable storage has to handle multiple systems gets to be expensive and awkward. And, I'm all for standardizing.

Now, as I've indicated in my comment, I don't conceive the permanent repository chosen today as being more than an experimental permanent repository. Not that you might want to move it, but you're not going to want to seal it as a permanent repository because you will never be able to be sure of all the geologic interactions with the canisters without measurement, without observation. So, it's going to have to be retrievable. So, the question is how fast can you make an retrievable underground housing versus an above-surface? Well, I've pointed out why I think the above-surface could go faster because it's an engineered non-geologic issue. I have great confidence in being able to

build a repository for hundreds of years above the surface under complete engineered systems rather than have to worry about proving through all our mechanisms of abstract hearings and so on that an underground repository can be done. In either case, they're going to have to be retrievable certainly for--for certainly a century or so.

DR. PRICE: Other questions?

DR. NORTH: I'd like to ask you to comment a little bit more explicitly on the systems analysis and Probabilistic Safety Analysis aspects, together with the observation by our Board of a problem that various people are working on who are here in this room and will be talking later in the meeting, the relative lack of achievement of the Department of Energy's program to do the overall systems analysis.

And, the comment I'd like to have you expand on is your Section 4, No. 4, the utility industry taking a more active role and comment particularly on what the nuclear industry might do in filling in this need for a better overall systems analysis.

DR. STARR: Well, let's talk about system analysis. You have to look at the total issue of the public benefit of a choice of a system and relative to what the public invests in getting such a system. As you know, one of the problems of risk analysis is money spent on reducing a public risk to some very small value in something is money taken away from

investment in something that's a higher public risk. This allocation of national resources, no matter who spends it, is the key issue. So, what you'd like to do is have a spent fuel storage system which puts the minimal demand on the total public national resources and gives you the most in terms of public safety relative to some other application of that.

Now, to do this, you have to look at the whole system. You have to look at an effect starting with the spent fuel handling at the nuclear utility which represents the public pays for everything, sooner or later, through rates. So, the cost of handling on-site and then the cost of an MRS as an operating thing, eventual storage in a permanent repository, the cost of all that development, you have to lay out a system strategy from beginning to end. I have never seen that. I've gone through the literature and I still haven't seen it. I notice that in the last report of the waste board, the summary executive comment, asked for that, but I've never seen it. Don't ask me why the DOE hasn't done it. I understand about bureaucracies and I'm not here to restructure the DOE. Each part of the deal has got a job to do, but the total system picture I haven't seen. And, that analysis of this really hasn't been done. So, I think that the question of that task is a key one.

Now, eventually, the public is going to pay for all

of this. If it doesn't do it directly, it's going to do it indirectly through electric utility rates in our present structure. So, I think to answer the second part of your question, I think it was a big mistake for the nuclear utilities--I can tell you the date; roughly, it was about I think '73 or '74 when the bill was passed for the tax and so on. It was a big mistake for the utilities to hope that the Government would take the spent fuel storage problem off their shoulders. I think they've got to get back in because they're the ones that are going to have to collect the money to pay for it and I think, at this late date, you can't displace the Government because the Government has the responsibility for the reason I mentioned before.

The public thinks the Government is going to be here forever and I don't know about the lifetime of utilities. So, it's got to be a partnership and I think that the utilities up to now have been putting up the money. The Government has been spending it, but the utilities have had very little to say about what's going on. I think that's a strategic error for the utilities and a strategic error in the laying out a really optimal strategy for the country.

DR. NORTH: So, I interpret your remarks as strong encouragement for the electric utilities to take a proactive role in the strategic planning and the total systems assessment.

DR. STARR: Very well stated.

DR. PRICE: Other questions from the panel members?

(No response.)

DR. PRICE: Just a moment for someone from the staff?

DR. CHU: Yes, Dr. Starr, I gather that it's your opinion that the design and the development of the MPC is not a very large technical challenge in your mind, and I think to most people to design something that you can use for storage and transportation, they would readily agree. My question is that, for some, they believe that there are great uncertainties as far as incorporating considerations vis-a-vis disposal, that is the geology. Would you comment on that?

DR. STARR: Well, I have my own conceptions of the MPC, but I'm sure it's going to turn out this way. One is that you have a canister that you use for transportation and interim storage in a monitored retrievable storage that's good for a couple of hundred years under controlled atmospheric conditions, under constant supervision, and so forth. And, that is about as routine an engineering job as one can design. So then, I can conceive of a second shell outside of that which would be designed to match the geophysical characteristics that are found in whatever you want to have as a permanent repository. And, that during the period while the MRS is in operation, one can carry on this

experimentation. You can carry on the measurements and the observations on an underground site to find out what the geology really does, what water rates are, what various leakage rates are, and so forth and so on, and determine what that outer shell, that second shell that goes over the canister, is going to be. There are great varieties. There are different metals. There are ceramic materials, a huge variety of materials; may of them which we know will last for millions of years under the right geologic circumstances. So, you have to know what the geologic circumstances are.

So, that's the reason I'm suggesting that there be a--next to the monitored retrievable storage there be a laboratory for actually running a variety of second coatings to test out conditions which are found in the geophysical situation.

DR. PRICE: Thank you very much, Dr. Starr. You've touched our hearts in a couple of places and we really appreciate it. Thank you.

Our next speaker is the author and originator of "The Aztec Princess" and he's got a tough act to follow. Robert Bernero, Nuclear Regulatory Commission.

DR. BERNERO: I'd like to speak from this location in order to handle the viewgraphs here. Basically, the subject here is spent fuel storage, but I think one has to take an integral view and Dr. Starr in his remarks was taking an

integral view. You're really talking about spent fuel storage in a context of storage, transport, disposal, the entire system needs. And, I'd like to speak to those in a given order here.

First, I'd like to say a few words about the safety of long-term storage and the safeguards distinguishing sabotage or malevolent activity from safety which is natural forces, corrosion, or whatever else might happen. And then, I would like to give you a status of our regulatory program for storage and transportation. I'm leaving out the waste disposal because I think it diffuses the issue too much to try to fold it all in. But, using some examples of what we have for storage and transport review and certification, I would like to raise some of the technical issues again and use real examples to illustrate what we're talking about.

Now, you're heard remarks already this morning, as you should, about the system and system analysis. This slide, I used it quite a few years ago--I think it was 1989 --with our Commission. The chairman of the Commission at that time was Admiral Zech. And, Admiral Zech thought that it was just absurd not to have a standard package, cradle to the grave. He said why don't you approve storage, transport, and disposal all in the same package? And, I made this little cartoon and illustrated it to him and the Commission and one of the difficulties you have here is what is the

system?

Now, depending on your perspective, you could be taking power generation or nuclear power generation as the system or, as we're talking about here, spent fuel management or high-level waste management as the system. And, as you can see from the boundaries on the illustration, no one is in charge of the whole system. The utilities individually control the left hand side of the system as it exists today and the Department of Energy controls the repository and MRS programs, insofar as they can. And, I would point out to you that if you speak of this as a high-level waste system, reactor spent fuel isn't the only high-level waste. The Department of Energy has what I like to call the cats and dogs. That they have to look at all of their sites and they have vitrified logs from defense waste, they have Hanford and reactor spent fuel which really kind of falls outside of this framework. They have a variety of research and test reactor spent fuel. They have Naval reactor spent fuel and on and on. Perhaps not very large in quantity, but certainly diverse and certainly part of a system. So, if they are going to do responsible system analysis, they have to do all of it. I find it tantalizing, the NRC has in this system here, the spent fuel system, we have regulatory jurisdiction over all these elements, but we are not the system engineer and that can be very frustrating.

Now, we all speak of spent fuel and here's a typical spent fuel assembly. You have a picture of it in your handout and I use the word advisably, typical spent fuel assembly. I think it is unfortunate that many people who speak of spent fuel think that one cookie cutter has been used to make every one of these things and that is far from the truth. Most of them look like that, but here is a list of what sort of spent fuel actually exists now out in the public arena in the utility spent fuel pools. And, if you'll look at that, it is not simply that PWR fuel assemblies, in general, are 2.4 x bigger than BWR fuel assemblies; there is quite a wide range.

Admittedly, most of them are around what one might call standard commercial spent fuel, but there are outliers. If you look, you have outliers at the short end. Some of the early boiling water reactors had very short fuel. And, in the modern reactor you have an outlier at the high end. The plant is in Texas. It's called South Texas and it's modeled on a French reactor and there it is; two feet longer than anyone else. So, not to mention the cats' and dogs' wastes, the system engineer has to look at this entire spectrum. If you're going to standardize, you have to standardize in such a way as to accommodate these.

Now, let's talk a little bit about the safety of long-term storage. Basically, in order to understand the

safety of long-term storage and what the NRC has said in this finding I refer to, recall that the NRC was challenged back in the 1970s with what I would paraphrase as the following question: How can you possibly issue licenses that, through exercise of that license, generate high-level waste since there isn't an obvious solution for disposal of the high-level waste? And, that led the NRC--it was a Court suit, ultimately--and, it led the NRC to what is called the waste confidence finding; in essence, a way to say how sure are we that there will be in some appropriate time a high-level waste disposal system that is acceptable and, in the meanwhile, is it safe? Can one store spent fuel in the meanwhile without undue risk to the public health and safety?

That original finding was published in 1984 and I will not go into those aspects of it about why there was confidence in the ultimate availability of the high-level waste repository; although, I will say that now we're not talking in a few years this way or that way. For this kind of institutional development, you're thinking in decades, not in a few years at a time. And, at that time, the Commission said reactors are typically licensed for 40 years and, if we look at it technically and assume institutional delays are such that you would have the spent fuel still there for 30 years later, there was a conclusion drawn that for 40 + 30 years, or at least 70 years, there is no apparent technical

problem. I think Dr. Starr put it, these are simple, fairly low temperature, passive, static systems and one does not envision rapid corrosion rates or anything like that to threaten.

In a 1990 modification or reconsideration of that decision, the Commission was then actively considering the possibility of renewing operating reactor licenses and that raised the question of a possible perhaps as much as 30 more years of operation; just assuming for the moment a license renewal for 30 years and then that institutional 30 years afterward. So, one could envision at least 100 years. Once again, the Commission concluded that there is no corrosion rate or threat in such a way as to say that this would be unsafe storage. The engineering is straight forward. In neither case is this a limit. It is not a statement that they can be stored for no more than 100 years; it is that it's safe for at least 100 years which is a very important distinction.

Now, the Commission's findings were again very similar to what Dr. Starr was saying. We have a lot of experience, decades of experience with wet storage. We had a good understanding of the temperature. The decay heat curve of spent fuel is such that many of you know that after a certain time, you can actually hold it in the air and it will air cool. When it's fresh out of piles, some spent fuel can

actually melt itself it's so hot. But, as the decay heat comes down, you get to self-cooling or passive cooling and, basically, from that experience and from a lot of safety analysis, the Commission was able to conclude that long-term integrity was predictable; static systems and long-term predictability.

Now, we also looked at risks from accidents or of sabotage. Now, a few words first about the accidents. If you look at any spent fuel management system, one of the first characteristics that strikes you is that they are large robust systems. They have to be shielded. The gamma radiation from spent fuel is very considerable, even after the heat has died down quite a bit. And so, you have to have very thick shields. Steel, depleted uranium, concrete, water, whatever it is, you have to have very thick shields and they are provided in very robust structural systems. As a result, if you look at it, you have in older spent fuel--again, I emphasize older; not fresh out of pile fuel, but older spent fuel--you have robust systems that are inherently resistent to natural forces or accident forces or malevolent acts and you don't have a driving power like something that will generate a lot of gases or temperature pressure driver because the decay heat is down fairly low. And, as a result, you're resistant to accident forces. The system is inherently robust.

Now, one thing that is still on the table is that the consequences of a large-scale explosive attack should be considered. Just recently--well, you know, early this year, I think you all remember the World Trade Center was bombed almost a year ago. What was it, December, I think--November or December of '92. The World Trade Center was bombed when someone apparently left a van containing explosives in the parking garage of the building. It was apparently a malevolent act. The trial is still going on. Very severe damages was done to the buildings and several people were killed.

Almost coincident with that at Three Mile Island Nuclear Powerplant, there was an incident that led to no real harm, but was very disturbing. A person of unpredictable behavior took his mother's car and, on a Sunday morning, weaved right past the entrance gate, drove through a fence, imbedded the car through a roll-up door into the turbine building. And then, that individual abandoned the car and ran and hid and it took hours to find him. He was hiding under the main condenser in the turbine building. Now, that person did not cause any significant damage to the powerplant and, in retrospect, did not constitute a real threat. He wasn't carrying bombs or guns or anything like that. But, the fact remains that person was able to drive a Plymouth Reliant station wagon, which is not a large armor penetrating

vehicle, and he was able to drive it right through the fence, right through the roll-up door, and get into the turbine building.

As a result, the NRC really asked itself whether terrorist threats using vehicle bombs may not be an appropriate addition to our consideration for nuclear facilities. And, as a result, we have come out with a proposed rule to change the design basis threat for nuclear powerplants to include in that threat consideration of explosive laden vehicles where the purpose would be to haul in significant quantities of explosives, get it close enough to the vital areas of the powerplant, and set it off.

We are also studying as a part of that a similar attack on spent fuel. Now, in a nuclear powerplant, you're talking about a building or a room, say, that contains a functional diesel generator and what we're comparing now is what would be the relative effects of an explosion on a spent fuel storage system. When we show pictures of those, I'd like to raise that point again. But, that is being considered and you may expect to hear in the coming year of the results of it.

Now, let me talk about the status and point out a few things here that I think are significant. There are not many approved spent fuel transportation casks in existence. And, they range from small things like the NLI 1/2 and others

that really are truck casks. They can carry one pressurized water reactor assembly or two boiling water reactor assemblies. They range up to these two large ones here that are rail casks. The NLI-10/24, 10 PWR or 24 BWR assemblies, to my knowledge has never been used. That is a very large cask. I'll show you a picture of this one and this one here had such a large load that it was going to be used if we had fuel reprocessing. It was never completed.

This one though, the IF-300, only four of them are in existence, but it is one that has been widely used in industry. I'll show you a picture of it and there's a very important system point I want to make with it. It contains seven PWR or 18 BWR fuel assemblies which sounds like a generous compliment, but that isn't. By way of example, let me point out to you the shipments are going on right now as we meet here. The Shoreham Nuclear Reactor which is not the largest sized reactor--it was to be about 850 mega watt electric--it's being decommissioned and it's initial core, just one core, was slightly used and is being send to the Limerick Plant in Pennsylvania for reuse. They are able--they're trying to preserve that fuel for reuse. So, they have modified the internals of this cask to carry 17 assemblies per shipment. Just for one core, it takes 33 shipments of that cask. Thirty-three shipments and that leaves one assembly left over. I've been meaning to find out

how they're going to get that one there. Make a special trip for it or put it in the back of a station wagon. This fuel is not used very much, at all. It's very, very low burnup. It was used only for low powered testing. But, the point I make is the sheer numbers of fuel assemblies are staggering. Truck shipments can supplement, but there is a system pressure to have bigger and bigger and bigger casks. Get as many assemblies as possible into each shipment and that's going to be a significant factor throughout the system analysis of spent fuel storage and especially transport.

Now, let me show you an example. This is the NLI 1/2 cask and it's a truck cask. As you can see, it's fairly large, but it holds only one pressurized water reactor assembly or two boiling water reactor assemblies and there are several aspects of it that are noteworthy that you can see in this picture. One is you put a cage around it, an overpack, because one controls the environmental impact due to direct radiation. That's a shielded cask, but it still has a significant measurable radiation exposure at the surface. So, in order to meet constraints for shipping--you remember, you're out in the public with this vehicle, this truck--it has to have a cage around it to keep people from getting up against the cask. You know, getting the radiation that goes with it. The cask also has a fairly robust construction because transport, in general, is the most

challenging of all the environments. You have to be able to take accidents.

Dr. Starr mentioned the British test of--the high speed train coming down a straightaway and going into one of these casks. In 1977, the Department of Energy sponsored out in the Albuquerque or New Mexico desert, a series of tests with old solid fuel rockets where trucks or trains were rocket propelled into one another or into concrete abutments and there were very spectacular tests where nothing survived except the casks. I mean, the trucks disintegrated and the railroad locomotives fell apart, but the casks are extremely robust.

But, if you are going to have robust devices, you have to look at the accident environments and consider other things besides collision. And, among other things, there are technical controversies that do come up and it is a very significant factor that in the regulatory analysis of a transport cask, we assume that after a collision, it may fall in water. The ends, the seals, the mechanical closure can be sprung somewhat. It's tolerable to have some leakage, but we also assume that water can get in. That moderator can get into the contents of the cask and, therefore, if criticality could occur, that would be unacceptable. As a general implementation of Part 71, the design of the cask is such that you must assume moderator gets in and the cask is still

sub-critical.

In a similar vein, the question comes up what burnup do you assume of the fuel? And, burnup credit is a current issue with the Department of Energy. We have not allowed burnup credit in our criticality analysis for a variety of reasons, mostly predictability, and the question of how to deal with end effects because burnup is greatest over the span of the fuel, but the ends are not really burned up. And, just visualize if this thing were in the water and had a foot or two of water in it and you picked it up by one end to take it out of the creek bed and all the water goes to the other end, the end could be a critical assembly.

So, there are two issues here that are prevailing out into the questions of multi-purpose casks, as well as single-purpose casks, and they are moderator getting in and how to deal with burnup credit.

And, I would add something to what Dr. Starr said. He said--said it several times--that the engineering is straight forward and I agree with that as long as you know what you're trying to build. It's the system specification that's the hard thing, not the system implementation. And, that is especially true with transport.

Now, here is the trend to the larger cask. This is the IF-300. It's a rail cask shipped on a railroad car. This is the one I mentioned that's going from Shoreham to

Limerick. It takes about a week or a little bit more than a week to complete a shipment. It goes onto a barge at Shoreham, goes around Montauk Point at the end of Long Island, and comes down to Cape May and up the Delaware River to Eddystone, Pennsylvania where it's put on a rail and brought up to the Limerick Plant. This is large. That's a very heavy cask. That table early-on shows you and the system pressure, if anything, says that's not big enough. You need something bigger. And so, systems that are being examined for rail or barge shipment now are even much, much larger than that.

When you get to spent fuel storage systems, the range of alternatives is rather broad because, remember here, one is talking about passive storage at reactors or elsewhere for that matter. The vault at Fort St. Vrain, one of those is in existence now. It's a very large concrete building and it simply holds the spent fuel in long slender cans. The fuel assembly for a gas-cooled reactor, such as Fort St. Vrain, is not a tall skinny fuel assembly like the typical one I show. They are shorter and they're sort of block-like assemblies, and they're stacked several in a can, and the cans are hung like a long spent fuel assembly. There are casks that is a large, almost monolithic, generally steel structure, such as the Castor V/21 and so on. Then, there's another family of designs called the canister assembly.

We're getting to the need for common terminology. I've talked to Lake Barrett about this. That what we ought to do is when it's a simple metal container essentially holding nothing but the spent fuel in some kind of a grid, call it a canister. A canister then may be put inside of a cask or some other assembly, such as a concrete structure, either a cylindrical or a horizontal concrete structure, and I'll show you a picture of some of these because they bring in other design considerations, other system considerations. Many of these designs are in use now and others are coming on line in the near future.

Here is the first site where spent fuel storage casks were licensed. This is the Surry Plant in Virginia. I believe many of you have visited that. It's across the river from Williamsburg. And, this is the typical deployment of spent fuel casks where you basically just have a concrete paved parking lot. In the case of the Surry Plant that's, oh, probably, a quarter mile or a half a mile from the reactor itself because the reactor occupies sort of a peninsula by itself, but you know, basically, it's just a yard. You can see the security fence running around the perimeter and the security lights here. And, it has paved strips so that a transporter, such as this, that A-frame, is simply a way to carry a large cask vertically, a foot or so off the ground. It's rubber-tired. And, you could drive out

here from the reactor when the cask is loaded and just set it on the pad. That's the typical deployment.

I might take you back for a moment to that vehicle bomb threat that we're evaluating. Basically, you look at this and say if somebody had a truck laden with explosives, where would he go and how would he set it off and what casks would be affected and how might they be affected? These, of course, are all metal casks. They're heavy metal structures.

This is an example of the concrete assembly. This is with the three containments. This is the Oconee Nuclear Station and it uses a canister--basically, a metal can full of spent fuel carried out in a temporary shield and then a plunger is used to push the canister off its shielded truck into one of these horizontal bays. This concrete structure then is the temporary storage assembly and the cartoon may illustrate it a little bit better. The cartoon shows you that the canister is actually suspended on sort of a track inside. It's bathed in air, natural air convection cooling. The air comes in down here, goes around, and comes out the top. It has shielded doors. And, later on, one can speak of a canister not only coming out back into a temporary shield, but it would be a shipping shield, an overpack. People generally use that word "overpack" for whatever might be used to receive this canister, this dry canister, for either other storage or for shipment. And, when you get into the multi-

purpose, that concept takes off.

Now, we have some dual- or multi-purpose cask designs that are under review and/or discussion and I would like to make a point. The benefits--I just list the one here, minimize fuel handling. Benefits are not to make it safer or more secure from sabotage or something like that. The benefits are system or programmatic benefits, whether costs or whatever factor, of minimizing fuel handling. We have done radiation exposure analyses of the fuel handling associated with loading and unloading, one of those bunker designs like I showed you; in fact, the one for--and there is very little worker radiation exposure involved in an incompatible system; in one where you go into storage and then to ship you have to come out and cut it open and put it into a transport cask. There's very little additional radiation exposure involved there.

The real benefits here are programmatic. For instance, at the Rancho Seco Nuclear Plant--I think you're going to hear more about this before this meeting is over. At the Rancho Seco Nuclear Plant, there is a fair inventory of spent fuel from about 10 years reactor operation and a desire to decommission the reactor and not hang around with a spent fuel pool. And so, there's an incentive to have a concrete bunker canister storage system that is amenable to dual-purpose, both storage and shipment; sort of a free-

standing capability. So, you can have a dual-purpose satisfying transport and storage regulations or now it's evolving that the term "multi-purpose" is applying to all three.

So, the multi-purpose canister is speaking of Part 50 for Disposal, as well. So that one would envision a canister, a metal can, containing essentially only the spent fuel in some kind of a grid, and that can would have three overpacks. One configuration of overpack is for storage, another configuration for overpack is for transport, and a final one is the 1,000 year can for disposal or whatever is needed for disposal. But, that is the vision that's currently talked about.

Now, we have a dual-purpose design under review, the NAC storage and transport cask, and we now have the new NUHOMS-MP 187. That's the one I was alluding to for Rancho Seco. So, these are the dual-purpose concept. We are meeting with DOE on the multi-purpose concept.

The dual-purpose cask, the NAC, is a traditional cask design. We should complete this transportation review and then the transportation review dominates the consideration. So, the storage review will catch up to it and then that we expect to have a final design approval for a combined storage and transport cask. The NUHOMS is this horizontal storage module as an overpack. We've had meetings

with them. We have applications. And, the issue here is a transport overpack. It's something like a shipping cask modification that is adaptable or amenable to using the storage canister.

And lastly, and the one I think we all clamor, we enjoy clamoring to DOE why don't you do your system analysis and Lake and the others have a lot of work to do in system analysis. But, basically, it is a sealed canister with different overpacks for storage, transport, and disposal. And, perhaps, the most significant system analysis, as I see it, that's needed is a systematic address of what are the benefits to be obtained by this marriage of convenience, by this homogenization, this standardization? What are the benefits to be obtained and what are the penalties? What are the prices? Because there are many things that can limit your options at the design interfaces. There's one example I like to give to DOE and, sooner or later, we have to address it. And, that is, being familiar with the high-level disposal program, I know that the Yucca Mountain Repository has as one of its current design features what some people call the "hot hole" concept and that is that the thermal load of the disposal package and the spacing of the holes for the disposal package is such that one controls the heat output and thereby the temperature of the repository to maintain the hole or emplacement well above the boiling point of water for

hundreds and hundreds of years. It's a deliberate design feature.

One of my favorite questions is if you make a multi-purpose canister and the system pressures are what I said they are--bigger, bigger, bigger, bigger; put, you know, two dozen or three dozen assemblies into one can--don't forget the standard can will be made in serial production and Serial #486 will be sent to Cooper Nuclear Station and that is an old boiling water reactor with relatively low burnup. And, Serial #487 will go to Arkansas Nuclear One which is a pressurized water reactor with perhaps the highest burnup in the industry. And, both of them will have to go into the repository and, remember, with the hot hole concept, you're not setting a thermal limit, you're setting a thermal control. Now, how much thermal control do you have if one package is filled at Cooper Nuclear Station and the next package is filled at Arkansas Nuclear One? So, it's system issues. What do you gain and what do you give in system tradeoffs? And, that's the system analysis that I think everyone is looking for.

With that, I would like to stop and take questions, if you wish, now.

DR. PRICE: Thank you. Questions from the Board?

DR. NORTH: I have one detailed question I'd like to ask relative to the exercise you're doing looking at the

explosives in the vehicle. Are you also considering an armor piercing shell as another threat that might be used instead of or in combination with the explosive loaded vehicle?

DR. BERNERO: We're not looking at it now, so much as just reviewing what we did before. In the late 1970s, we did a study called transportation in the urban environment. In that study, we--actually, the urban environment in that study was New York City and it was spent fuel, oddly enough, that we were thinking of. We assumed a truck cask driving right through Manhattan and postulated that some malevolent persons modified a Coca-Cola truck or something like that--you know, a beverage truck with the roll-up sides--and just came along side the spent fuel truck and fired an anti-tank weapon right through it. And, we did research and analysis in those days and, even that, an anti-tank weapon. We did evaluate it. There are both classified and unclassified versions of that work accessible to the Board, if you wish. At the time, the concern was what led us to safeguard--track spent fuel. As you probably are aware, we track all spent fuel shipments. But, that work showed that the source term or release, even where you can vaporize the fuel, due to the energy in the shaped charge, is so localized it was not the really catastrophic effect. So, we're looking at that again. But, what we're looking at here is more the big blast effect; you know, the sheer bulk explosion rather than the

concentrated anti-tank.

DR. NORTH: Yeah, my concern stems from my visit to Surry where I asked that question there and was told, yes, with an armor piercing round, you could put a hole in one of those canisters, but that basically the material wouldn't go anywhere. The threat would be very localized. And, the question I'd like to see somebody look at is supposing a terrorist group has an anti-tank round and can blow a hole in each canister and then they have a truck full of explosives that they subsequently detonate, can they spread enough of it around to cause a serious problem?

DR. BERNERO: Well, we did the damage assessment for the anti-tank weapon back--as I say, it was about '77 or '78 and we have that information available to the Board, if you wish.

DR. NORTH: We'd like to look at it and also subsequent efforts when they're available.

DR. BERNERO: Um-hum, yeah.

DR. PRICE: Other members of the panel?

(No response.)

DR. PRICE: Staff?

DR. BARNARD: Bob, given your knowledge and intuitive feel for the waste management system, how much more difficult do you think it will be to design a multi-purpose rather than dual-purpose canister?

DR. BERNERO: Well, I think what I said before, Chauncey

is right. When you know what you're trying to design, the engineering is very straight forward. In the high-level waste repository, of course, you are talking about a 1,000 year package and corrosion rates and so forth. But, the real thing, the real difficulty, is the specification. Exactly what is it? Is it a 24 assembly, humongous thing, that's too big to turn in the repository tunnel or is it a small package? And, basically, the concept as envisioned or presented to us is separating the interface by saying I will have a handling canister, a multi-purpose canister, and the disposal package is an overpack. And, you know, I see that as a possible uncoupling, but again the specification is the tough part. What is it, what's in it, and don't forget the cats and dogs. Because everything you conclude in high-level waste, if you're standardizing, you have to say, well, what about the other pieces, the other bodies of waste that have to go in there?

DR. CANTLON: The U.S., in none of the reports that I've seen have talked much about fillers in the fuel assemblies to either slow up corrosion or protect them. And, if you look at Chauncey Starr's model, if you want to have a repository that is in a sense an underground interim storage system amenable to looking at even several hundred years in the future, then some stability on those assemblies might be a very worthwhile investment. As he was saying, the amount you

put in early-on is not really the cost of the system; it's all of the details of undoing a bad design. Why is it that the U.S. system has not really addressed fillers, at all?

DR. BERNERO: Well, are you referring to fillers in the hole; you know, bentonite or something like that?

DR. CANTLON: No, no, no. Fillers in the assemblies?

DR. BERNERO: Inside the canister?

DR. CANTLON: Right.

DR. BERNERO: Well, I think Harald Ahagen might say from Sweden I don't think they're thinking of hot isostatic pressing of copper anymore or fillers. The issue of fillers, I think, is going to have to be faced sooner or later in the sense of criticality control. If you look at an assembly--remember what I told you about moderator ingress and burnup. Perhaps, the most dominant factor in burnup and moderator and criticality control is high-level waste itself. You know, what happens 3,000 years from now? If you have spent fuel standing this way, does it finally, you know, slowly but surely, crumble and maybe collect at the bottom? And, the package is expected to last probably 1,000 years or more than 1,000 years, but can water get in, what are the--you know, is there possible preferential dissolution? What happens to the poisons? What is the reactivity as a function of time? There's where you can get into filler. But, again, that's the system analysis that will lead to your specification.

DR. PRICE: If there are no other questions, we're about on time and we can stop now for our break. We'll see you back here at 10:30.

(Whereupon, a brief recess was taken.)

DR. PRICE: All right. Ladies and gentlemen, it's now our opportunity to have the Department of Energy provide to us some things about the management plans and strategy for the interim storage of U.S. spent fuel and we're very pleased to have Lake Barrett to provide the presentation which will go from here until our lunch break.

MR. BARRETT: Thank you very much, Mr. Chairman. My name is Lake Barrett. I am the acting deputy director of the program, soon to be the permanent deputy director of the program when various pieces of paper get signed and we finish some daisy chain things at headquarters. I think, as you all know, Dan Dreyfus has been confirmed to be the director of the program. He sends his regards and condolences he could not be here today. He looks forward to the next meeting of the Board in January in Washington to engage with you on these issues. So, I will try to be a fill-in for him here today.

I will try to cover things that you requested in your letter to us. I'm going to do basically the first half of this and go into whatever level of detail you'd like with me to the ability that I can. Ron Milner who is the

associate director of storage and transportation is going to do the second half of this. Then, we're going to have considerably more detailed technical presentations with the Board over the next day and a half.

So, what I would like to do is cover from sort of a macro sense the status of the program right now, what our goals, the status--the goals and priorities are; what our key planning assumptions are; our macro storage and transportation strategies; and, the interim storage progress and plans and how that ties into the ultimate disposal and your repository. I think Dr. Starr said it very well that we need to have a program that is robust and flexible enough to handle both decades, centuries, and millennia as we go forward.

Just a little bit of status, as well as the goal--this is not solely the goals here--but I think most people believe that the Act of 1982, which is our base Act as amended in '87, has not really gone forward as it was envisioned by the authors back in the national debates in 1982. At that time, the goal seemed to be set that in '98 we would have a functioning system and be ready to go. I think history over the last decade has shown this is a much more difficult problem to solve than was envisioned.

In my opinion, the hardest part of this has not been the technical aspects of it. The technical engineering

and the science, as daunting and as complex as that is, is easy and simple compared to the institutional and also the political aspects of this program. I believe there has been little satisfaction with the process from all sides. I believe the utilities have not been satisfied. I don't believe the rate payers have been satisfied. I don't believe the environmentalists and environmental groups have been satisfied. I don't think the Department, as career civil servants, are particularly pleased with what's happened. I don't believe the United States Congress is particularly pleased with what's happened. And, I believe this Technical Review Board in its reports has not been particularly pleased, either.

One thing that does become pretty clear is people may say I don't like it, but I'll tell you, there seems to be a larger divergence on what are we going to do? As you go on and talk to the various people. there seems to be even less and less consensus on what is the solution going to be? I believe there's going to be a national dialogue over the next year or so as to any redirection of this program. We are going to continue along with the program to the best of our ability. With Dan Dreyfus as the confirmed leader for the next several years, the Department of Energy intends to play a major role and be leaders in that dialogue as we go through that. I'm going to touch on many of the issues that I expect

that there will be entering into that dialogue because none of these problems are easy and have simple solutions.

Okay. Sort of where we are at this moment as far as priorities. This is sort of my 1994 budget priorities that I sent to our people. If you don't have it in the budget, you don't really do it. So, you may want to talk policy and you may want to talk philosophies; the real proof of the pudding is what are you doing in the budget? And, that's really where the rubber meets the road. We are basically trying to maximize our scientific investigations at Yucca Mountain. That is a key area. The other key area, the two main ones, also is looking at the MPC which is the main topic that we're going to be talking about here today.

Now, as far as in the waste acceptance, what we'd like to be able to do is to be getting into MRS sitings. As you know, the nation, Congressional direction in '87, looked at the voluntary negotiated process as the mainstay of the siting program. Ex-Congressman Stallings has been nominated by President Clinton. He was voted out unanimously by the Energy Committee last week and I would anticipate that he would probably be confirmed by the Senate next week or shortly thereafter. We'll await Mr. Stallings to negotiate with potential parties that are interested in obtaining more information concerning MRS siting. Meanwhile, we are evaluating the MPC and we'll hear much more about that. We

also are working to have a transportation capability in 1998 and we'll go into that more, also.

I've also directed that we limit our program support activities to support the Yucca Mountain scientific work and the MPC areas. We've tried to cut back a lot of that. We've cut back over 10% of our headquarter support contractors. We've transferred people from east to west and trying to cut back on this and I'll go into more on that a little bit later in the balancing of the program.

Secretary O'Leary has given us specific instructions concerning involvement of various stakeholder groups to try to build a national consensus and that's a major part of what we're trying to do also. She has the review processes and we'll go into that, as you may wish to in the question period. But, we certainly are going to be working more in that area where we will solicit external views on the program. We will listen to those and we will respond to those. There's been a very clear message by most folks that not only are we to ask for it, but we are to act on them, as well.

Okay. To talk about the program. The key thing is the systems point of view. We have come a long way in the systems area and we still have a long, long way to go. This is a very difficult program to integrate together. The Board has constantly advised us to improve in that area and we've

taken that to heart and we have made some substantial improvements there. I am nowhere near satisfied at this time with our performance and our performance is going to improve substantially in that area as we work harder and harder there. This is not easy. To set specifications, that's the easy part. The hard part is to take the systems concepts, as you look at the whole, and try to get down into specifics and when you start to pull the thread down on some of these, be they basket designs of canisters, we start to find some very substantial issues that you get in there and almost every one of these hundreds of technical issues, when you add them all up, any one of those issues turns out to be a billion dollar issue, pretty much, any way you go at it. But, we'll get into that and a little bit more in a bit.

Contingency planning is a major part of this. Making irreversible decisions are very, very important and very cautionary when you do that. The only irreversible decisions we're going to be doing in the next decade basically is one of financial. You'll spend money at it and have to take it apart. For example, if we choose a canister or a cask and it turns out to be one that is not compatible with the ultimate millennia type of thing, you have to take it apart. And, all you've basically done is wasted money because with the public health and safety and the environmental protection processes that we have are going to

clearly cover that we'll be making the proper decisions from health and safety. What you will find, though, is you may have to strap some money. And, we're talking substantial pieces of change in this whole program.

Improving the system performance through standardization and minimizing fuel handling, I'll have a chart a little later on. We will go through the various options we're looking at. Basically, we've got nominally 300,000 fuel assemblies that we're going to be seeing just from the commercial side into our program. That's no new orders. We're talking nominally numbers like that. We'd be talking like a million handlings of fissile pieces of material. There's probably a better way. I think most people have urged we're--finish the concept is a better way. We believe it's a better way, but we haven't determined exactly what the right one is yet. We have some good ideas, but yet they have not had all the homework done. We have reached a point on much of this. We know what we don't know, but we don't know for sure and certainly not with the scientific information this requires or reasonable assurance and the licensing or to prove to this Board that we know the answers to a lot of these things. We know a lot of concepts, we know a lot of characteristics, but we don't have the technical specs on a lot of these issues at this point.

Controlling national program costs are mandatory.

I believe this is going to be a bigger part of the program over the next couple of years than it's been over the last 10 years. I think the Super Collider gave a message to many of us that I think everyone would agree the Super Collider was a noble project, a noble program. The nation has got to pay for these things. They don't come for free. When you start adding, you know, tens of billions here or there, all of a sudden, someone says we're all paying for this. If you look at some of these can concepts, debts of a billion dollars here and there are real easy to achieve and real easy to see, and a billion dollars is real money. This is money that could be used for health care, AIDS research, breast cancer, you name it, certainly training for our youth in the cities. There are many things that society needs this money for and you can reduce this. As Dr. Starr said, you go from the 10^{-7} to 10^{-8}, 10^{-25}, as far as risk and, as a citizen, I believe, we're not wisely spending our resources in this nation. So, national program costs, I think, are going to play a more major role in the future. It still must be done safely and it still must protect the environment, but I think we need to get a better handle on that as to what is society willing to pay, what risk, what price, how safe is safe enough at what price? So, I expect there will be more of that.

The MPC system under evaluation, the policy that I have established for that is that I want that, if it is

viable, to be capable to be used in 1998 as a goal. If it's not--you know, if it turns out we can't do it, we won't. But, that is our goal and is our planning basis that I've directed Ron and his program guidance to follow and you will be seeing more detailed schedules and milestones. And, '98, the reason we have chosen that is, I believe, it is doable and also that's the date and the goal that the United States Congress established for us.

The key to receiving into the Federal system is an MRS site. The MRS siting is really an institutional/ political issue. It is not a technical one. The technology and engineering is simple. It is not in my back yard, fairness, those kinds of issues. The last thing I think you want is the Department of Energy to go stick a pin in the map and say there's the place and make it stick. It isn't going to happen. There either needs to be more of a dialogue, a discussion--I think you're going to hear some of those today when you hear what some of the folks in Michigan have to say about the program, Tennessee, and others on this. And, unless the voluntary system can be made to work--and, I think, as you all know, the recent Congressional action on that will end up changing that program somewhat. Some may say it's for the better, some for the worse. It will probably take it a little bit longer than what was certainly envisioned, I think, even back in '82 and certainly in '87.

But, we will continue to go along that line.

As the siting is not as certain as we'd like it to be, there's more importance to the MPC concept. There are a few things that are certain here. One of them is that fuel exists today; shut the powerplants down or renaissance of nuclear. Fuel exists and fuel will exist tomorrow and our grandchildren will have this fuel to deal with. And, that we, in this generation, need to take some responsible steps to assure that there is a capability to handle this and manage it in a sound, manageable way if the public has confidence. You may have an engineering way to do it, but if the public doesn't have confidence in it and it's not politically viable through their Congressional representatives, it's not a viable program. So, we need to work on that.

In the long-term, our basic assumptions are that there will be a repository sometime. It is decades away. But, we believe there will be one. If it turns out that it may or may not be Yucca Mountain, depends on what the science says and it also depends on what the politics will say on that.

Now, for interim storage, I talk about here is some of the key elements that we've directed our folks to do. We must work very closely with the utilities. TQM is a very important thing in this administration and this Department.

Customer service, focus on the customers. The utilities and their rate payers are customers. We have many customers, but those are the primary customers for us and we must work very closely with them on this concept of interim storage, canisters, dry storage.

We may have the greatest technical widgets, but if it doesn't fit and isn't used and useful in a utility, it's a waste of money. And, we in this society cannot afford to waste money anymore. So, we've established close working relationships with the EEI groups, also individual utilities, and we've established connections at the working engineer level, the mid-manager level, and also utility CEO level, and you have to function at all three levels to have successful interface with the utilities and an exchange of views.

We will continue to support volunteer storage. Again, we are not driving that. The Congress set up and negotiated to do that, but we are there to assist in any way that we can there.

Standardized packages, we believe, show great promise to assist the nation and the societal costs. We historically in DOE focused pretty much on the Federal system which did not include at-reactor storage. That was handled per the Act by the utilities. We would receive it in. We are now looking more at the societal cost which includes the DOE costs, but as well as what utility costs are for having

to store fuel. This becomes even more important today than, say, it was five years ago with the advent of early closure of nuclear powerplants. I think, five or 10 years ago, you would not have envisioned that Rancho Seco, the Trojan Plants would be closed down for economic reasons. Some of the environmentalists envisioned that and they would envision more of that and there may truly be more of that and that has been the trend. But, clearly, the advent of those and the societal costs to maintain their spent fuel pools for long periods of time, plus our delays, the institutional delays, as well as technical delays in the repository and the MRS siting, clearly, cries out more for a need. Recommendations from this Board, from the NRC, from the United States Congress, and your Court language clearly this is a time for the United States of America to focus more on that concept. Our response to that has been to do more work on the multi-purpose canister system and we'll go into that in some detail.

And, basically, building on the technologies that exist. We have, as Bob showed you, storage that is licensed and is operating in the United States of America, dry storage. We also have had transportation casks licensed. We have two applications--there are two applications, let me say, to the NRC for combining those two technologies; the dual-purpose, storage and transportation, a fairly straight

forward engineering task. I believe the nation will be successful and we'll have that. The harder part is to make this compatible with disposal. That's the 10 CFR 60 issues and that's what we're--I believe is the main focus of this meeting today and I think it's very timely that we have this interchange as we go into that area in some detail.

In your letter to me, you asked for key planning assumptions. I'd like to go into that a bit, and then in the question period and also in the panel later today, we can go into these to whatever detail you would like.

But, as far as waste acceptance, a very key thing is that we are sort of separating out from this is that we are going to continue per the contracts and the waste acceptance is according to the rights of the oldest fuel first. We're not changing that around. This is a complex issue all on its own and we'll deal with that be it through free market or otherwise, but as far as an issue of multi-purpose canisters, this is what our assumption is.

As far as our base, I believe that the no-new-orders more likely projects what the future is going to be. But, also, we must have a program that is flexible and is fairly insensitive to what tomorrow brings. Tomorrow may bring further shutdown of operating reactors, more than what's beyond today, and fuel will even do down further as powerplants may shut themselves down. A major issue will be

next year as the Minnesota Legislature debates what it wishes to do about dry storage at Prairie Island. There is a distinct possibility that the state may decide to not grant dry storage at Prairie Island and that could lead to the shutdown of those two nuclear powerplants and you could see that happen other places, as well. Then, again, on the other side, as Dr. Starr mentioned, maybe greenhouse effect or whatever, global warming, maybe there will be a renaissance of nuclear. I don't know what that's going to be. The Department of Energy still has a job to do and it's got to do that job under either of those cases, whatever tomorrow will bring.

Storage. As I mentioned, interim fuel storage is a reality. There are 121 reactors out there, 75 sites that have fuel sitting on them. It's there. If you shut them all down tomorrow morning, they're still there and we've got to deal with that.

Dry storage is a reality. We have five different sites with dry storage today. I think, Bob had that on one of his slides. We have different technologies for dry storage. There will probably be more in the future as we--in a free market enterprise and competition and you will--there is a natural evolution from metal to horizontal, concrete, to other types of things as we look for more cost-effective ways to do this. But, there's a proliferation of these and I

believe there is some advantage for some standardization. If we're not careful, we'll end up with a couple of dozen different technologies at 76 different sites a couple of decades from now and we'll look back, our successors will look back and say why did those people in the '90s let that happen? Where were they thinking? Where was their vision? Who was trying to get to that vision? So, we have responsibility to ourselves now and to the people who will follow us that we look at the big picture and we try to do the right thing here.

MRS siting will continue. Voluntary process is what we have on the books right now and I believe there's probably some debate about is there other ways? Former Secretary Watkins suggested there be a Federal siting push. That is not what the current administration is doing, but I believe there will be debates about that. All I will say on that is it's going to be very hard to do a fore-siting type of thing and sustain that in the United States.

The planning basis for the MRS, if we were to get a site, let's say, this spring, it would be nominally around the year 2000 would be the earliest you could get a greenfield; basically, a new site through the process and that's an optimistic process. If you were to consider an MRS coupled with an existing nuclear facility of some sort, be it commercial or be it Department of Energy where there is a lot

of nuclear data and there is a nuclear infrastructure, you could bring something in before the year 2000. But, then again, this gets into--if you want to try to follow the voluntary process, that's a very touchy subject that you are never going to force it. My wife is a natural childbirth teacher. So, I know about babies and our children. You can't force it. They're going to come when they're going to come. And, the same thing kind of comes with a voluntary process, as well.

The MPC being available in '98, I mentioned that's one of our planning basis. That's one of our directives I've given to Ron. We believe that an MPC in '98 can mitigate the national situation. The MPCs, in themselves, will not solve the waste acceptance issue per the contracts with utilities and the rate payers who are paying the bill. But, it certainly can mitigate the impacts.

Moving along to other assumptions, transportation. I've cut the transportation program back substantially. I still believe that transportation has the potential to be the Achilles' heel. That's the thing that's going to be most visible in the program when the program does start. But, given the budget situation and the emphasis on the science at Yucca Mountain and work on the MPC, we've cut this back to a level that I am not comfortable with, at all. But, I need to get through my FY-94 budget year. But, existing casks can be

used in '98. They are very inefficient. Bob showed pictures of some of the existing casks earlier.

We are developing one advanced technology cask. It's an advanced technology truck cask. General Atomics is the contractor that we used there and basically we've handled 4 PWR assemblies, basically four times the capacity of the existing technology casks that Bob showed the picture of, the NAC casks. So, you could basically reduce your shipments by a number of four with that cask. We are continuing that at a lower level of funding than I would like. We are continuing that. And, if the MPC gets the go ahead on that, that we would develop basic--that would be a larger container and we'll go into that in some detail in a little bit--that we would develop the rail cask that would go along with that and that could be available around the year 2000. We could maybe advance that a little bit if I ended up getting the site in the fairly near future and if I got the funding that we'd need in '95 and out to do that.

Disposal, a repository will be available in 2010 or later. Those of you who follow this program know dates seldom advance. So, it's 2010 or later. The MPC, as you go forward and look at an MPC, we cannot answer all the repository questions on the waste package today. We don't know the answers to those things. We don't know what the thermal loading repository is going to be. And, we can go

forward and take some engineering risks--these are basic economic risks--and, try to design that to be as compatible and as part of the overall system and not foreclose many options.

Dr. Cantlon asked about fillers. We've done some conceptual work on that and we've decided we don't know enough today about fillers. So, we'd better keep that option open and have the capability to put fillers in. But, to talk about putting fillers in. The place to put fillers in is the first time you load it. That's a decision to be made over the next several years when you may not know if you really need it for a decade or so. So, you have to make a judgment call on what you're going to do with that. And, as part of our systems work, as Dr. North mentioned, we're trying to enhance that work so, as we make these Federal decisions, we're making them wisely with the best judgment and the best information we can at the time.

That's the systems work that we're trying to do, so that you know what your feedback groups, you know what your risks are as you go forward, and we make decisions. And, we don't want to make default decisions any more than we have to. I just want to mention that. You know, decisions will get made. You can make them consciously or you can make them by default. And, a default decision is the worst kind of decision; you really didn't control or influence your

destiny, whatsoever. So, we want to minimize default decisions.

Program funding, a basic assumption here is that we would receive some funding relief from what historically happens in the Federal Government. As you all know, with the Deficit Reduction Acts, we are basically limited to sort of the funding that you had the previous year overall in the Federal budget deficit activities. This program, if you've followed it over the last five years, would say this year is a low year, but next year I'll get double the money. Well, the next year comes along and it's the same story again. And, that we've carried a fairly large infrastructure along because next year we're going to get double the money; well, it's never happened, okay? We're not asking for double the money in '95, but we are discussing at the highest level of OMB about going to a revolving fund type arrangement where we could get sufficient funds to be able to carry on this program along with what we believe Congress envisioned in '82 and '87. We receive in approximately $600 million a year basically from the rate payers who pay the utilities who pay us.

Out of the--I'll just talk the commercial side here and skip the defense for now. We have been authorized--we've been appropriated about $260 million to $300 million of that money for the program. And, now that we have access to Yucca

Mountain, the state has cooperated with permits. We have a construction program at Yucca Mountain. As you know, construction programs are not cheap; they're expensive. You must balance capital equipment with operating. You don't want to buy too much equipment and then not have the money to operate it. I think that was mentioned earlier about operating funds. There again, you don't want to be foolish and spend a lot of time operating something you didn't have the capital equipment to go with it.

We must balance the systems engineering work and which we've been short on as you look at the whole system. We must do the scientific integration. You commented on that in your report several times, the integration. So, we've got the scientific experiments to go on in the tunnel. You've got the performance assessment, the probabilistic risk work that needs to be done. We have more work to do than we basically have funds to carry it on in that area. So, we're going to--we are requesting in the internal Clinton Administration, discussion is going on on this issue, and we are optimistic that that will happen. If it turns out that we do not get funding, if the will of the nation--and, that's a combination of the administration and the Congress who has the ultimate say in funding--is that this program should run at a level budget of nominal--you know, $300 million to $400 million a year, the program will have to be substantially

restructured and dates will change quite a bit as we go through with that. As GAO in their reports have mentioned, if you don't put the funding in, it's going to take a long, long time to reach some of these objectives.

Now, the interim storage strategy, most of these I touched on in the earlier high-level ones. We'll continue support voluntary siting. We're going to evaluate the MPC and you're going to hear much more about that in a moment. And, if it's warranted, we would design, develop, and procure MPCs. The MRS design activities are basically in abeyance until we find out more about the potential site. So, we basically strip that program down to a very bare minimum. We will work with all the stakeholders and the constituents in the nation who are concerned about this and see if there's a better way. Wednesday, there will be a meeting of the--the National Association of Utility Regulators is having a meeting with utilities and others and there's going to be discussion of that and I will attend that and provide information to them as they wrestle with what we're going to do with the--and, what their suggestions would be for the '98 date.

Transportation, I mentioned we're going to continue at a very low level with new technology. And, if we go forward to MPC, we'd develop the transportation system to go with that. Again, we'll continue with technical resolution.

There's many issues involving transportation. And, we'll continue to work on the institutional activities. That's the emergency preparedness, inspection of vehicles, a lot of those issues that you need to do work in. We'll continue that at a very minimal activity level. And, we'll maintain the state involvement. These are the Western States Energy Board, Southern State Energy Board. Basically, maintaining and working with the various groups out there. Bob Holden is the National Congress of American Indians and focus where we're going to have a lot of transportation issues when the time comes. It will all move; it's just a matter of when. We all know it's going to move. It's just when it's going to move.

These are some of the dates that we have for our benchline, our baseline. These dates will all change, but you have to know where you are and have a reference point. Principles of some of the systems approach this. Right now, in late '92--first of all, the feasibility study was done back in '92 on the multi-purpose canister concept. I think this Board has been briefed on that report. We now have a conceptual design report that the TRW or our M&O contractor has given to Department of Energy that's presently under review. That conceptual design report are those white books that's sitting on the table right there. Those are under review now. I've read much of those books. Some things in

that needs to be changed. Some of that stuff is real good. So, we are going through that right now as we're evaluating it. The schedule is that if it turns out to be viable to go forward with--and, I believe it will be--we would basically make some baseline decision changes in early '94. I have made a decision concerning the procurement aspects that we would use vendors to do this as opposed to doing all the in-house design with the TRW family. That we will go out for a procurement and use existing private industry to do that.

Then, constantly, we will be reviewing these and checking back. This is going to be a iterative process as you go through conceptual design, preliminary design, as we have interface with the regulator, as we have interface with all the constituent groups. Hopefully, there will be an MRS potential host who may have a lot to say about this. For example, the Mescalero Nation, as they looked at this, their view was they did not want to have their fuel in the MRS; they wanted to have it in a canister type thing as far as contamination control. It makes good sense. If I was a host, that's how I'd like to see it, too. But, these things all are tied together and all have interfaces, you know, back. So, there will be many people, many groups that need to be consulted with, discussed with, as they through the consensus process on that.

So, what we envision in these books when we look at

drawings and conceptual sketches, what we will finally have a decade from now is probably nothing like any of these books show you now. It will be different. But, some of the concepts and principles and the envelopes hopefully will still be about the same.

Again, critical time is NRC approval, basically, in the issuance of certificate of compliances or licensing statements. In the '97 time frame, you can start doing some initial fabrication and we would have cans ready to be deployed in the '98 time. And, this would be the first generation of canisters because, in 1998, we still probably won't know definitively all the answers about the repository. So, you need to have this to be a forgiving system with the concept of overpacks that Bob Bernero talked about earlier where we can basically use the canister part to be compatible and integrate in with the Part 60 case which would yet to be proven at that time. And then, if it turns out that there needs to be change, maybe the first multi-purpose canisters may only be dual-purpose, may only be storage and transportation. We could go through and look at that at that time. This is part of what some of the engineering risks would be.

Now, I'd like to go through and discuss a bit about the five--there are, basically, five basic concepts that we've looked at. I'll have to be fancy and do two viewgraphs

here. I'm going to try to tell you what the five basic concepts are and give you sort of a thumbnail sketch of the pros and cons of some of the things and what some of our analyses, you know, are showing.

I've run this from sort of left to right. The reference system is what we generally always had which was not dual--it was storage alone, transportation alone, disposal alone, and it builds going toward the right. What I'd like to do is go through and kind of--in a very simple schematic sketch to be sure we're all on the same basis to start, what the different ones are.

This is the first column which is a single-purpose cask system which is the reference system. And, this is where spent fuel assemblies are put into a storage cask or storage concept of some sort or utility. Then, they must take--then, the utility would take the assemblies out of storage casks when we were ready to go there and pick it up with the DOE transportation cask. The cask at Surry that you saw in the picture that Bob had, those are not certified for transportation. So, the utility would have to put those casks back in the pool, take the fuel assemblies out, put them in the DOE-supplied transport cask, who would then move it to the DOE receiving facility. The MRS would be at the repository and then it would go into the DOE system. If we did not have an MRS--and, it's possible we may not have an

MRS--it could go to the repository and, if we have the waste package at that time, we could put the assembly straight into the waste package. If we don't, we could put it into a DOE storage cask which could be done. That was the concept of the basic 1980's MRS concept which would be dry storage there.

The next evolution--and, I'll come back and tell you about the pros and cons of these systems--is the dual-purpose cask system. There's two applications to NRC now for this. Basically, assemblies put into a canister or cask which would be both storage and transportation. This would --or the utility would not have to put it back into the pool again. Then, it would be shipped to the Department of Energy and then the assemblies would be taken out of this storage/ transportation cask or it could be just left in storage. Then the assembly would eventually be taken out of the cask and put into a waste package for ultimate disposition. That's the next step. That's the dual-purpose cask. And, this is thick wall. It means shielding is supplied and goes with the canister at all times.

The dual-purpose canister system is the variation of that. It's where the assemblies are placed in the canister. The canister is then placed in the storage cask and this can be the horizontal as shown in the pictures Bob had or could be vertical as in the Palisades design and the

Pacific Sierra design. Then, the canister can be brought out of the shielded storage and placed in a transportation cask. Then, that comes to the DOE facility. And then, the fuel assembly is taken out of the canister and placed into a waste package or it could be left into a DOE storage cask at that point. It could be a concrete thing very similar to what utilities would have. Again, in this design, the canister design, the internals of the canister, be it fillers or whatever will go into that, is not compatible or we can't demonstrate that it's compatible with the ultimate Part 60 waste package. And, that's the dual-purpose cask or the dual-purpose canister.

Now, there's a concept known as the multi-purpose cask system. This used to be known as the universal cask, but like Bob said, we're trying to standardize jargon so we don't confuse ourselves all the time. This ideally is what you'd like to be able to have. Is you put the assemblies at the utility into a cask/canister system, basically a thick-walled cask, and it would stay there all the time. It would be shielded and that's what would be placed into the repository and we would meet 10 CFR 60 requirements. That's ideal. And, we'll get into the pros and cons of the various systems. If we knew--this decade, we have to decide on a system, but this decade we don't have all the answers on disposal. So, it makes it very hard to do that, plus they're

expensive unless you have a pretty high degree of assurance that you know what the disposal aspects of that is going to be. But, this has been looked at in some detail since the mid-'80s, basically.

Now, the multi-purpose canister system is the last column. We'll go into that. This is what appears to be the most promising at this time. And, what we have here is assemblies go into a canister and then the canister needs to be designed that it would be compatible--not that it would demonstrate the requirements of 10 CFR 60--it would be compatible with Part 60 requirements. Then, it would go into storage at reactor and the cask would be withdrawn from the storage cask and put into a transportation cask and then it comes to the Federal facility. It can go into storage at the Federal facility. We could have another little storage cask with one of these casks over here and have storage at the Federal facility and be part of the ultimate waste package where you could put overpacks on it. And, you could put multiple overpacks on it. You could put a corrosion resistant layer, you could put a corrosion allowance, a mild steel on top of that, or whatever the geologic setting will require us to be. As Dr. Starr mentioned, when you're dealing with a millennia, you want to have not only engineering, but you also need to have this compatible with

the natural barriers, as well. And, that's where, as we're just starting to drive down into Yucca Mountain with the tunnel, we don't know that much about Yucca Mountain and you also have to consider Yucca Mountain may not be the repository. It may not be scientifically turn out to be the repository. Let's assume it was scientifically okay to be a repository, it may not be politically adequate to be a repository. So, I mean, that is a real possibility that we cannot ignore that.

Okay. Those are the definitions of what the systems are. I'd like to give you sort of a brief thumbnail of where we are looking at the pros and cons of the various systems. I believe this is in your books and I believe there's handouts in the back for others that were not at the table. They might be a little more legible than this.

The first row is just the description which I've tried to explain that in the little schematics and you start getting into the pros and cons of these systems. The reference system requires three different cask designs plus a waste package. You've got a storage cask, you've got a transportation cask, and you've got Federal receiving, and then you've got the waste package. There are about 300,000 fuel assemblies and I'm just dealing with commercial; I'm not dealing defense, I'm not dealing cats and dogs. Because you bring in all those outliers, it makes a much more complex

issue than it already is.

But, basically, with 300,000 assemblies and you're going to handle it four times here, you end up handling spent fuel nominally a little over a million times. Now, that's not anything to be particularly scared about. The nuclear world has handled probably over a million pieces of fuel assemblies already. So, this, as an engineer, I'm not terribly concerned about that, but nonetheless, the more you do it, the more chances you might have a problem. And, if you can avoid it through prudent engineering and prudent design, you should do so. And, I think that's a point behind what the Commission was saying, Admiral Zech and Bob had those discussions, and what the Board has been telling us.

You're also loading and unloading casks a lot. I've done some of that and, yes, mistakes can be made. Certainly, human factor is an important part as you design these things. You want to minimize that. Nonetheless, there are a lot of activities, there are a lot of human interfaces, a lot of things, Murphy's Law is around. Even though we build safeguards to assure public health and safety through all of those things, it's something that we should try to avoid if we can.

Now, the cost of this, if you look at the-- including the reactor costs, we tried to do that, and we have a lot more work to be done on the costs down here. But, if

you want to deal in one significant figure and we're probably pushing it a bit with that, this is basically a billion dollars higher in total societal costs than the MPC system and we'll get to that in a bit. But, all of those actions, if we look at that, it's probably about a billion dollars more to the societal system. That includes utility costs plus our costs. If I look at this as a rate payor--and, we're all rate payers here, okay, and I pay my electric bill, you know, I want to pay that. Okay? That's a billion dollars society could have used on something else and, believe me, a billion dollars is something that even in Federal terms is real money and it's important. We should walk into these things knowing what it is we're doing and have a proper consideration to that.

The dual-purpose system, what happens here, you end up with a cask design for storage and for transport. You still have to develop a waste package and you will end up discarding either the cask or you will end up discarding the canister. The rule of thumb I use is a big heavy wall cask is nominally a million dollars. A canister is several hundred thousand dollars by the time you finish with these things. These are nuclear quality assurance. These are not, you know, flimsy little things. But, you're throwing away either big, heavy, 100 ton casks or you're throwing away a fairly--nuclear grade baskets, you know, and the canisters.

And, that's a lot of money you're throwing away. You have half the number of spent fuel handlings because utilities don't have to bring it back into their pools at this point. So, you have basically half the number of cask loadings and unloadings, but you've got a lot of cost still because you throw away all that material that you're going to have to deal with.

Now, the dual-purpose canister system, you have to be careful here; you get into vendors. Some vendor will say, wait a minute, you penalized my system and, you know, mine is really cheaper. So, you have to give us a little bit of latitude as--you know, fine tune this thing. This is not a competitive bid type of thing. But, as we looked at the dual-purpose canister, it appeared to have nominally the same number of handlings with this. You're going to handle canisters more, but it costs less because normally a canister would be the disposal part of that system and a canister costs maybe a third or less than a cask because you don't have all that material. And, the key thing, as Bob mentioned, is the transportation is the controlling engineering aspects of this. And, if you designed the cask, if it's a dual-purpose cask, you had to basically throw away a confinement barrier, a thick wall cask, that was able to take the 30 foot drop, the puncture test, the fire test and the half hour fire, the submersion, you had to throw that

away and that is not a cheap package to throw away. So, this, to us, or TRW, looked a little less expensive and a little more advantageous. Looking at the multi-purpose cask, this again is the minimum number of handlings, minimal number of cask loading and unloading. This shows a higher cost here, a $3 billion cost higher. Here, the problem we have is we need to make a decision on this in the '90s. It's basically a now decision in this business. But yet, in the '90s, we don't really have a high degree of assurance of what the repository is going to be. So, you're going to end up having to over-design that multi-purpose cask to assure that you can encompass and adapt for the geologic conditions you're going to find in a repository. So, you have to over-design it or else you've got to throw it away. So, that becomes a problem there. So, this looked like a higher cost option there.

The multi-purpose canister again is the minimum handling as far as the fuel. You've got more cask unloading because you have to pull the canisters in and out of casks. This appeared to be the reference point and a lower cost to this and it was more adaptable because we can defer some of the final decisions on the disposal Part 60 aspects of it by using the overpacks to accommodate the waste package 10 CFR 60 issues.

There are some complex issues and Ron Milner is

going to talk a bit about those and you'll get more detailed presentations tomorrow concerning criticality. There are some irreversible things you do when you establish the canister design. Because then what you're saying is that canister is going to be compatible for the repository which is the millennia type of proof. And, whatever this nation is going to do that involves millennia proofs, there's going to be a rigorous licensing process and the nation is going to go through a licensing where the public says I have good assurance that the Federal Government is doing something that will be right for millennia and the future. So, things like basket designs, criticality--if it all will slump or not slump; if you're using poisons, are poisons going to migrate out of the package before the fuel migrates out of the package; and those kinds of things regarding criticality--these issues are going to be difficult to deal with. You're going to need to do a combination of probabilistic risk work, as well as some deterministic work, and you can spend a lot of money, many millions of dollars, in analyzing these kinds of things.

The jury is still out on a lot of these issues. The 801 Report, that's on the National Energy Strategy Act last year; the National Academy of Science is basically looking at how safe is safe enough? Or, for that, what's the safety standard, environmental standards? Their work is not

done. And, I believe what they're going to end up saying is they should be our safety standards and EPA has to translate that and then the NRC will translate and change the Part 60. There are many unknowns as to what that's going to be. Yet, we are faced here to try to make some decisions and do some of this work without knowing a lot of those answers yet and we won't for some time. But, this is not unlike the early days of anything, be it the early days of railroad, the electric light industry, or nuclear power industry. You never know all the answers when you start, but you try to build a robust system, a forgiving system that will follow and it is not any decisions you made are not irreversible and not unreasonable ones.

The next half of this, Ron Milner was going to do and go into a little more detail on the different multi-purpose canisters we have selected and are being evaluated in some detail. If you have any general questions of me, you can do that now. I'll also be on the panel this afternoon. I'll be here all day.

DR. PRICE: Thank you.

DR. NORTH: I'd like to ask a philosophical question and that is have we stopped being schedule driven yet? You talked in your initial slides, Slide 3, about DOE's plans for a national dialogue and we heard very eloquent statements of the need for the systems analysis to develop the objectives

from both of our morning speakers. It would seem like the right way to do this is to do the systems analysis, develop the objectives, translate those into specifications, and then begin implementing. And, we haven't really seen that package complete yet and, as far as I'm concerned, we haven't yet had the national dialogue. And, yet, we have these dates looming before us of 1998 or 2000 to have these systems up and functioning. So, I wonder if you could expand. Have we shifted paradigm yet? Have we become non-schedule driven and have a procedure for having the dialogue in getting the systems analysis done to develop the right objectives before we proceed?

MR. BARRETT: We have become non-schedule driven as one defines schedule driven as by, let's say, your recommendations and your special report to Congress on the GAO and others that you're going to force the schedule for '98 or 2003 license application to the NRC on Yucca Mountain, no matter what. And, the science--the hell with the science and the hell with the engineer, I'm going to meet the schedule. We are not that, okay? If you say are we non-schedule driven, we have no schedule, we have no milestones, you know, we don't really care on that, we're just going to do our little thing from day to day, we're not that either. Okay? We've got schedules. I've given goals and baselines to Ron to follow. As we've changed our program management,

I've been--some have accused me of being too hard on we're going to have program managers. Where there is resource allocation, there is a responsible name next to the piece of work, then I expect it done by a date that we agreed to and that's how I hold my people accountable for and the contractors accountable for and we do appraisals based on that kind of thing. I mean, we are doing that sort of thing. So, are there schedules? Yes. Okay? Do we have goals? Yes.

You asked where is the systems and where is it all laid out? If this were a classic engineering program, if this was putting a man on the moon, building a space station or a bridge, I'd lay all that out for you in some detail. The biggest issue here, as Dr. Starr mentioned earlier, is the institutional one. If I were to put that system up, I'd put it up there with an MRS right smack dab in the middle. Okay? That's what the '87 Act authorized in MRS. Are we going to have an MRS? That's an institutional question. Okay? Are we going to have--is nuclear power going to be viable 10 years from now? Are we going to shut all the plants down as many environmentalists would say we should because we haven't solved this problem? I don't know. Is there going to be a renaissance of nuclear? I don't know that either.

So, I don't spend a lot of time, especially when

I'm a little short on resources, okay, to theorize all the various options that could be in front of us. I think it's going to take some hard discussions. And, we know what the issues are as we try to bring the various parties together which will all culminate in Congress. Probably, a debate on our budget request or some other amendment someone will introduce to either stop the program or I stuck the pin in my favorite place, now put it there. okay? There will be a debate. And, I don't believe that debate is going to turn on a systems engineering analysis. It's not going to turn on a multi-purpose canister. It's going to turn on fairness, public perception, you know, and public involvement have been treated fairly, and these things. Those are what the debate will turn on. This is not an engineering issue. This is a societal issue; not quite as complex as health care and some of the other ones that the nation has to deal with, but that's what it's going to be. So, I haven't spent a lot of time on--

DR. NORTH: Well, I'm pushing you in the direction of what is the national dialogue going to be and what are DOE's plans to have it? We're going to have a mini-version of dialogue this afternoon and I hope we're all going to learn a great deal about other points of view. What are the Department's plans to have dialogue with the various stakeholders and concerned parties as we look at the near-

term decision of how to allocate these resources toward the development, design, and then implementation of either the multi-purpose canister which is coming out the cheapest in the preliminary evaluation or something else? Again, I heard our morning speaker say the engineering isn't that tough if we decide what it is we want to do. And, you've stated that what we want to do is a societal decision of a highly institutional character in our jargon.

MR. BARRETT: And, what we've done in that and we're going to continue to do in this particular area, we've had the workshops which have been, you know, widely attended by a couple hundred people--many of your staff was there and some members were there--which involve various points of view. We've done one of those already. We've got another one coming up in--I guess, it's later this month, I guess, now in November. And then, we're going to involve the people as we go through the process and, as we select vendors, there will be a public involvement piece to that to allow basic segments of society to plug in in this iterative process. And, parallel with that, the Secretary has her review going on. You know, I am being reviewed; I ain't the reviewer. So, I note she's announced the financial management review part of that and she's trying to kick off fairly soon and, as well as others, and I believe there will be either on our budget or our discussion, there will be a Congressional debate on this,

as well, as Dan Dreyfus now has been here a couple of weeks and he has stated to me very clearly that he expects to be a major player, you know, in that. But, again, this is not--this is a 10% engineering type of thing and systems thing.

DR. PRICE: Lake, should society be making this decision without the input of systems engineering?

MR. BARRETT: No, sir. No, sir. We have a much--in my view, DOE has been very lacking in communicating what systems work it has done. It's been lacking in communicating it to the Board. Okay? It's been lacking integrating itself. Okay? And, it's been wholly deficient in my view in explaining to the nation what this really is. Okay? And, we are doing substantial efforts internally to improve in that area.

DR. PRICE: The top level systems engineering studies need to be done not only for the information of society, but also for the value that it has if there is a legal proceeding beyond society's decision which perhaps there will be. And, without the systems engineering studies as part of that, I think the legal proceedings might go very hard.

MR. BARRETT: Well, you know, if you try to do something, odds are you're going to get sued or somebody is not going to like what you're doing. You know, we have done --you know, there's probably two feet of paper on this that scratches the surface of a lot of these things. We've got,

you know, another foot of paper on system studies and we'll go into that in more detail, I guess, at your next meeting. We've got to do more of it, we've got to do better of it, but I'm caught in a situation here where I'm trying to do the science on Yucca Mountain, I'm trying to develop the MPC, and some of these other areas I haven't been able to do as much as I would like to have done and as much as you would like to have had us done. But, there's only so many dollars I have in this budget.

DR. PRICE: I think our time is probably requiring us to move on to Ron. Oh, John?

DR. McKETTA: Lake, Chauncey and Bob and you--I'm asking an entirely different question--have indicated very clearly that we know very well how to play a game, but nobody wants us to play it on their field. And, I'm asking you this because I'm politically very naive, but I've dealt with people for 75 years. One of your statements here was that you're vigorously pursuing a volunteer storage site. I believe the volunteer process is not working and will not work the way that it is. And, I just wonder what would happen if Government would sweeten the pot? If the Government would come out with an announcement saying that there will be one billion or two billion, or whatever number you want to add, a year to any state that provides a site for us, along with a deed for the fuel. And, I say spent fuel

because many of us believe that within 100 years or so, we're going to need this spent fuel as a source of a tremendous amount of fuel. And, if a state had a deed, I'm just wondering if we might not get 40 proposals from various states if this sort of a proposition might be put out, instead of saying someone must volunteer?

MR. BARRETT: I don't know what would happen with that. There would be great debates, I'm sure. I think most people in this business realize the price is high. The price is unspoken, but the price is probably high. You end up from a --this gets into a pure political issue and it has to do with selling your great-grandchildren for bribes is how that gets translated in raw political terms and which--

DR. McKETTA: Compared to doing it for nothing now?

MR. BARRETT: Well, I don't know about doing for nothing. We haven't picked a spot for a storage site. We have the scientific work on Yucca Mountain and we'll hear more about that later, but that is not the place we're going to put this for sure. All right? It has to go through a process and there's a veto thing that was established by Congress. I don't know what's going to happen. I think this goes back to the, you know, Morris Udall and the Congress and the debates in '82. You know, theoretically, this was a fair and right way to do this. Then, some other folks came and let's short-circuit, let's save some money, let's do this,

and you had different views of how to do that. Given that--if we had a benevolent king who led our country and we didn't have a Congress and Executive Branch, we'd probably do that. My sense is that the raw politics of it, the first elected official who stood up and said the billion dollars sounds good to me, you know, whatever--

DR. McKETTA: Per year?

MR. BARRETT: You end up having some raw--and, I'm not a politician, I'm an engineer. I don't know what's going to happen with that, but it is a possibility. Some people think that could work; others would say that's doomed because it's got the bribe piece to it and what are your children worth in money? That becomes a hard one to deal with.

DR. PRICE: I think we need to go on now.

MR. BARRETT: Okay. Ron, do you want to pick it up from here?

MR. MILNER: I want to cover this morning our development planning process as far as the multi-purpose canister system. Before I get really into it, let me just mention the approach we took to developing the canisters or at least at the stage that we're at. Recognizing that the canister certainly cuts across the whole spectrum of the waste management system from reactor to the repository, we put together what we called, for lack of better terms, an implementation team within the Department. So, not only is

the Office of Storage and Transportation heavily involved in this, but also our systems engineering group, the Office of Systems and Compliance, as well as the repository people. In addition to that, we've certainly worked very closely and continue to work very closely with the utilities since ultimately these are going to have to fit their system, as well.

Just to talk a little terminology in what we're talking about in canisters, we're looking at a canister that would be loaded at the reactor site, sealed, and hopefully--and, I say hopefully--never again opened all the way through disposal. It would consist of a number of overpacks, storage overpack; ultimately, not an overpack, but a transportation cask. As far as disposal, as I think Lake and several others mentioned, the canister would be put in a disposal container, I think is the terminology he came up with. This could be one layer, multi-layers, whatever; some other overpacks potentially around that. All of that comprises what would be called the waste package.

The canister that we're working on is intended to meet the transportation requirements of Part 71, the storage requirements of Part 72, and be compatible with the requirements of Part 60. And, as has already been discussed, we don't know where the repository is, we don't know all of the disposal requirements. So, at this point in time, we can

only look to be compatible with those requirements, criticality or whatever the case may be. Obviously, it must incorporate the utility requirements. We've also undertaken, I think, a pretty iterative stakeholder involvement process in developing the canisters to make sure we have all points of view at least considered in the development. Lake mentioned we've had one stakeholder workshop. We've had any number of meetings with utility industry. We have our second workshop the 17th and 18th of this month, I believe it is.

There's a number of different requirements that we have to look at as we develop the canister; certainly, waste acceptance, there are utility requirements, transportation, storage, disposal requirements. Looking at the waste acceptance, for a variety of reasons, mostly efficiency, we want to maximize the number of assemblies that we can carry in a canister. A constraint to that certainly is that the various plants have different physical, nuclear, thermal characteristics of the fuel. I won't go through all of the dimensions that we thought we looked at in terms of both of the fuel that we would handle, but I think some of the more important ones are looking at fuel that was 40,000 mega watt day burnup and 3.75 enrichment. Also, we looked at fuel that would be 10 years old. This is simply the average, if you will, that we looked at in terms of designing the canisters.

Some of the utility requirements that we have to

deal with, we want to certainly maximize the number of utilities that can handle the canisters that we develop and what I mean by that is that there are various physical constraints within the reactor plant itself. There are certainly some reactor sites that are not rail-capable and so forth. We have to look at all of those things. We have to look at certainly the crane capacities within the different reactors.

What we ended up with as far as the conceptual design is looking at two different sized canisters, a 125 ton and a 75 ton, and what I'm meaning by that is that not that the canister is 125 ton, but rather the canister loaded with spent fuel in the transport cask in the spent fuel pool flooded with the shield plug in place; in other words, the hook weight for the crane is 125 ton for one size, 75 ton for the other.

The 125 ton, as is, could service 56 different reactor sites. If you used a lighter weight transfer cask, you could use the same canister as would fit in the 125 ton cask, use a small lighter weight transfer cask, and transfer that to the transport cask outside of the spent fuel pool so you could pick up an additional 32 sites with that mechanism.

The 75 ton would handle an additional 14 facilities leaving about 19 facilities that you could not currently handle with either of those two casks. They would either

have to use a truck cask where bare spent fuel would be loaded in the truck cask or you might do a dry cask-to-cask transfer in the reactor yard itself and load a larger canister. Some of the other things that we looked at is welded closure, 9 foot diameter, utility transfer system in case you needed to do dry transfer.

I won't go through all the transportation requirements in detail, but obviously it has to meet all the requirements of 10 CFR 71. Dose rates, in terms of rail casks, we want to operate on the free interchange, unrestricted interchange. So, that is limited to size. We've got criticality control, surface temperature considerations, cladding temperatures.

What we ended up with in terms of the design basis of these casks, 125 ton was the maximum cask that we said we would handle. We would look at burnup credit for criticality control during transport. As Bob mentioned earlier, we have to look at the moderator inside the canister and taking no credit for containment of the--canister shell itself for transport.

On the storage side, at least initially, we were looking at a service life of something around 100 years. We wanted the canisters to be transportable after long-term storage. Of course, that has to meet the requirements of Part 72, as criticality considerations, cladding temperatures

aren't really applicable and--or, I'm sorry, I had that up from transportation, as well--cladding temperatures. Design basis was, as far as storage, we would take containment credit for the canister. We did not want to have an internal inspection after storage.

Disposal requirements certainly are the hardest ones to deal with in the canister. We wanted to be compatible with the repository thermal loading approach. A lot of people have said that selection of, for example, the large canister may preclude some options in terms of repository thermal loading. That's not necessarily the case.

You have to deal with the waste package exterior temperature, the near-field temperature, the overall areal loading of the repository which I think the repository SCP is looking at something like 57 kilowatts per acre, although near-field effects, you can have greater than 100C temperatures. You've got to maintain criticality control. It's got to be sub-critical by a 5% margin after you take into account the uncertainties for different methods of calculation. At this point, that would lead you to a k_{eff} of about .89 in the repository. You've got cladding temperature.

The design basis, as I mentioned earlier, the canister is not media-specific, if you will. The overpack and disposal container would be the media-specific factor.

Credit would be taken for all elements of the fuel cladding and shell and so forth, as appropriate. We would hope that as the repository design evolves, we could take credit for the MPC shell, but to be conservative initially, we haven't taken credit for that. And, we are working with NRC, as Bob had mentioned earlier, looking at burnup credit for criticality control.

Just briefly on some of the alternatives and trades that we looked at as we were going through the conceptual design process, as far as the MPC closure, we looked at both the bolted and welded closure. We chose a welded closure since it minimizes the storage monitoring and also alleviates a concern as far as the corrosion. On the shell itself, we looked at a variety of materials, carbon steel, Alloy 825, some different stainless steels. We selected--and, I'm using the term "selected" because this is kind of the baseline that we came out with in the conceptual design as we go further in the process. These are not locked in concrete. Lake had mentioned that we're coming out with an RFP, ultimately, for the detailed design of the canisters. What we will go out with is a performance spec, not specifying any material or even a specific size of the canister in terms of assemblies. But, at least, at this stage, we selected stainless steel over the others for a variety of reasons; cost, there wasn't a whole lot of cost difference between stainless, 316L is

what we showed. And, carbon steel, a great deal of difference between stainless and Alloy 825, but we did one transportability after long-term storage which carbon steel would likely not give. We looked at different sizes, 24 PWR versus 21 PWR. 21 was selected because at this point in time it appears to be a thermal loading in the repository constraint, although this certainly is under review and could very easily change.

Filler material, we did, in fact, look at filler material. We could not determine at this point whether or not there was a firm requirement to use filler material. So, in terms of the design of the canister, what we looked at was to not necessarily design in a mechanism to add filler material, but to have the design such that filler material could be added, if need be. You wouldn't want to do it when you first loaded the canister. So, like, we would want to add that filler material, if necessary, right before you emplaced it.

We looked at burnup credit. Certainly, there's an advantage for the PWRs. We can get four assemblies in the larger canister if you go with burnup credit. In terms of the basket neutron absorber, we looked at both borated aluminum and borated stainless steel; chose the borated aluminum for heat transfer and looking at a lifetime of at least equal to the canister life.

Unfortunately, nothing is simple and there's still a number of unresolved issues; criticality control, thermal loading at the repository, and burnup credit. We're working with the NRC. We're putting a report working group together to deal with that issue.

We'll be briefing the NRC on the criticality evaluation needs at the end of this month and looking at presenting a topical report to the NRC in early '95 on criticality control. Thermal loading is certainly an issue at the repository that won't finally be answered until a little later time frame. However, there's a variety of studies going on which hopefully will give us some pretty good indication as to whether the right thing to do is a hot repository versus a cold repository and we can factor that into our designs as we go forward with the canisters.

Burnup credit, we've begun. We held a management meeting with the NRC at the end of August. We've got our first technical exchange with NRC planned for the end of this month. In total, we've got three topical reports planned to submit to the NRC for burnup credit. For storage and transportation, we're looking at about a year from now submitting that topical report for disposal. This would be the actual submittal of this topical report the following year. And, if we need burnup credit, for one reason or another for storage and transport for BWR fuel, we would

prepare that one. We would nominally look to a one year turnaround from the NRC on those topical reports.

I won't spend a lot of time on the cartoons on the canisters. I guess, the thing to look at there is that for the 125 ton, we're looking at a one inch thickness on the shell. On the 75 ton, it's .875 and this particular one that--there didn't appear to be a whole lot of advantage on the 75 ton to--or really strongly pursuing burnup credit. So, this particular design has flux tracks in it.

Contingencies, certainly there's a lot of uncertainty on the repository side. So, what happens if the canister is not emplaceable, whether it's incompatible with the repository requirements, criticality control, thermal loading, or whatever. Probably, a worst case scenario is that you load, let's say, 10,000 metric tons which just happens to be an MRS capacity, worth of canisters and ultimately you find that those 10,000 metric tons worth of canisters are not emplaceable, the worst cost situation is that you've basically wasted a half a billion dollars in canister; not an irreversible decision, but you've spent 500 million in canisters that you're no longer going to use. Kind of a high number, but when you look at the fact that even the dual-purpose has some savings, basically you're talking about a program savings of 500 million, given a one billion savings if you could put that in the repository. The

same thing is if it turns out that the canister is not transportable over long-term storage, you have another cost penalty. If you don't have an MRS, actually the canisters help, I think, by mitigating the system's impact. So, at least, you can begin standardizing the system. If you have no MRS, you've at least begun that process.

As Lake indicated, we're making a decision at least in the relative near-term to proceed with canisters or not to proceed. That would come about in the January time frame. That decision would be to proceed to the next step, not necessarily ultimately. But, some of the things we're going to look at, obviously, are health and safety. We're going to look at life cycle costs. Canisters certainly have to be economically viable to use them. Licensing, regulatory compliance, stakeholder acceptance are the various other factors which all go into it.

What goes into our decision process, certainly, the conceptual design report. We've also undertaken or beginning to undertake an independent review of that conceptual design, much the same as we did for our two casks' designs about a year or two ago. Industry certainly has input. We've gotten quite a bit out of our first stakeholder workshop. We hope to get additional out of the second one. Environmental input, working closely with NRC as we develop, and certainly the input of this Board.

April of '94 is when we hope to put out the RFP for the detailed design of the canisters. That RFP may contain an option to procure the first small number, but basically the detailed design. We would award those contracts by December of '94. Look at submitting the safety analysis report in December of '95. Complete EA in December of '95. And, complete prototype testing, March of '87. All leaning basically at starting deployment or having the MPCs available for deployment starting in January of '98. If that schedule is compared with the schedule we have to look at burnup credit, criticality, and so forth, we think we can incorporate the input that we're going to be getting from those exercises into the design process. Again, the worst case situation is that you come down and have a finally designed canister which you learn something from the repository study that says you need to change that design. That's not a major issue. That's not an irreversible thing. Pointing that out, there's a decision to proceed here and I think Lake had mentioned earlier that there's a number of points where we're going to be evaluating that decision as we learn more and more from the repository site characterization process.

And, with that, I'd like to take any questions you might have.

DR. PRICE: All right. We're running a little bit late.

So, we've got time for maybe one or two questions. Then, we'll need to break for lunch.

DR. LANGMUIR: Ron Lake suggested that there was perhaps a $3 billion difference between the multi-purpose cask and canister choices and suggested also that a reason for the major cost difference--which seems rather counter-obvious, doesn't it; I mean, one transfer versus three--was the uncertainties involved in having to make a decision now about the choice in the case of the cask if you had to. Did you assume the 10 year old fuel in all the calculations? Was that a baseline in Lake's approach to cost in his total options?

MR. MILNER: Yes, 10 year old fuel.

DR. LANGMUIR: What happens if you go to the average fuel right now which is 28 years? Or, go to 30 years, which is perhaps even more likely? What does that do to the uncertainties in those choices?

MR. MILNER: Well, I think, obviously, as the fuel gets older, you certainly--your economics get better. You can potentially carry more.

DR. LANGMUIR: Does it get--better? Does it bring those options closer together? Because you've now apparently decided upon the canister approach. It seems like that's your preference.

MR. MILNER: Yeah, we certainly are going towards the

canister approach. I haven't gotten really into those cost numbers. I'm not sure I can answer that at this point.

DR. PRICE: Any other pressing questions?

(No response.)

DR. PRICE: Thank you very much, Ron.

I'm told that we have a buffet lunch available which may be able to cut the time down so we can still start at about 1:00 o'clock when we get back. It's in the cafe at $8.95. There are menu orders also available in the cafe.

So, we'll break now for lunch and reassemble at 1:00 o'clock.

(Whereupon, a luncheon recess was taken.)

A F T E R N O O N S E S S I O N

(1:00 p.m.)

DR. NORTH: I'm Warner North. I will be the Chair of the session this afternoon.

As you have heard from the speakers this morning, I think unanimously there is a need to focus on the institutional aspects and not just the technical issues. The Board is quite mindful of the significance of the institutional issues associated with interim storage and their potential effects on the implementation of technical decisions. That's why we are devoting this afternoon to air some of these institutional issues. We have a very full afternoon and we wish that we could do even better in terms of listening to all of the various points of view on the institutional aspects. We have tried to fit in as much as we could in the time allotted and, therefore, as Chairman, I have the problem of passing that restriction down to the individual speakers asking that everybody stay within their time limit.

This session this afternoon has two parts. The first part begins with a lead-off talk from a visitor from Sweden, Harald Chagen, who will give us a view of the European and Swedish experiences with interim storage. This will be followed by a series of 10 minute speeches representing a variety of perspectives. Discussion on all of

these speeches, as well as other issues, will be deferred to the second part of this session which is a round-table discussion.

As many here will remember, the Board devoted much of its January 1993 meeting to interim storage. There was some perspectives formally presented to the Board at that meeting. Some of these views will be represented at the round-table. Since we have quite a few speakers, we really need to stay on time. After the break, we will have the round-table. There are a number of participants from different groups and some of them are most anxious to have this opportunity to express their views. We have some additional invitees that spoke before the Board at our January meeting. So, in the afternoon session, I will try to play traffic cop and keep things reasonably on time and organized, but we have many, many people that would like to express their point of view or ask questions. And so, we ask again that you try to be brief and concise so that everybody has the opportunity to participate and, to the extent possible, we will be taking comments from the audience at the very end of the session.

So, with that, let me introduce Harald Chagen who is a consultant to KASAM, the Swedish National Council for Nuclear Waste. He's going to give us a perspective on the Swedish and European experience on this topic. Harald has

been in the United States a number of times. He's very knowledgeable about the U.S. program and we are giving him 15 minutes, given all the territory that he has to cover.

Mr. Chagen?

DR. CHAGEN: So, I'm going to try to cover ten countries in a foreign language in 15 minutes in my very general statements and very brief touching on many, many points here. I guess, I need to introduce myself and the Swedish organization a little bit, as I will focus mostly on Sweden.

In Sweden, the utilities have the responsibility for the management of the waste and they have formed a company, a joint company, to carry out that task. Government supervises this operation and we have three different groups. KASAM, which I work for, that advises the Minister on nuclear waste issues only. And then, we have the Nuclear Power-- which resembles NRC; and SSI, the Swedish Radiation Protection Institute. That sort of has a similar task as EPA. This will be my talk; Swedish experience, some European experience, in general, and third, some conclusions.

When we read the term here, "interim storage", I mean central mainly. The Swedish history, I think, is very important in this respect of interim storage. We were forced, due to a change over government in '76, due to an election that was to a large extent forced by the nuclear waste issue, to show an absolute safe way of disposing our

waste. And, in a rush, the industry put together two reports, KBS1 and KBS2 reports, that laid out--it was a conceptual study that laid out the whole program for the back end fuel cycle. This conceptual study, I think, has given us--or these conceptual studies because we did a couple of more afterwards--has given us a lot of stability because, I think, we then went through a very cumbersome process with a lot of reviewers, national and international, including municipalities, interest groups, universities, and finally the decision--the approval was taken by government. This report or this decision was used in order to be able to fuel new reactors. It was almost like part of the licensing processing in our terms. I think, this gave us considerable technical and political consensus and, I must say, that this program from '76 and '77 is basically the same program that we have today. We haven't done much changes in the overall concept.

We have a sea-based transportation system using IAEA type standard casks. That has been in operation since 1982. We have a central interim storage at one of our reactor islands close to Oskesand on the east coast. That is in operation since '85. We have an operation of low/medium level waste repository and we have a concept that we have agreed upon based on a repository in crystalline rock using a long-lived copper canister. We are right now in the process

of implementing a volunteer siting process for the repository and we have separated the encapsulation plant from the repositories. Encapsulation will take place at the interim storage.

I think the justification for our decisions are shortly that we knew we were going to run out of space in the mid-'80s. This is back in '76 and '77. There was a strong feeling that the central storage was a more optimum solution than several reactors' storages, both technically and politically. I don't think it was felt that some of the smaller utilities that only operate reactors should have to take on what might be a long-term task. We did not see any possibility to implement geologic disposal at the--and we did not really know if we were going to reprocess by using outside contracts or not. We actually did at the beginning and we cancelled that about five years ago.

As you might know, we have a wet storage and I think we would not be able to wet storage today. But, at that time, we wanted to go with a proven technology, timely solution, much more important than optimizing and to develop new technology. So, I think, we felt that was something we could do directly and get licensed directly. It has also other advantages in terms of safeguard because it's underground pools. Costs for such underground constructions in Sweden is about the same as aboveground. So, that was not

a big issue. And, we could take off a lot of the difficult sort of low probability scenarios.

I'm not going to go through all these figures, but I think central interim storage for us doesn't constitute the major portion of our back end cost. It's about 15% of the total or .4 cent per kilowatt hour and the marginal cost is about $70,000 per ton in the system we operate today.

This is just sort of a summary of the operation of parts of the system. The CLAB facility that will host also the encapsulation plant up to the right, storage pools down to the right, and the transportation system for the ship--the special vehicle and the cask.

So, some even more general comments about other European programs, I think we need to divide them up in reprocessing and non-reprocessing nations. Because reprocessing nations don't really discuss this because interim storage becomes a very minor part of a much more complex facility. So, I don't think that's an issue in these countries; France, Great Britain. But, there are what's called the base load customers, those that have contract with these nations. They usually operate central interim storage facilities or are in the process of developing interim storage facilities for vitrified waste. And, siting is almost exclusively co-siting with other existing nuclear facilities. And, there are casks suitable, dual-purpose

casks, in operation.

Direct disposal nations exclusively plan all of them to have a central interim storage. And, you can see those that have early facilities like Sweden, Finland. We have wet technology. They're more modern. They are either in operation or are being planned or are of dry type, using dry technology.

Generally, it's a trend in Europe, I think, to back out of reprocessing, as for France or Britain, but for the other contracting nations, I think, you will see in the next year--I would say, within the next year, one or two nations drop out and they will then have to go to interim storage for spent fuel.

Some conclusions. All European programs have or have plans for a central facility. No country with direct disposal is not planning central interim storage. And, siting at nuclear islands or nuclear parks have been used successfully in almost all of these countries except Germany. Germany is the country that had the most problem. I think, a driving force in most countries have been--robust and timely has been far more important than optimization and latest technology. Licensability and acceptance, I think, has driven most of these programs. And, the cost is typically 10 to 20% of the total back end cost. And, dry storage is the modern technology. But, also, I would say

forceful development of final disposal plan for around 2020, 2060; for Britain, I think, 2020; typically, for Sweden, Finland. I think it has helped public trust in that interim storage is not a final solution. It is in interim storage and it will not be anything else than that. And, no one is trying to make it anything else than that.

And then, as my title said, some observations that are my own. I think--I mean, the overriding problem, society in Sweden, we're taking 50% of our electricity [from nuclear energy], you're taking around 20; I think the overriding problem here is to give the reactors an opportunity to continue to provide the electricity. I think even experts say we can dispose of the waste, the public does not believe that yet. Polls in Sweden typically show that around 50% do not believe it. We just gain public confidence in our disposal programs before we can move ahead. And, we cannot force decisions even if we would like to unless we have gained that public confidence.

As far as I'm concerned, interim storage has proven technology and I think it's just to go out there and procure these solutions from industry. There are plenty of different transport casks and storage cask concepts available. I think, nuclear island sitings where nuclear operations are well-known has proven to be favorable to break new ground. And, on the other hand, deep disposal technology is not

available for implementation today. I cannot think of any company who can offer a turnkey repository. So, this is going to take a long time. We're going to have to develop detailed knowledge about our sites and we're going to have to demonstrate a lot of technology and we're going to have to gain this public acceptance.

DR. NORTH: We've run out of time. Thank you very much.

Our next speaker is William Magavern. I hope I pronounced that right. He is a director of Critical Mass which is a unit of Public Citizen, an organization that I think many of us associate with the name of Ralph Nader. He is going to provide us with a perspective of this national environmental organization.

MR. MAGAVERN: Okay. I thank the Board for including a diversity of viewpoints in this session. I think that it's going to be very necessary to listen to diversity of viewpoints because one of the biggest problems with radioactive waste programs in this country has been that the Government and the industry have tended to exclude citizen participation and that way of doing things has not been working. If we're going to reach any sort of a resolution of radioactive waste issues, it's going to have to be a democratic one. And, there's a long history of the Congress, DOE, the NRC, and the nuclear industry of trying to force so-called solutions on communities. And, those communities have

tended to rebel and we reach a gridlock which I think everyone here is familiar with. We've seen that certainly in Nevada. Mary Sinclair will describe her experience in Michigan there where public participation has been excluded and we really need to find a new way of doing this. I think that everybody here should understand that if the process continues to be anti-democratic, then it will also continue to be very costly and very contentious.

We hear at gatherings like this a lot of talk about public acceptance, but I think those of us on the citizens' side feel that we have yet to find that there is a lot of listening going on by the decision makers to the concerns of citizens. Instead, we often find that the concerns of citizens and state, local, and Tribal governments are written off as being, oh, well, that's NIMBY and then that gets put in a category that's essentially a derogatory term and those concerns are trivialized. And, we often hear that, well, there aren't really technological problems when we're dealing with radioactive wastes, but the problems are political. And, that sometimes results in an effort to try to find the public relations campaign that, you know, this one is really going to do it. This is the one that's really going to turn our public relations problem around. And then, what we see is that things end up even worse than they started. A good example of this would be the American Nuclear Energy Council's public relations campaign in Nevada over the last

two years where, I think, they managed what some people would have thought was even impossible which was to make people in Nevada more opposed to the Yucca Mountain dump than they had been before this multi-million dollar campaign started.

Slick media tactics are not going to solve the problem. In fact, the track record that this country has on radioactive wastes from Hanford and Savannah River to Maxey Flats and West Valley does not give people any kind of confidence that these highly hazardous wastes can, in fact, be isolated from the environment for a period of time that is far longer than human history. That, in combination with Governmental and industry actions that have really overrode the concerns of citizens and state, local, and Tribal governments has resulted in the kind of mistrust that has caused governors to reject getting involved in the MRS process.

I think that if you look at some of the decisions made by, for example, the Governor of Wyoming, that it's clear that the states have not been willing to trust Department of Energy and the Congress to follow through on commitments that they're making and that there is a very major concern that if there is a so-called interim facility sited that that will, indeed, become the final resting place for the waste. And, that's a very legitimate concern.

We've seen very recently in Congress this concern

manifested in the Bingaman amendment which did call for a halt in the nuclear waste negotiation process until state and local governments are in agreement. And, I think, we're going to continue to see this kind of involvement on the part of politicians who want to make sure that the affected state, local, and Tribal governments are involved in the process and do not have their concerns simply pre-empted as they often have been.

And then, there's the problem of looking at the creation of the waste in the first place which is something that again the Government and the industry have frequently tried to ignore. And, some people are still dreaming about building more nuclear powerplants in the U.S. We heard some of that dreaming this morning despite the fact that we still have no satisfactory solution for the wastes that are being created by processes that were started 30 or 40 or 50 years ago. It is no accident that the country that seems to be furthest along in its waste program, Sweden, is a country that has made the decision to phase out the operation of its nuclear powerplants. They're going to stop creating the waste. Probably, the most important lesson we've learned over the last quarter century of environmental protection is that what works best is pollution prevention. Stop the problem at the source. Don't create it in the first place. And, everyone from Barry Commoner to George Bush has

recognized that it's much better to prevent pollution than to try to regulate it at the back end. Often, that's ignored by saying, well, if we shut down all the plants tomorrow, we'd still have the problem to deal with. Certainly, we do have a waste problem to deal with, but we can't do that by ignoring where the waste comes from.

I was asked to basically represent the concerns of national environmental organizations and I speak only for Public Citizen, but I want to talk about two policy recommendations that I think are very representative of the opinions of national environmental organizations that deal with these issues. First, the MRS is a bad idea. It's being driven by the utilities' desire to get their wastes off-site and out of sight so that they can go on generating more of it. It is not needed, it is highly expensive, and will continue to be highly controversial. National environmental groups have always opposed the MRS and have feared that it would, in fact, become a de facto waste repository.

And, secondly, I think there is a consensus among national environmental organizations that we really need to take a new look at the whole radioactive waste problem, to admit that what we're doing is not working, and to have an independent review by a blue ribbon panel of radioactive wastes, high level or so-called low level mixed waste, military waste. To start with the classifications, don't

even make sense right now. There needs to be an independent review. It can't be done by DOE because DOE is involved in the problem and doesn't have the credibility to do the review itself. We need one overall review and to get away from the kind of piece-by-piece ad hoc decision making that has been one of the problems and that has seen us getting into more and more of a problem.

And, I will close just with a proverbial message which is that people have found by common sense throughout the years that if you find yourself getting deeper and deeper into a hole, the first thing you do is you stop digging.

Thank you.

DR. NORTH: Thank you very much. And, thank you for leaving one minute for our busy program.

Our next speaker is Ben Smith who is a member of the staff in the Tennessee Governor's Office. Tennessee was proposed by the Department of Energy to be the host of the MRS facility in the mid-1980s. This was later voided by the Nuclear Waste Policy Amendment Act of 1987. Tennessee was a proponent of the multi-purpose container concept. That's also, of course, the home of a DOE laboratory, Oak Ridge.

MR. SMITH: Thank you. I'm pleased to be here and I'm pleased that the Nuclear Waste Technical Review Board is dialing up the interest on this subject of interim storage of spent fuel. As was mentioned, the State of Tennessee was

deeply involved in this issue really beginning April 25, 1985, when we were sort of surprised by the proposal, on to November 1, 1989, when the MRS Commission reported out. I think those dates represent sort of a rise and fall of this as a central defining theme of the nation's spent fuel management program because not since the MRS Commission reported out has Federal centralized storage regained its earlier prominence.

Over the past four years, I have watched the DOE develop a much better focus on the repository as a central defining theme of what they're trying to do. And, during this period, the technical and institutional confidence of handling fuel at reactors and storing it there has increased. To quote the DOE Report of the Task Force on an Alternative Program Strategy: "Today, few, if any, stakeholders believe there's an urgent need for rapid full-scale disposal. The NRC has said that waste can safely be stored for up to 100 years."

And, we heard the NRC speaker this morning give the reasoning behind that decision. So, we can safely assume that this fuel can be kept at reactors out beyond the year 2050. That's not to say that other issues, such as utility system costs, local community preferences--and, I believe, we'll hear some more of those in a few minutes--special utility hardships, potentials for emergencies, contractual

obligations, those are not trivial issues. They're very important and there really couldn't be a better time, with a new administration in Washington and a newly confirmed director of the Office of Civilian Radioactive Waste Management, to have another look at those issues. 1998 is the year that's drawn a lot of attention in this program. It's just around the corner. And, the utilities have a right to know what to expect from the Federal program.

The Nuclear Waste Technical Review Board could do this country a great service by pointing to some important programmatic decisions on interim storage. The Federal Government needs to decide about the 1998 date. They need to clearly define the role they're going to play in interim storage from 1998 to the date that the repository will accept waste.

Now, looking back, the MRS Commission produced some very valuable review of the key issues of interim storage. Tennessee didn't agree with all the conclusions and recommendations. Frankly, some of those conclusions and recommendations seem strangely disconsonant with the content of the report. But, there was a lot of real meat on the body of data and reasoning which was brought together by that Commission.

Taking the substance of the Commission report and other findings and happenings since then, we really should be

able to now finally lay to rest the vain hopes that the Federal Government is going to bail out a relatively small number of utilities by providing centralized storage. Now, if we could lay that hope to rest, we could move on without unnecessary distraction to define a program which will optimize interim storage on-site at the reactors.

I can assure you from several years of grappling with the creature that MRS dies very hard, but it's very sick and it's very tired now and it should be put out of its misery. Let me list some of the sources of its misery.

(1) The MRS Commission found that an MRS linked to repository development as the Congress intends, increased total system life cycle costs by $1.3 billion. As Lake Barrett said this morning, that's real money.

(2) The MRS Commission found serious equity problems for financing an MRS from the Nuclear Waste Fund. You have all the utilities paying into the fund based on an amount of electricity they generate, but obviously they will not all have the same ability to enjoy the benefits of an MRS. So, for that reason, the Commission recommended that its 5,000 metric ton "son of MRS" be funded only by contributions from the utilities that use it. And, I can really imagine the consternation of the few utilities who already calculated the subsidy to their programs that a Nuclear Waste Fund-financed MRS would represent.

(3) Congress has resisted all efforts to break the linkages between MRS and repository development which were put in place in the 1987 amendments. Proponents to de-linking MRS failed in attempts to include any language for de-linking in the Energy Policy Act of 1992. So, I think you can see that the persistence of favor in the Congress for linkages really dashes the hopes of those who thought that a volunteer sited MRS could emerge free of linkages.

(4) In three years of operation, the Office of the Nuclear Waste Negotiator has been unsuccessful in finding a willing host state for an MRS. The latest bad news for the Negotiator is that language that was mentioned just a minute ago; Senate language that's been approved in the Energy and Water Appropriations Bill which will halt any Phase IIB grants to study the feasibility of MRS siting unless the Negotiator can find a reasonable likelihood that agreement can be reached among all relevant Government officials in the vicinity of any proposed site. I think if this language stands, you can expect to see most or all of the Indian Tribes MRS feasibility studies to fold.

(5) A May 1993 General Accounting Office report criticized the high-level waste program for continuing to pursue these dual objectives of having a repository ready by 2010 and having waste acceptance by 1998, both under Federal tight budgetary constraints. So, in answer to that, DOE

downplayed their resource allocations to MRS, as they rightly should have.

(6) Finally, no argument can be made that a Federal storage project is going to help us unlock the secrets of the origin of the universe. MRS is not going to represent in advance or even a contribution in the technology of waste isolation for a 10,000 year period. In fact, the technology is close to humdrum, as we've heard this morning. So, a project like this is going to have to stand on the usual pillars of justification, costs, benefits. Financing will have to be fair. And, this is just where the MRS failed in past attempts to be justified.

Instead of listing all the other problems with MRS, it would be better for me to finish up here by talking about what can be done on optimizing a system of at-reactor storage and defining a helpful Federal role in that endeavor.

Some excellent progress is being made, I think, through this MPC concept. I haven't seen the complete design report. I'd love to have the time to go through it. But, if this concept is developed with care, I think it will provide some of the system benefits which Tennessee advocated in the 1980s with the dual-purpose cask system.

Certainly, the MPC would represent for DOE that first step across the fence line at the utilities. Much of the original justification for an MRS was predicated on the

receipt of a whole slew of heterogeneous casks requiring handling, rod consolidation, and repackaging.

During the 1980's, Tennessee was unable to convince DOE that large system benefits could be gained if you would just cross the utility line and try to standardize the waste form. We were disappointed that the MRS Commission didn't pick up on this, but it's heartening to see that this Board has picked up on it.

So, let me urge in my last gasp here in a 10 minute presentation that we not stop with the MPC concept as we cross inside the fence at utilities. Let's dust off the 1992 Facility Interface Capability Assessment, the FICA report, the work that was done by Nuclear Assurance Corporation, and the 1992 Near-Site Transportation Infrastructure Final Report also done by NAC. These reports point out cask handling and transport improvements which are needed to increase the efficiency of spent fuel transportation system. As Tennessee demonstrated in the 1980s, there's significant benefits to be derived from moving spent fuel across country on dedicated trains in very large casks. We heard the NRC speaker talk about the tremendous driving force of getting waste in bigger packages and we proved that back in the 1980s. We criticized the MRS concept bitterly because these potentials were being ignored back in those days. So, proper use of the MPC concept and a serious look at Federal participation, at-

reactor upgrades in handling, and transport capability would represent a welcome change in emphasis in the nation's spent fuel management program.

A final observation here, let's not forget within the last 40 years, we've created a 10,000 year problem. It's not going to go away and we can only decide the pace and dedication with which we'll address the problem. So, let's not let any interim storage options get in the way of solving the real problem.

DR. NORTH: Thank you very much and again thank you for being on time.

Our next speaker is Dr. Mary Sinclair, a citizen from Midland, Michigan. She will give us a perspective of a citizen from the state in which a dry storage facility is being installed in connection with the Palisades Nuclear Facility.

DR. SINCLAIR: Thank you.

DR. NORTH: Dr. Sinclair?

DR. SINCLAIR: Thank you. I really appreciate the chance to speak to you on this issue today.

The U.S. Radioactive Waste Technical Review Board is to be congratulated for including in its deliberations the viewpoints of a wide range of people with varying perspectives on this issue. I have a paper available. So, I'm just summarizing much of the contents.

This nation is at a very critical stage in its policy decisions on high level and low-level radioactive waste disposal from commercial nuclear powerplants. There is a grave danger that economic pressures together with a desperate need for solutions will result in very poor decisions being made at this moment in history. These decisions will be irreversible in their impacts on some of our most valued natural resources and will adversely affect all our future generations.

The current placement of high-level nuclear waste in untested concrete casks at the Palisades Nuclear Plant site in my view is one such decision. These casks are 150 yards from the shore of Lake Michigan and in the heart of the Great Lakes. Every cask that has been designed and constructed for storage of high-level nuclear waste in this country up to these casks were built has had to meet rigid construction and testing requirements devised by the Nuclear Regulatory Commission. Each cask had to undergo a rigorous site-specific licensing procedure but with the VSC-24 casks, these types of requirements that would give assurance of due regard for public health and safety have not been met. I will describe some of these regulatory failures.

The VSC-24 casks were the first to be approved under the generic ruling which provides that the Secretary of Energy shall establish a demonstration program in cooperation

with the private sector for the dry storage of spent fuel, spent nuclear fuel at civilian nuclear power reactor sites, with the objective of establishing one or more technologies which the NRC may, by rule, approve for use at the sites of civilian nuclear powerplants, without, to the maximum extent practicable, the need for additional site-specific approvals by the Commission. There's nothing in this or any other provision of the Nuclear Waste Policy Act which states that site-specific determinations must made by the NRC as has been the case for Palisades, that the public's right to an adjudicatory hearing may be obliterated by a generic rule-making process. And yet, this is what has happened at Palisades.

By presenting some of the highlights of the violations of NRC's own rules in the process of expediting the construction and loading of these VSC-24 casks at Palisades, I hope to demonstrate the harsh realities of what is happening at the grassroots level that is at great odds 3with the technical planning and intent of organizations such as the one that has called this meeting. I will describe the institutional problems and breakdowns that are part of the process and the dangers they pose in making policies for the storage of high-level nuclear waste in this nation.

In 1990, in adopting the route by which they would approve dry storage technologies generically, the NRC was

careful to spell out many important safeguards for the process. However, in what was to be the first implementation of this rule with the VSC-24 casks at Palisades, the NRC made numerous exceptions and allowed significant contradictions to this rule in order to approve it expeditiously and generally. The NRC was driven by the fuel loading time table of Consumers Power Company at its Palisades plant, rather than by a conscientious application of the rules it had set out for the process of generic approval of this technology which were intended to protect public health and safety.

For example, the eight concrete casks and three metal baskets that have been built for storage of high-level nuclear waste at Palisades were constructed eleven months before the Certificate of Compliance was even issued for that cask and before the public comment period was even announced. Yet, one critical requirement for generic approval of cask technology is that "fabrication of a cask under the Certificate of Compliance must not start prior to the receipt of the Certificate of Compliance." The rule further states that if a vendor has not received a certificate, then the vendor does not have the necessary approved specifications and may design and fabricate casks to meet incorrect criteria.

Also, the 1990 rule for generic approval specifically provides, "that to the extent practicable in the

design of storage casks, consideration should be given to compatibility with removal of the stored spent fuel from a reactor site." But in approving the use of the VSC-24 cask at Palisades, however, the NRC contradicted this requirement and simply asserted there is no need for the VSC cask, 24 cask, to be compatible with transportation requirements.

A good deal of concern was expressed in the public comments on the lack of monitoring devices for these casks. In addition, NRC's generic requirements provide that "storage confinement systems must have the capability for continuing monitoring in a manner such that the licensee will be able to determine when corrective action needs to be taken to maintain safe storage conditions." However, in approving these casks, the NRC deviated from this generic requirement and said, "the NRC does not consider such continuous monitoring to be necessary for the VSC-24 casks."

In a letter dated August 31 of '92, while the public comment period for the final rule was still in progress, and when eight casks had already been built, the manufacturers, Sierra Nuclear Corporation, indicated that it would agree to make changes in the cask design in response to NRC's safety concerns. However, the project manager said, to get the subject documents--said that, "he preferred to get the subject documents and our generic certificate of approval as is and as soon as possible in order to support our efforts

at Palisades." The final rule on the VSC-24 casks and their Certificate of Compliance were issued and became final on May 7th, '93, and two months later, on July 16th, the manufacturer of the casks wrote to the NRC saying that he was now ready to take up the amendments to the Safety Analysis Report at a meeting scheduled in July.

Now, was this to include the safety issues that had been held in abeyance as he had requested a year earlier in order to complete their efforts at Palisades? Were other safety issues considered? No public information is available on this meeting.

The question is then, when does a final rule on the safety of a cask become final? What will utilities be ordering? Why would any utility buy anything except the least expensive version that the NRC has already approved? The major issues, construction of the casks prior to the issuance of the Certificate of Compliance, the violation of NRC's rules, as well as concerns for the environmental of Lake Michigan and the Great Lakes, promoted thousands of people to send petition signatures, calls and letters to Attorney General Frank Kelley of Michigan. In response to these citizens' requests, he asked for a public hearing on this project at Palisades. Our elected officials, Michigan senators and Michigan congressmen John Dingell, and senators from neighboring states of Illinois and Wisconsin also

followed up these requests, but no public hearing was granted by the NRC who is apparently accountable to no one except the nuclear industry.

Through all of this period of time, the NRC reiterated that no public hearing was indicated because the VSC-24 cask system was generic and not specific to Palisades. However, any number of site-specific requirements have been required and the NRC has asked for them, and they're detailed in my paper and they're at many others.

Although the National Environmental Policy Act requires that an environmental impact statement be made for any federal action that impacts the human environment, no environmental impact statement was produced. Yet in approving this cask, the NRC has made it available for use with no public input to any utility in the country.

Other safety issues have been ignored and these include the process of what will be the process of recovery, and there are corrosion problems that have been mentioned and that have not been resolved. Without making any full scale field testing of this cask, the VSC-24, the NRC concluded in their five page environmental assessment that there was no significant impact on the environment from this project. The only tests that were conducted were at the Idaho Engineering Laboratory where a smaller cask, the VSC-17, was tested in a controlled environment. But the NRC did not use these test

results in their rule making, but the manufacturer did use these results in the design of the VSC-24 cask.

Furthermore, Consumers did not have the type of fuel specified in the Certificate of Compliance. They had fuel with less heat content that was needed for the test. The NRC made exception to allow them to use this fuel, but now the fact remains that this cask has been released for use by any utility with no public review, without us having had any real test of its heat removal capacity.

These casks have been set on a storage pad in a fragile sand dune area which is geologically characterized as a high risk erosion area. No information is available in public documents on this. When the NRC was asked for these data, the director said that this was not NRC's responsibility because the VSC is a generic cask and can be placed anywhere. The Michigan Department of Natural Resources which issued a permit for the storage pad said the details of storage pad construction were not their responsibility since the decisions were preempted by the Nuclear Regulatory Commission. The utilities spokesperson at the site of Palisades said that numerous contractors were involved in building the storage pad but that this information was not available to the public.

The NRC received many public comments on this cask design once the proposed rule to add it to the available cask

design was announced in the Federal Register. They included, among many others, important observations by other cask manufactures and the utility executive who noted that numerous requirements for construction and testing had been relaxed in the construction and deployment of the VSC-24 casks, and it was generally characterized as a substandard cask. And one commenter said, "expedited approval of the VSC is based on reasons other than full compliance with these established standards which all previous applicants have been required to satisfy. By virtue of its actions, NRC has established a new precedence which has lowered the standards for all future storage systems."

I would urge you to read my paper for other comments. I have many documents that I've brought with me that I would like to share with you in order to substantiate my statements.

Thank you.

DR. NORTH: Thank you. In order to keep us on time at eleven minutes, I'm going to cut speakers off. So you can see my sign. Please stay within the time limit.

Our next speaker is Mr. Ken Miller, who is the Decommissioning Spent Fuel Disposition Project Manager for the Rancho Seco Nuclear Generating Station for the Sacramento Municipal Utilities District. He will describe the needs of a shutdown reactor for dry storage and expedience with

hearings on the subject in the community.

Mr. Miller, soon as you get hooked up to the machinery.

MR. MILLER: Dr. North, members of the Board, we thank you for inviting us to share with you the experience that we've gone through at Rancho Seco in planning for an interim on-site storage facility.

It's always nice to start out a presentation with an objective, so for today's speech, I'm going to talk about the discussions of the institutional issues as they relate to what we had to go through for interim on-site storage. And the first thing we're going to talk about is the impacts from decommissioning, and then we'll talk a little bit about spent fuel storage and disposition strategy, the economics of spent fuel storage, and then the environmental activities. And then lastly, we'll get into some future developments.

But before we get too far into the presentation, I thought it was important that we go over the brief background of why we are shut down today. Essentially the plant was shut down by a referendum of ratepayers in 1989. SMUD undertook an effort at that time to sell the plant and those efforts were unsuccessful, and in the latter part of 1989 we notified the Commission that we were going to decommission the plant, spent the next year or so preparing a decommissioning plan. We submitted that to the Commission in

1991, and we were granted our possession only license in 1992. That allows us to store spent fuel but we can't run the reactor without the permission of the NRC. The fuel has been removed from the reactor and is currently stored wet in the spent fuel pool.

Now, as we got into decommissioning activities, we recognized there were several major issues that we had to address. The first was what were the available funds for decommissioning and at the time we shut down, we only had about $60 million in our trust fund. When we got our first site-specific cost estimate, we got a bit of a surprise. We found out that the cost to decommission the facility and terminate the nuclear license was somewhere in the neighborhood of $281 million. So we had a problem there.

The second issue that we had to deal with was low level-radioactive waste, where to dispose of that. Under law, we can't go to Hanford. Barnwell's a long ways from California, and the Southwest Compact is not open yet, so we have a problem there.

And the last issue on the subject of this presentation is what do we do with our spent fuel and how we dispose of that.

Going on to some of the specific issues that we addressed that were directly related to spent fuel, we had to deal with what was the cost of the extended pool storage of

our fuel. We also had to talk about what was the size of the capital investment were we to go dry? And then the issue of we were going to decommission the plant and what would we do with the fuel assuming that it wasn't taken away after the plant was decommissioned; and then the last issue which is a paramount issue, which is how do we recover from an off-normal condition after the spent fuel pool has been decommissioned? And we've addressed a lot of these issues in the dry casking system that we've purchased.

Our strategy involved the study of a number of options that would lead us to some conclusion as to what to do with our spent fuel. One of the issues that we addressed was going ahead and modifying the spent fuel pool to the point that it would be a stand-alone facility and we could operate it without all the systems that are operable today. We found that to be rather costly and also included a large staff.

The next issue we looked at was an all dual purpose fleet of dry storage casks. We found that to be something that would be appealing but yet costly. We also talked about shipment to a federal repository, but that was a short discussion. We talked about reprocessing off-shore. When we got an estimate of what that cost was, we found that not to be cost effective. Also, we recognized that we got the waste back and we weren't sure whether the State Department would

allow us to ship it off-shore. And then we talked to a couple of neighboring utilities to see if we could store our fuel in their pool, and the response on that was not very overwhelming to say the least.

So, what we did was essentially we went out for bid. We looked at the dry casking community and what the products were they had to offer. We did select dry cask storage. We put together, working with the vendor, what we call a transportable storage system, and we're in the process of having that license today.

After making all those decisions, we came up with an overall schedule for Rancho Seco, and it goes something like this. That we're going to put the plant in what we call custodial storage. We're doing that today. We expect to have that in storage by 1-1-94 and we'll start our spent fuel campaign shortly. We'll be storing fuel in casks and we expect to have that activity completed by about 1998. Thus far, we're ahead of schedule. We may bring that in a year earlier. So we will then put the plant into what we call a Hardened-SAFSTOR, where we lock up the doors, put up barriers, keep it in that storage mode for about ten years. We'll decon the plant between 2008 and 20011, and sometime between 2001 and 2015, according to the acceptance priority rate or rankings, we would expect some of our fuel to be moved off-site.

Now, from an economics point of view, here's where the numbers are. The capital investment for our dry cask storage system came to about $16 million, about $13 million for the casking, which included two transportation casks. About a million dollars or so for the ISFSI, this is our storage facility. And another $2 million for engineering and other costs.

The estimated savings from approximately ten years in the Hardened-SAFSTOR dry storage mode amounts to about $8 million a year, and that's based on the cost of 10.6 for wet, 2.6 for dry storage, and taking out the capital investment we believe that we're going to save about $64 million over the Hardened-SAFSTOR period.

From an environmental point of view, we have complied with the California Environmental Quality Act. We did an initial study. We found that there were no significant impacts and, consequently, we did a negative declaration.

By the same token, the National Environmental Policy Act required that we make an evaluation. We did so. Again no significant impacts. We are aware that the NRC is having a challenge to their environmental report. Again this is more on the decommissioning side, but it does include spent fuel storage.

We did conduct three public meetings. We had two

public hearings. The public participation in the Sacramento area was very minimal and we did not have any significant issues that came up.

The last issue I'd like to bring up is perhaps an indicator of where we are in the community, and that's future developments. We have 2,400 acres at Rancho Seco. About 87 is the nuclear facility. And so, currently we're underway with the development of a golf course and country club, an equestrian center, nature center, hiking trails and a group use area. We've had our first public meeting on that and essentially there were no negative impacts, no significant issues came up.

Regarding future generating facilities, we're currently in the process of trying to site 2,000 more acres adjacent to Rancho Seco for the purpose of a solar thermal plant and we're looking into some gas options as a result of a pipeline now being installed nearby.

So, in conclusion, we can say thus far in our stage that the interim on-site dry spent fuel storage, even though it's costly, is the most effective method for Rancho Seco, and thus far does not appear to be a major local concern, nor a major factor in future site development.

Thank you.

DR. NORTH: Thank you very much, Mr. Miller. And thank you for staying within your time limit.

Our next speaker is Mr. Robert Mussler, from the Office of the Nuclear Waste Negotiator. He'll provide us with an update on the status of activities in the Negotiator's Office.

MR. MUSSLER: My name is Bob Mussler. I'm the acting deputy negotiator for the Negotiator's Office.

I'm not sure where to begin right now. I don't want to stand up here and apologize for being in the Negotiator's Office trying to site an MRS. I wasn't clear. It appears we're getting into a debate of whether an MRS is needed or not. Let me just briefly, before I get into an update, state that from my perspective of three years of doing this, we don't have the luxury of getting on one side or the other. Our job is really to try to understand what it's all about. We have to talk to both sides about this issue. The bottom line is, we've got 72 MRSs right now. So if you don't want an MRS, you're out of luck. The issue is how you're going to manage your fuel responsibly and whether some centralized approach contributes to the responsible management or not. It's not our job to try to argue for or against an MRS, but there's certain realities that we just see and have to at least deal with and communicate.

One of them very simply is, if you just leave it on site, the suggestion, well, let's just leave it on site and then Lake's point that dry storage is a reality, there's a

large chasm between that and the Palisades and the Northern States Power experience. So you have to decide whether if you've got 20% of the United States power being generated by nuclear, and you've got 19, 25, some number of powerplants running out of space by the year 2000, and you've got situations with the energy generated by Mary Sinclair and others regarding Palisades and Northern States Power and the uncertainties associated with dry storage.

I think the issue boils down to is perhaps some centralized approach. Does that make sense or not? And again, I'm not prepared to argue it. I'm just going to let you know there are issues out here that we have to deal with and it's not just a simple answer.

First thing, let me tell you where we've been. Over three years we got about twenty serous inquiries into hosting. Those came down to right now four tribes are looking at it. There's the Mescalero Tribe in New Mexico, the Goshute Tribe in Utah, the Fort McDermitt Tribe in Oregon, and the Tonkawa Tribe in Oklahoma. Of those tribes, two of those tribes have approached the Negotiator's Office and said they want to negotiate for a site, identified sites on their reservation that they were willing to have considered. Those two tribes are the Mescaleros and the Goshutes.

DOE at our request did a quick review of those

sites to determine if there was any obvious reasons why they would not be technically acceptable and I got a report back within the last couple weeks that they found those sites to be technically acceptable based on very quick review. Again, the report wasn't in depth but the issue was is there any reason to consider the possibility that these might be acceptable sites, and the answer was yes.

The Act gives us the responsibility for seeking to find a state or tribe wanting to host a facility on their terms. So now that the discussion at the Negotiator's Office has failed, we throw that around and others throw that around fairly easily. But in terms of having four tribes involved right now and two tribes having written letters expressing desire to negotiate and having identified areas on the reservation.

We feel like maybe we've--maybe failure isn't quite fair, but again, I'm not saying that there's not issues associated with all four of those and there's not a lot of work to be done if we're going to go forward. The bottom line is failure.

Where we are right now. We have to respond to those requests to enter into negotiations and we've not done so yet. The previous negotiator was asked to leave on June 11th. He was a Bush appointee and we're--I think it was October 7th Richard Stallings was nominated by the President

for negotiator and we're anticipating his confirmation very shortly. He was reported out of committee as Lake said, and he's going before the floor of the Senate tomorrow and we're expecting--so we're very shortly expecting to have a negotiator. In the meantime, since Mr. Leroy left, Hazel O'Leary was assigned as the President's acting negotiator.

The issue of the Phase IIB--let me clarify something about that. First of all, it was in the Energy and Water Appropriations Act that was passed. I think it was passed and signed last week. The language started out with what people had suggested it saying and what passed was basically the administrative action of establishing Phase IIB grants was voided. You can no longer give money under Phase IIB grants. The idea of a condition went away. They took that language out. So it's not the--you can only give Phase IIB grants if the state and locals approve. You cannot give Phase IIB grants, period.

In his confirmation hearing, the nominee Richard Stallings, suggested that was a good idea. That he felt that the grants were too open-ended, first of all. Two point eight million dollars was the amount of money that was to be provided to a potential host. It was too open-ended and there was no opportunity for funding of state and local communities in that process. So his sense was that that Phase IIB process was essentially flawed. The idea of

voiding the Phase IIB process was something which he supported. And where we go from here, we'll find out if he gets confirmed tomorrow perhaps we're expecting, and I think getting down and discussing with DOE what our next steps are, where we're going to go.

The Senate had the authority--Congress had the authority to withdraw the legislative authority for financial assistance and they did not do that. DOE still has the authority to create financial assistance for participants in our program. What they did was they said that the administrative action of the Phase IIB grants specifically. The Congress didn't like it. Negotiator's Office didn't like it and it doesn't exist anymore.

Where we go from here. Mr. Stallings, if confirmed, he suggested that there's going to be a certain redefinition of the program. He suggested there's perhaps a two-tier approach. We're going to continue working diligently with the tribes that are participating in the program right now, but also open up and see if there's others who might be willing to be approached; states, communities for considering this as well. So a two-tiered approach under his administration is what is suggested.

There's a strong emphasis on having the program make sense, so issues such as were raised here about the need for an MRS are issues he's going to want to discuss, he's

going to want to address. Whether the program makes sense or not is going to be important. It's just going and finding a volunteer host doesn't make much sense if it doesn't work.

The last thing I'll say is--the next to the last thing, any specificity of the program is something that's very important. Bob Bernero suggested that you need to have the--once you have the specifications it's easy to do the thing. Well, I'm not sure it's easy to do the thing for us but we don't have the specifications either and I think that we are probably going to work at the front end of trying to get more specificity into the program, identifying exactly what it is we're trying to decide, exactly what we're prepared to offer to negotiate.

The last thing I'll say is the idea of inverting the approach, in the past, the idea has been that this is something that you should--that a potential host should determine for themselves whether it's safe or not, and then if they think it's safe, if they conclude that it's okay, then they ought to consider the benefits that they might be able to get from it. That's almost an apologetic approach. I think that inverting it, we may see more of an inversion which is, this is a solid economic development opportunity for a jurisdiction, and it's based on a proven technology that's safe. That's a whole different message than the other one. So we're looking for Mr. Stalling's tenure coming on

perhaps tomorrow. Next time I talk to you, maybe we'll have something more concrete to suggest.

Thank you.

DR. NORTH: Thank you very much, Mr. Mussler. Again, thank you for being on time.

Our last speaker before the break is Mr. Robert Holden, Director Nuclear Waste Projects for the National Congress of American Indians.

He will provide us with the perspective from Native Americans pertaining not only to the MRS negotiation, but also other tribal concerns as well.

Mr. Holden?

MR. HOLDEN: Thank you and good afternoon. I appreciate the opportunity, the invitation from the Nuclear Waste Technical Review Board to present some aspects of tribal government and Native American perspectives.

The NCAI, as you may be aware, has a program out, information dissemination a two-way street, through a cooperative agreement with the Department of Energy, Civilian--Radioactive Waste Management. In this program we disseminate information from the different components of OCRWM-- provide the tribes with this information, therefore they can take that information, deliberate and meet with their councils or governing bodies, their people, their districts, and make an informed response to some of the

activity within our--many tribal governments operate in somewhat of a dichotomy. These tribal governments were formed primarily in the mid--in the early 1930s, the Indian Reorganization Act, to deal with the federal government. Many of these governments came from their own way of life, from their own ways to govern themselves to make the decisions within the different components, but in order to facilitate impacts by federal actions, it was decided--by this federal government to set governments up with the constitutions with laws that would enable them to interact with the federal government. Of course, you have to understand that once these governments set up, these constitutions were set up, they had to be approved by the Bureau of Indian Affairs. And on top of that, many of the tribal chairpersons were appointed. That's not to say that it's good or bad, but in some instances it was both, but that's the way it happened.

But there's also the aspects of Native American technical experts. It's very difficult to try to find something to say to you, your backgrounds, your schooling, your education in your various fields came to much difficulty. But it's sort of the way you chose what you wanted to do in your life.

Some of our people don't have that opportunity or did not have that choice. That choice was made for them, and

these are the people that we call our medicine men or spiritual leaders. Our technical experts who interact with their surrounding community, whether it be relatives, plants, animals, water, the rocks, the air, the sky, whoever, there's a day and time in the old Indian world where there was much interaction between the relatives. It may be hard for you to fathom but it's something you have to be aware of. Something that you're taught--and that's something that we respect to this day.

An example is the man who had a recurring dream to have a Sundance all alone, to do a Sundance all along, a certain tribe in South Dakota. That's not typical. It's quite atypical to do that by yourself. And it's also difficulty in terms of physical--the physical demands to do something of this nature. However, this dream had haunted him for so many years that he decided that he would take that step and reenact this because it was--a dream that he was experiencing then he has to enact that. He thought by doing this, it would go away. So during the Sundance, which he prepared for a year in advance, his relatives came together and helped him prepare a place to do this. In much pain he danced for four days, fasting, singing, praying. Many clouds came to rise and you could say that there was a terrible storm on the horizon to be quite destructive, and in the ceremony in his dancing he lifted the pipe up towards those clouds that were coming and they split and they went around

and they crossed--caused much destruction in the surrounding areas on both sides when they went around this area and met and went on their way.

That's not without difficulty that someone does that and it's not with reprisals or some sort of action or reaction. For every action there is a reaction. We believe that also. This man, after that, was chosen to be more active, more of a spiritual leader. He got deeper and deeper into it. He could not walk away from it because that's what he had been selected to. He ran from it all his life. Now he's a healer. He has been a healer for many years. He's 80 years old and he still does ceremonies which modern medicine can't comprehend or understand or incorporate or reenact. But he's able to do that because he has this interaction with those things of nature.

However, we are forced to deal with modern technology with the technical aspects. I guess the point I'm making is that these review boards, these panels, the federal agencies need to enact, need to work not only with the tribal governments, but somewhat the communities, the districts, even if these are governments. Even if these are governments of the people and they operate as such where the individuals of the community nominate and vote in their representatives, and these representatives are chosen to make those decisions. There still needs to be some local community input in my

mind and the minds of the people out there. For instance, we're talking about the MRS.

The NCAI had a meeting in Nevada last spring and the local Department of Energy officials were wondering why we were holding this meeting when they told us that everything was going well when there was a very good tribal government--Yucca Mountain project officer relationship going. That was not the case we learned and that many of the tribal leaders, 20 of them approximately, made statements to the effect that they did not receive adequate communication, that they were not apprised of the activities and so forth and so on down the line. Even though Yucca Mountain had made attempts and had done cultural resource protective initiatives trying to bring cultural officials from the tribes to talk about tribal assessment tribal impacts, cultural impacts. But then again, these impacts may differ. I mean, the mitigation may differ in the minds of Indian people and the minds of some of the technologists, the people that work in this area. For instance, in one particular situation an assessment--some tests were to be done in a certain area which was a fault line which stretched for 20 miles, my understanding, but for reasons unknown those scientists did not want to move 200 yards or two miles from that site to make that assessment. Even though that fault line ran for 20 miles, they decided to dig in this place.

And even though it was known by archaeologists, anthropologists and tribal people as a significant site and the idea of mitigation, well, it was after we're through testing, after we dug this place up, we'll put everything back the way it was.

There are some people represented here that probably represent both sides of the MRS issue in terms of tribal governments. I noticed a man from Escalaro who has worked on this program for many years and Grace Thorpe, who probably represents a tribal grass-roots viewpoint from that. They might make a statement during the public participation aspect of this conference. I guess where NCAI comes down on this is these are tribal governments, as we said. They do represent their communities, their governments. They have that ability, and the language in the Appropriations Act suggests that relevant governments need to be included. Tribes are relevant governments. They have sovereign status. They have the decision to regulate environmental quality. They have the ability to regulate transportation activities within their borders. Many times they've not chosen to do that, but that does not lessen their ability to do that next week, next year or ten years from now. Just remember that they have that ability and they will probably exercise that once they become more apprised of the situation and their infrastructure is adapted to meet the needs of the future.

Affected can mean impact. Impacted can mean affected. Affected, though it is a statement that are legal terms in terms of the Nuclear Waste Policy Act, it is the same. The result is the same. Many tribes in the Nevada area and tribes and bands, the Shoshone and Paiute people do not have affected status. Under the Nuclear Waste Policy Act, though they have much closer cultural historical, as well as geographical nexus to the Yucca Mountain repository as many of the counties there do too--there are ten counties that are receiving several million dollars a year as the local affected unit of government--some of the tribes have approached the NCAI about working with them on changing this policy and having the federal agency, Department of Energy, working with them on affected status. And this will probably require a meeting with the Secretary of Interior in doing so. I guess that probably would call for more coordination across federal agencies. Someone brought up that sentence in a different context earlier. But we're also looking at correlation between the Environmental Protection Agency, Nuclear Regulatory Commission, Bureau of Indian Affairs and Indian Health Service due to these treaties which are still in effect. These tribes are obligated to have trust responsibility, obligations to the tribes and to see that their needs--that the health, welfare of the citizens in the Indian country are dealt with.

DR. NORTH: Mr. Holden, in fairness to other speakers and to keep this on time, I'm going to have to ask you to conclude.

MR. HOLDEN: Then I will conclude at this moment. To let you know that NCAI does not supplant input; we only supplement that. During territorial days, not too far from here, less than 100 miles, law cases of southeastern Oklahoma or sometimes settled in federal court in Paris, Texas, Federal Judge Bryant who presided over the court enjoyed fishing in Mountain Fork River in the Indian Nations. Judge Bryant spent time there where an English speaking Indian judge lived. They became well acquainted. Once the Indian judge was called as a witness in federal court, he asked for an interpreter. Judge Bryant knew the Indian could speak English so he instructed the bailiff to take the Indian to jail until he was willing to speak English. The next day the Indian judge testified in English. After the court was finished with him as a witness, he approached the bench and asked Judge Bryant if he planned to come to Mountain Fork River and fish. Judge Bryant answered affirmatively. Judge Bryant was then informed by the Indian judge that when he came to the Indian Nations he must speak Choctaw or go to jail. Judge Bryant never did return to those waters to fish.

Thank you.

DR. NORTH: Thank you. I'd like to thank all of the speakers. We're almost on time. We're going to take a break until 2:45 and then have the round-table. I'd like to ask the members of the Board who are not directly involved in chairing a panel to take a seat in the first row so we can fit everybody in.

(Whereupon, a recess was taken.)

DR. NORTH: We will now begin the round-table. Again, I'm Warner North and I'm going to be the moderator for this exercise. We are going to start out by inviting five participants of the round-table who have not previously spoken today to introduce themselves with up to five minutes of their comments on the issues before us. We will start off with Mr. Dean Tousley who is on the staff of the House Subcommittee on Energy and Mineral Resources, part of the Committee on Natural Resources chaired by Representative Richard Lehman.

Mr. Tousley.

MR. TOUSLEY: Thank you. I have to start out with a fairly obvious caveat and that is that although I work for the Congress, I can't speak for the Congress. I work for one of two committees on the House side that have jurisdiction over the high-level waste program. There are two others in the Senate side, and they don't always see eye-to-eye, needless to say.

On the specific issue that we're speaking of today, interim storage, our committee does not have an official position at this point as to what should happen with respect to that, so I can't say anything very definitive about that.

What I can say with complete conviction is that at least among the committees that do this on the House side of Congress, there's a great deal of appreciation and respect for the work that the Board is doing, and that was conveyed to the three of you who were present at our oversight hearing on July 1st. And I want to convey it to the rest of you. Congress has been very impressed with the work that you're doing and at least on the House side, and we sincerely hope that you'll continue along in that same vein.

Another thing I can say with some conviction, at least from the perspective of our committee is that we agree strongly with the positions that were expressed by the Review Board in its special report last March, and by the General Accounting Office, that there needs to be a comprehensive independent review of the waste program fairly soon. That was a major point that was discussed at the oversight hearing that our joint committees on the House side held July 1st. A few weeks after the hearing, the chairman of the two subcommittees that held that hearing, my boss Richard Lehman and Congressman Phil Sharp, sent a letter to DOE supporting the idea of an independent review and we haven't yet had a

response to that, but we continue to feel that that is an important part of this.

And the interim storage question has to be included in that. We're hearing sounds about a review of the repository program but the fact that we're having this meeting here today makes it pretty clear that the repository program is not the only thing that needs to be reviewed. As has been fairly abundantly stated by all the speakers today, we have and are going to have some decades interim storage of spent nuclear fuel. The question is whether it's all going to be at reactor sites or whether it's going to be mostly at reactor sites with some small portion also at a centralized monitored retrievable storage facility.

There are those in Congress who feel strongly on both sides of that issue. Needless to say, the fact that the linkage between opening a repository and between licensing a repository and using an MRS facility that is in the current Nuclear Waste Policy Act reflects that sort of ambivalence in Congress about it.

One of the main problems with centralized MRS that lead to the perceived need for that linkage and that led my committee two years ago to state a position opposed to centralized MRS development in its views and estimates on the proposed DOE FY '93 budget, is that it tends to divert attention from the ultimate problem of permanent disposal.

And in a very important sense a centralized MRS has a much bigger political disadvantage compared to reactor storage, and that is the fears we hear expressed that once waste, if we have a lot of interim facilities, the incentive to have the final solution will dissolve. And that is a much bigger problem with the centralized facility than it is with on-site storage for the simple reason that the reactor sites are represented by a whole lot more people in Congress than a centralized MRS is. And I think the possibility that Congress would let reactor sites become de facto permanent storage facilities is nonexistent. That's just not going to happen. Once you move it to a centralized place, that seems to be a more realistic fear. So that's sort of a political angle on the decision between a centralized and reactor site interim storage.

And with that, I'll conclude.

DR. NORTH: Thank you.

Dr. Barnard is the executive staff director, is acting as time keeper to enforce the five minute limit, and you were just in it.

Our second speaker will be Mr. Philip Niedzielski-Eichner, who's name is always a challenge for this moderator to pronounce. He's a consultant representing Nye County and he has experience with many other local government groups, including many that are home to DOE facilities. So to go

from the Congressional perspective to the local government perspective we go to Mr. Niedzielski-Eichner.

MR. NIEDZIELSKI-EICHNER: Doc, you get an A+ for the effort. I appreciate it. I'll leave my comments to just two. One, I'm going to speak from a Nye County perspective, which is jurisdiction for the Yucca Mountain site, and the second perspective is more broadly construed as related to local communities that have federal facilities within their jurisdiction and those communities that potentially have federal facilities in their jurisdiction.

The first comment is simply that from a Nye County perspective, interim storage is a helpful concept in that if it's done successfully, it will in our judgment relieve some pressure on this kind of institutional push toward making Yucca Mountain the repository, and this has been a constant concern of the county that the scientific evaluation of the site and the technical evaluation of the site will be subjugated to the political pressures of just having a solution to a problem, whether it be 1998 or 2010. So interim storage offers an opportunity take some pressure off.

Now, of course, those folks who might have an MRS or an interim storage site in their jurisdiction might wonder whether that's going to be the permanent site, but that is another issue from a Nye County perspective.

Switching gears then to a broader issue of how

hazardous waste stations are dealt with in this country, and what we see is that the experience that we are gaining with Yucca Mountain and the authorities that have invested, the state governments, tribal governments and the local governments and local communities, that the opportunity for meaningful involvement in the federal process of evaluating this site is very, very significant. And with my experience in working with DOE sites that are broader than Yucca Mountain, it's a model that at least I'm espousing to the communities that I help represent.

Basically you have statutory standing and you have the financial systems to have that statutory standing have some meaning to it. We find it very important that the local communities be able to know the technical issues as well as the socioeconomic issues associated with the site for a federal facility. And it takes technical expertise to be able to do that. It takes resources to secure that independent technical resource and expertise. And so whether it be interim storage, whether it be permanent storage, whether it be clean-up at any of the numerous sites across the country, there's a significant and key role that will have to be played by the state government has already been evidenced as regulators, by the tribal governments, by the local community and the local government. Local government working in conjunction with citizens.

Thank you.

DR. NORTH: Thank you very much. For our next point of view I would like to turn to the representative from NARUC, the National Association of Regulatory Utility Commissioners. I gather that Ms. Shishido-Topel was unable to be with us. We have instead Mr. Emmit George.

MR. GEORGE: For those of you who are familiar with Lynn Topel, obviously I'm not Ms. Topel. I'm a commissioner from the State of Iowa, utility regulator, and within NARUC I'm vice-chair of the Nuclear Issues, Nuclear Waste Subcommittee. I think for NARUC, if I can borrow from a cliche used in real estate, there are three important factors that drive this issue for us. The first is cost, the second is cost and the third is cost. And I think that we are pragmatists. While we have concern for public safety, equities and public acceptance of the issues, we are secondarily political in terms of decision-making.

In the recent past, while we look at nuclear energy or nuclear electric generation, it is one of several options available to utilities. And utility regulators are generally requiring that utilities weigh the options available to them and take the least cost option in terms of generation. Again, we get back to cost.

I think that cost is a factor I hear, and one that will become more of a factor as we are affected by the

unknown costs that are associated at the disposal of the spent fuel. One of the things that is required in making an analysis as a regulator, what is the least cost option, is to quantify in dollars the risks that are involved. Nuclear waste at this point is a risk.

I've heard several suggestions during the course of presentations today that I think are consistent with regulatory thoughts in terms of least cost or avoiding cost. The MPC is one of those things that I think most regulators would encourage, that the issue be pursued. However, the fact that we don't know what the cost will be or whether or not the MPC will be used in conjunction with a repository or with an MRS is a factor that translates into a cost that certainly we would urge utilities to take into account when making decisions in terms of closing facilities or not.

I think that while regulators attempt not to micro-manage and feel that what occurs with regard to the nuclear industry will be the result of decisions of utility executives and DOE, I believe that we're going to see in the future decisions made with regard to nuclear generating facilities which are actually made based on cost as compared to comparable cost in the future. I think we'll see that more often that we've recently seen them.

Thank you.

DR. NORTH: Thank you very much.

We'd now like to turn to three representatives from the nuclear utility industry, starting with a visitor from Canada, Dr. Mohan Rao from Ontario Hydro. He's in the Spent Fuel Management Department at Ontario Hydro where they have extensive facilities for spent fuel storage which the Board visited, I believe it was three years ago. He'll be on the technical agenda for tomorrow morning, so perhaps you can keep your remarks a little shorter than the five minutes, since you'll have some time tomorrow as well.

DR. RAO: At the outset I'd like to thank the Board and the audience here for giving us an opportunity to come over here, and more than that, to let us speak to this panel and also tomorrow's morning session.

I'd like to rather than--I'd like to sort of put context to it. In Canada we have two agencies, Ontario Hydro and AECL, Atomic Energy of Canada. Ontario Hydro, we call ourselves the storage and transportation people. Atomic Energy of Canada Limited, AECL, they are repository people. Now both these agencies, they are sort of agencies of the government. We are responsible to the provisional government and the AECL, the federal government in Ottowa as far as the national field waste management program is concerned. From Ontario Hydro's perspective, storage is a main activity of interest.

In terms of institutional involvement, I don't

think it's something that's appearing out of the blue. We have been involved in this institution and public aspects right from day one, and in fact, this whole area has directed in my view what we have been doing in the area of storage and transportation to a good extent.

For example, late 1978 also we had very involved public hearings program called Royal Commission on Electrical Power Planning at which time there was a lot of discussion on what to do with this nuclear fuel in Canada. And Ontario Hydro, being 95% owner of the fuel in Canada, we did a massive study which looked at on-site storage versus centralized storage. A decision was made in 1978, '79, that on-site storage policy is the best policy to go with and we stuck to it.

The decision was contingent on two things. If Canada decides to reprocess the fuel, then we are to look at it again. If we don't reprocess, by the year 2025 comes we have to look at it again because the stations are running out of space.

So with this on-site storage policy our transportation program became very simple. There isn't one. We store the fuel at the stations and our transportation is limited to very few research shipments for the sake of disposal.

As far as disposal is concerned, I'd like to add a

few words. AECL is the main actor in this area. The program was started 10-15 years ago. We are about to go into the first phase of hearings, what we call the concept hearings. In 1981, the government decided that we would not go into a site selection program until the concept is put before the public and the governments and the decision is made whether disposal is a way to go in terms of disposal in the Canadian shield.

There was a ruling in 1981 that we have to go to public hearings as soon as the concept phase is finished, and that's where we are at. Next year the Canadian program is going to go before what we call the EARP process, Environmental Assessment Review Process, which includes publics hearings and in preparation for that we have had what we call the scoping sessions. This is our first testing of the waters with the public. We had discussions in about ten cities. These involved all members of the public and I'm gratified to note that some of the issues that are coming up with the public involvement programs are very much what we have been hearing today from Dr. Starr and the different people here. The same issue is coming up again and again. I think that the challenge is to keep on realizing that it is an intergenerational program. It's not something that will go away tomorrow or next year.

DR. NORTH: Thank you.

Our next member of the round-table is Mr. Robert Rasmussen from Duke Power. Duke has installed a dry storage system, the NUHOM system. He is the chair of the Universal Container System Task Force for EEIU waste, and we welcome him again as he presented before our Board in January of this year.

Mr. Rasmussen.

MR. RASMUSSEN: Thank you. I appreciate the opportunity to be here again. Just wanted to say from a responsibility standpoint, the two things that I pretty much look after for Duke Power, number one, is interim spent fuel storage. Obviously we want to be able to keep our reactors operating so whenever there's a need to expand outside storage, I get involved in that and therefore become familiar with the technologies.

Secondly, in order to look after--I like to call it an investment in the DOE waste program, ours is to the tune of about $50 million per year. We do tend to spend a lot of time interacting with the Department of Energy in the various programs that are involved with transportation, interim storage and, of course, the repository efforts. So with that introduction, again, I just wanted to cover a couple quick points.

First of all, with respect to interim storage,

there's been a lot of discussion about the technologies that are available for interim storage; how safe, how easy, how simple. I just wanted to reiterate that that is something that Duke Power has done and is currently doing at our Onconee station. We've operated since the summer of 1990 without any difficulties whatsoever.

It's interesting to note that we do run quite a few tours through the Onconee plant and I'm amazed every time a group runs through that facility when they look at the dry storage operations at how impressed they are with the simplicity and the safety features associated with that facility. So I encourage anybody that has not seen such a facility to arrange a tour of the site. I understand Calvert Cliffs has a real good facility to go see. We're not discouraging tours of the Onconee site, we're just trying to pass them around a little bit.

But basically the message on the interim storage, it's really not a very high tech operation. It's something we've been doing for quite a few years and don't anticipate any problems in the near future. We encourage the future development of any new technologies and also encourage the work that DOE is doing to move forward with the MRS facility, again another example of interim storage.

With regard to the MPC, Duke Power and I think the

entire utility industry is very encourage by the work that DOE has been doing with the M&O in development of the MPC system. We think this represents both a technical and economical and political positive direction in the program and we would look forward to further development of this concept and eventual implementation provided no major snags are encountered as we continue to develop and study the concept. Again, we're very encouraged about the good quality work that's being done and also the good accelerated schedule that DOE is on in getting this work completed.

Finally, I did want to say a few words again about the MRS. I feel like we've heard all the discussions, pro and con, on whether there should or should not be an MRS facility. I think the issue here from a utility standpoint is that this is a facility that represents progress in the waste program, and I think that's something that both the industry and the Department of Energy need to see in the near term in order to ensure that this 2010 repository date that we're shooting for now is achieved. The repository as most people recognize represents the larger or the major component of the program. I think anything we can do to ensure that that schedule is maintained, that we don't run into any additional slippages in that schedule I think is beneficial in the long run, and I think the MRS represents a step in the right direction for making that happen.

Thank you.

DR. NORTH: Thank you.

Our last member of the round-table panel to be introduced is Mr. Jonathan Kapitz from Northern States Power Company, formerly a colleague of the individual who is now our Secretary of Energy I believe. He is the project manager on the Prairie Island plant's dry storage facility. I gather this is called ISFSI, Independent Spent Fuel Storage Installation.

And I believe you're going to tell us a bit about the utility industry's perception about interim storage with respect to the future of the nuclear option.

MR. KAPITZ: I guess I'd really like to address the issue of on-site interim storage mainly, since that's really the reason that we're here and were invited today.

In Minnesota the issue really has become will it ever leave the State of Minnesota, and that really comes down to an issue of federal credibility. Does the federal government have credibility? And it's not just the DOE. It really involves the whole federal government. The people ask that and they have a hard time coming up with reasons to find credibility and find trust in the federal government. They ask the question, what have we received for the three to four billion dollars we've spent on the program so far. About all we can physically show was about 200 feet of tunnel out in

Nevada for a few billion dollars. In Minnesota we built about 400 feet of concrete pad for interim storage for about $2.5 million. One thing that they were able to look at was the negotiated process which really seemed like a good idea instead of the ram-it-down-your-throat process. The federal government went out and tried to negotiate a process where they would find someone who'd voluntarily take a site, a hazardous site. And we got to the point where we have some governments that have got to the point where they're ready to really stand forward and say we'd like to seriously talk about this. Now the federal government has essentially pulled the feet out from under them and it's hard to understand how the federal government's going to have credibility with any government trying to negotiate a process like this anymore, much less--especially an Indian Native-American population. It seems just kind of the way that it's always been sometimes.

One of the attitudes we seem to hear sometimes is that, well, the federal government's responsible for the final disposal. Utilities are for the safe interim storage until that time comes, and if the utility is unable to site and construct a facility and keep their plant running due to lack of space, that that's not really the government's problem, that's our problem. That really is the whole crux of building these powerplants and we are only asking the

federal government to live up to their legal and contractual responsibilities with us just as we are expected to live up to all our legal and contractual responsibilities. And if they can do that, then all the issues associated with interim storage will be technical and not political. But right now, the real issue in Minnesota right now, a unit--two at Prairie Island shut down, which may be its last refueling if we don't get this sited. And if we can resolve these issues and the federal government can live up to their responsibilities, the issues will all be technical and they are really quite simple to resolve. If they can't resolve that, the issues will continue to be political and we'll continue to see plants being threatened by the inaction. And I guess that's where I'm at.

DR. NORTH: Thank you very much.

At this point I would like to invite our morning speakers to contribute their thoughts. I know Dr. Starr has to leave for a plane in about 45 minutes, perhaps sooner, and so I'll invite him to start with a three-minute limit.

DR. STARR: I'd be happy to answer questions but let me make a few comments first.

I think the very last comments clarify better perhaps than I presented them this morning the difference between a monitored retrievable storage and on-site storage.

I point out that technically they're very similar. But politically they're not, because politically monitored retrievable storage becomes the responsibility of the federal government and an on-site storage is the responsibility of the utilities. And if the federal government is going to establish some credibility in its implementation of its responsibility, the monitored retrievable storage represents that symbol. And that may be as important as the relatively finer issues of the economics of the storage or even of the risk elements for all the scenarios of things that might happen in the way of trucks running into plants and all the other hypothetical scenarios of induced risk. So I think that is a major point and is perhaps one of the best reasons for monitored retrievable storage at this present time.

I want to reiterate the fact that it's pretty clear from all the presentations that from a technical point of view this is the one thing that can move fairly rapidly with the least degree of uncertainty. As I mentioned this morning, the economics involved in that over the long-term are not the big issue.

My second major issue I think is not so much the location of the monitored retrievable storage, which is a subtle problem this may not be the best place to discuss, but the fact that when you have a facility of this sort, you really can do a proper job on answering all the technical

questions, the scientific questions you know about and can find out about in a permanent repository. And that I think is very important. And so, I would urge you give some serious thought to this special value of the monitored retrievable storage.

DR. NORTH: Let me call on Dr. Bernero and see if he has some comments to share with us.

DR. BERNERO: I'd just like to comment a little bit about the significant contrast in some of the dialogue we've heard today. I was very pleased to hear the first, to me, substantial system analysis that goes toward what is an MPC, what might an MPC do, what are the most rational ways to operate the program with respect to packaging for storage transport and ultimately for disposal. But I find it very interesting we heard a lot of discussion about whether or not it would make sense to include an MRS in that, and yet we just heard from the representative from Northern States Power where a facility is possibly going to shut down because there is not an MRS. It's not a matter of at reactor storage technology. It's program confidence. It's the federal program confidence level that's at stake here.

So I think the Board could well reflect on this and focus its comments on the two levels of consideration; the system analysis of the high-level waste program with respect to hardware, optimization of the process overall, but this

institutional thing that can drive you quite in an opposite direction.

DR. NORTH: Let me invite a response from Lake Barrett.

MR. BARRETT: Well, the big issue I think boils down to primarily institutional driven, a matter of willpower, and what does this generation wish to do with a very difficult institutional problem. And it boils down to, and I think Dean kind of mentioned it, if it's a lot of reactors and a lot of places, there's a drive toward Yucca Mountain or some particular place, that you'll hear on the other side from Nevada or Phil mentioned earlier, it becomes an irresistible force breathing on down and no one dare says that's not the right solution in spite of even what the technical aspects of them might be. And those are the things that you're going to go and it's six of one, half-dozen of the other, depending on where you happen to put it or stand on it or let someone political, democrat or republican, where you happen to stand on it as to what you're going to do with it. I think you have to follow process, due process. Some of the things that Mary Sinclair said was public citizen involvement. As Bill mentioned, whatever process, you got to do that. But the willpower to move on with it, whatever it is. It's not going like '82. There needs to be a dialogue and decide what it's going to be. And then as the executive branch will execute what to do. But right now we cannot when there is such a

lack of consensus, opposing view, and it's very easy for someone to stop something. It's not easy for someone to do something. Any jackass can knock a--build one unless there comes to be some consensus what are we building, a barn or a trench here? Then you have to go forward with it. Give the executive branch some direction and we'll do it. The nation's got to decide what it wants now.

DR. NORTH: Thank you.

Now, at this point I want to open it to all of you under the following ground rules. Whether you have a comment or a question for one or more of the other panelists at the round-table, keep it within two minutes. And one minute or less would be even better. If you have a follow-up question that you'd like to pose, that's all right, but hold that to one. No more than one follow-up question. And then and then once you've had your turn, sit back for a while a let other people have their turn. Now, you can indicate that you'd like to speak either by raising your hand or if your hand gets tired, put your card up vertically and I will try to keep track and call on people in the order in which they asked to be recognized.

So, who would like to start? Who among the panelists has a question or a comment?

Mr. Holden?

MR. HOLDEN: I met with some people from Prairie Island

last week and they were saying that, you know, they don't have a lot of confidence in NSP's ability to safely store spent fuel there. It seems that in the Dakota communities they must--Northern States Power has been and that in the early negotiations Northern States Power was going to provide jobs, they were going to provide many things of community infrastructure including as well as lowering utility rates. That came about, and in the mind of the Indian people, when Northern States Power decided to store their waste, the site was close to Redwing community and the community didn't like the idea and went to Northern States Power and Northern States Power pulled it back and said we'll put it somewhere else and then put it next to the reservation border there thought it was resolved.

What's your perspective on that please?

MR. KAPITZ: First of all, when we built the plant and the policies we made to the Indian community--some members of the community do work at Prairie Island. Some members of the community do work at the Prairie Island Plant. As far as providing them cheap electricity, they're not served by Northern States Power so we cannot by state law provide them with electricity. As far as where we put the site, when we first proposed the site on our property, the Department of Health was concerned that it was too close to some nearest residents. We did after negotiations through the

Environmental Quality Board agree to move it to a different site. That site meets all safety criteria and satisfied the Department of Health and they concluded that there would be no health risk to anyone. It is not necessarily really any closer to the Indian community than it was before. It is farther away from the nearest resident, who happens to live by it now. So we really did not move it closer to the Indian community when we did that.

MR. HOLDEN: I just understood some people there to say that there was a housing district as well as a day-care center adjacent to that area where it was being considered, so I--

MR. KAPITZ: The community center, the Indians have built a community center there. We really have essentially moved the site laterally along the boundary between the property line between NSP and the Indian reservation, so we really have not moved it any closer to the Indian community. We have moved it away from the nearest residents.

DR. NORTH: Thank you. I'd like to invoke the rule of just one follow-up question so that we can go on to other people. I'll also mention that we will not get to the members of the audience until I expect about 4:30. So first the panel will have their chance for the discussion. Then I'd like to ask all the panelists please speak clearly into the microphone to help in getting a clear transcript. Also,

it would be good if I don't mention your name, start off with your name so we have a clear record of who's speaking.

Next on my list is Ben Smith.

MR. SMITH: I'd like to address this to Lake Barrett. There's been a lot of discussion about the need for system studies and I think most of you know Tennessee has advocated system comparisons, life cycle cost comparisons for quite a number of years, and we've been active in that area, financed some of our own studies. When DOE removed the funding from our studies, we continued on with 100% state funds to look at some of those issues.

My question is for Lake. Only MPC concept--I know you want to do some system studies with that. Would you intend to do system studies that involve cases with and without an MRS and other sensitivity analyses? Take, for instance the transfer studies that you're doing, the cask transfer studies at reactors. It seems to me you'd need a system study assuming that you would have a positive result from that and then compare a positive result there with and without MRS. Do you plan to do such studies? And if you do, would you submit them for peer review by independent analysis?

MR. BARRETT: Yes, we would. We have done some of that--the TVA--years ago. Our folks have looked at those studies and, you know, continuing basically to advance that work.

And yes, those will be publicly available for folks to look at and peer review.

MR. SMITH: Just one follow up. Are you far enough along that you've done some MPC system studies with and without an MRS in the system?

MR. BARRETT: Yes, yes. We have.

MR. SMITH: So we'd like to see those.

DR. NORTH: Okay. I think we would too.

Mary Sinclair.

DR. SINCLAIR: I'd like to address the myth of the nuclear power being an answer to global warming. No nuclear powerplant can operate without the presence of the whole nuclear fuel cycle and from mining and milling, through transportation and especially through fuel enrichment, it takes a huge amount of fossil fuel, to the construction of plants, and then ultimately the envisioning that we have to exercise some care and energy literally forever for handling the wastes. The nuclear power option requires huge amounts of fossil fuel energy that contributes to global warming, and I know that there's a Department of Energy study on this, but I would like to ask, I know there are competent engineers that say because of these huge energy that goes into the operation of the cycle including the long-term waste option that has to be cared for, that there really is no net energy to nuclear power. And I was wondering if Dr. Chauncey Starr

would like to have the EPRI made an in-depth study of exactly how much energy it takes to operate the nuclear fuel cycle and to refer to the DOE study in the process of doing that.

DR. NORTH: Dr. Starr, would you care to respond?

DR. STARR: Yes. First let me make a comment. I don't run EPRI. I'm retired. Secondly. That issue was raised back in the--must be around 1975, 1976, was thoroughly investigated and turns out that less than about 10% of all the energy that goes into nuclear electricity is represented by the supporting facilities, construction, investment in the raw materials and so on. So your fact basis is not correct. And if you are interested, write me at EPRI in Palo Alto and I'll try to dig you up the ancient literature on this, but it was thoroughly investigated. It's just not true.

DR. SINCLAIR: Well, I'll send you the DOE study for starters and some other additional information that I have, and maybe we can take it up from there.

DR. NORTH: Thank you. Let me see. I believe Mr. Rasmussen was next.

MR. RASMUSSEN: Just wanted to follow-up on an earlier question again on the MPC and how it relates to the MRS program. It seems like this particular meeting is heavily weighted toward a good look into the MPC process and the program underway. So to get back to Ben's question earlier, the relationship between the MPC and the MRS, I think it's

important for the Board and even the audience and certainly the panel here to at least understand at this point whether or not the MPC makes sense under both the MRS and non-MRS scenarios. And I would invite either Ron or Lake or any of the other DOE folks to at least be able to respond today to that comparison. Again, the question is, does the MPC make sense economically based on the studies to date in a system where you either do or you do not have an MRS facility?

DR. NORTH: Ron?

MR. MILNER: Yeah. Bob, first of all, let me say that the system studies that we've done so far should be considered preliminary in nature but at least the results of those preliminary studies would indicate that the MPC does make sense whether or not you have an MRS in the system.

MR. RASMUSSEN: Appreciate that, Ron.

DR. NORTH: Let's see. Phil?

MR. NIEDZIELSKI-EICHNER: Thank you. I just wanted to get on the table something that was raised peripherally but I wanted to see if we can't address it directly. Are current federal sites under consideration for interim storage?

DR. BERNERO: If you're referring to the Admiral Watkins letter of December of last year, we're not doing anything with that. We're--for the voluntary process.

DR. NORTH: Bob Bernero?

DR. BERNERO: Some of the discussion of with or without

MRS prompts me to point out a regulatory consideration that we're looking at right now. I like to say that MRS with capital letters is the big one that DOE might own, and MRS typed in the lowercase letters is at reactor storage. And in the case of freestanding MRS at a reactor, something like Rancho Seco, we should look--and I would encourage the system analysts to look at it too--we should look at default or upset conditions if you have freestanding storage and you discover something wrong, you know; a leaky canister or something like that. What do you do? You don't have the spent fuel pool anymore to take the thing apart and fix it or put it in a new cask. It's something we're looking at in the consideration of licensing freestanding lowercase MRS's.

DR. NORTH: I will invite responses from Ron Milner and from the utility representatives present.

Ron?

MR. MILNER: You mentioned Rancho Seco, Bob. Certainly what they're looking at there is the potential if there is a problem with a canister, loading that in the transport cask for storage. Some of the things that we've looked at as far as the overall canister system is something like that. You could use perhaps a dry cask-to-cask transfer if it could be accomplished on site. If you had a problem with a canister, you could simply remove the fuel and place it in another one.

DR. NORTH: Ken Miller?

MR. MILLER: Thank you. Speaking for Rancho Seco, we did address that issue early on in our strategies I alluded to in my presentation a few minutes ago, but one of the major concerns that we do have exactly as Bob Bernero reiterated was when the spent fuel pool goes away, we have no place to go to mitigate an off normal condition. And so what we did in our strategy in our purchase with our vendor was to purchase two duel purpose casks whereby if we have a canister problem we can extract that canister and put it into the cask which will be licensed for Part 71 and 72, whereby two things could occur; the cask could serve as an isolation chamber under Part 72 for a period of time, or the faulty canister could be transported to another utility with an active spent fuel pool whereby it could be repaired. We have addressed those considerations and we do have a plan and a strategy.

DR. NORTH: Would any of the others from the utility industry care to comment on this issue?

Dr. Rao?

DR. RAO: I'm hearing a lot about the system studies. I'd like to put some of ours studies into context. They may call it apples and oranges, but nonetheless, I think it maybe worth listening to. Ten years ago we did probably what can be called a mini systems study. We looked at on-site storage followed by the centralized storage both wet and dry, very similar to what you call the MRS here, and followed by a

repository by the year 2025, and what we find--I don't want to go into the details of the study but what we found was in terms of cost--there isn't one heck of a lot of difference between the two options, going from on-site storage to a repository versus on-site storage to an MRS kind of situation then to a repository. That was our finding. And in fact, when you put a dry storage system as the central storage facility, you may even find an economic incentive to do that. Since then, we have been developing the dry storage container, what we call the DSC. To me it looks somewhat like your MPC here. I'll discuss more about it tomorrow. Our early studies with regard to systems analysis with the DSCs showed there would be a big saving in economics and, nonetheless, the way we are designing the DSC is we're going step by step. We're designing it for storage alone first, and it should show economics just in terms of storage. Then we're going to transportation, then we're going to disposal. Disposal is a big unknown but DSC will qualify for the disposal package. What we may have to do with that is the concept to qualify it for disposal. That's where we are.

DR. NORTH: Dean Tousley?

MR. TOUSLEY: I just have a technical question that Bob Bernero's point raised, and that is for all the options that Lake presented this morning that require removing spent bundles from a canister and putting them into another one, do

those transfers have to be done in water or can they be done in air?

DR. BERNERO: Technically they can--if it's old fuel, you can do it in air. You, of course, have to have shielding, you know, for the workers, but technically it can be done in air. And in fact, in a way, those canister transfers that you see with the NUHOMS design such as I showed with Aconi, you're actually transferring a whole bundle of spent fuel that is only partially shielded in its canister from one shield to another right out in the yard. And these spent fuel assemblies are cool enough that you can do that in there.

MR. TOUSLEY: All right. You're saying that it can be done in air. Would it generally be done in air? I mean, would that be the plan or is that not clear?

DR. BERNERO: Well, right now there is no system that we're looking at that actually takes the fuel assemblies loose and transfers them in air. With the exception of the Fort St. Vrain--

MR. TOUSLEY: Well, the duel purposes canisters would ultimately require that. Correct?

DR. BERNERO: Pardon?

MR. TOUSLEY: The duel purpose canisters would ultimately require that the--

DR. BERNERO: No, not necessarily. You could take the

whole canister. The whole canister is transferred in air, but there is no system other than the gas reactor, the one at Fort St. Vrain, where the fuel itself is handled exposed in air. It's always handled in a canister, sealed canister.

DR. NORTH: Bob Rasmussen, do you have contribution to this discussion?

MR. RASMUSSEN: Yeah. I just wanted to follow-up on Bob Bernero's question. I think one way to answer that question is to say that unless the utility industry or at least the individual utilities don't have some level of assurance that there is a way to move fuel off-site without the need to come back into a spent fuel pool, in general we are all going to keep our pools or at least one pool per site operational. I'm speaking I think for Duke Power as well as for utilities in general. Obviously some other people are being forced certainly in some of the shutdown reactor situations to go ahead and shut that pool down. But again, without some level of assurance which we believe the MPC system hopefully will give us, I think we're looking at some pretty substantial post-shutdown, spent fuel pool operational costs that we're looking at unless we have that assurance.

If I got the numbers right, I believe in the scenario where we begin spent fuel shipments in the year 1998, basically on schedule using a reasonable shipping rate, I believe the average facility looks at about seven to eight

years of post-shutdown operation. In other words, seven to eight years of having to keep a spent fuel pool open without any way to move the fuel back into that facility. If we wait until the year 2010, in other words, we skip the MRS facility without a way to move fuel off-site, you're looking at about eighteen years per spent fuel pool--I'm sorry--per facility for post-shutdown operations. So I think there's some good economic benefits to try to make sure that we've got a way to move that fuel off-site without the need to keep those spent fuel pools operational.

Thanks.

DR. NORTH: Lake, did you have a comment on this subject?

MR. BARRETT: Just back to Dean's thing. Question on the moving fuel in air. The concept we would do if the utilities have the crane capacities is only move canisters, so the fuel was inside a sealed canister. So fuel surface never comes in contact with air or the environment. There are designs and it's based on what the naval reactors people have been doing for forty years, is you have a transfer bell where you can move fuel assemblies out of a reactor on a boat and put it into a shipping cask or a canister. That's a transfer bell. This was done in the TMI unit two. That concept we would look at to allow to use a large cask for a utility that has a small crane. And that's part of the

corporate agreement we have with SMUD to do that. So that technology is there generally, unless you have a transfer bell or something, you don't have a fuel assembly, a bare fuel assembly in the air without filtration and shielding and such.

DR. NORTH: Thank you. Now let me call on Phil Niedzielski-Eichner.

MR. NIEDZIELSKI-EICHNER: Thank you. I want to slightly shift gears so if any of the other folks who have cards up wanted to address this specific topic, I wanted to give them the opportunity to do that.

DR. NORTH: Okay. Ken Miller?

MR. MILLER: Yeah. I just wanted to with the enlightenment of the audience and for those that are not aware, we have been working for some two years now with the Department of Energy to put together a demonstration program to do a dry transfer and the program has evolved. We've changed the course that it's been heading several times, but right now we're working towards a small cask transfer system that would allow a smaller cask to go into smaller spent fuel, bring it out, transfer it to a larger cask, and in addition to that, a dry large cask-to-cask transfer. And we'll be meeting in Washington with Jeff Williams and his people on Friday of this week to continue those negotiations and hopefully resolve some of the differences we have so we

can get on with this program as soon as possible, because I think it's a benefit and something the nation needs for the MRS.

Thank you.

DR. NORTH: Thank you.

Harald Ahagen, was your point on this discussion or a new one? Okay.

Ben Smith?

Okay. For new ones, Phil has first in line.

MR. NIEDZIELSKI-EICHNER: Thanks. I wanted to take advantage of the opportunity to have Ms. Sinclair sitting next to Bob Bernero, Dr. Bernero, and have some interaction on the assertions that came from Ms. Sinclair relative to the Michigan experience and see if, Bob, you have some feedback or some response to some of the assertions that were made today.

DR. BERNERO: Well, in a nutshell, I think the essential question is whether generic licensing by rule making is a legitimate way to proceed. There has been a lot of criticism of that in the Palisades case in particular, and it does go back to the very blunt fact that what the Congress requested in the legislation was a way to avoid site-by-site litigation of what is a general action, and a general license by rule making is what we had used there and that cask is the cask for the Palisades reactor, the Arkansas Nuclear 1-2 reactors,

and also for I believe it's Point Beach reactors in Wisconsin.

But the way it was done, it was not done by a site-specific licensing and the people in the locale feel frustrated because they don't have an opportunity for hearing. They have an opportunity to comment on a rule making but it's not the same, and that's the essential frustration.

MR. NIEDZIELSKI-EICHNER: One follow-up. In that context then, what's your sense of the appropriate alternative? Is there an alternative or do you feel good about the way in which that doubts come about, that approach?

DR. BERNERO: Well, you know, having done the safety and the environmental review for that cask and for a few other license facilities, we have in that regulation five different casks. This particular one was the fifth one added to the general license library, so that other casks could be used under general license just like the Palisades cask, and I think it's a reasonable way to do it.

MR. NIEDZIELSKI-EICHNER: The public acceptance though, do you feel that there's a different way that could have been handled?

DR. NORTH: Dr. Sinclair.

DR. SINCLAIR: Well, our position is we wouldn't expect that every aspect of that site and that cask would have to be

dealt with in a hearing, but there's certain things that were truly site-specific for Palisades and we felt that those should have been subject to a public hearing. And they include things like the emergency planning and, you know, interest in sabotage protection, which was very high about a year ago, and we saw nothing that we could comment on or do in that case. And so, it was a totally frustrating thing, for one thing. VSC casks are vented so that you have the metal container inside would actually be subject to damage quite easily if someone just threw a charge in through vent. And so, there are a lot of aspects like that. And when the NRC did the sabotage review, they actually used a metal cask which is pretty solid and cannot be damaged in the same way as a concrete cask that's vented. And so you have the metal cask that's much more vulnerable to that inside.

So, I mean, it wasn't that we thought every aspect of it had to be reviewed, but we did think--and we agree that many things could have been generic, but we thought there were certain site-specific things. For instance, placing it in a high risk erosion area in a shifting sand dunes area, it's a unique environment. I think naturalists have said there's only four places in the world that have that particular like mobile sand environment, and then there's no place to ship it. And they even said there's no--transportation is necessary. I'll say it was very

frustrating.

DR. NORTH: Would anyone else care to comment on this particular point?

Yes, Dean Tousley.

MR. TOUSLEY: This goes to the issue of whether we have new reactors in the future and the frustration that Mary and Bob are discussing now about this particular generic rule making will loom large in the new licensing regime for reactors but they're going to have pre-approved reactor designs by rule making. They're going to have sites approved 20 or 30 years before somebody might propose to build a plant there, and when the rubber hits the concrete on actually building a plant, the citizens are going to be faced with a situation where everything was decided a generation ago. It's going to be quite something.

DR. NORTH: Any other comments or questions on this issue?

Let me go back to my list then, and invite Ben Smith to make the next comment or question.

MR. SMITH: I'll switch gears again and get back to MRS because I feel so strongly that if we could ever resolve the issue of whether an MRS should be in the system or not we could remove a lot of controversy from the debate, possibly save a tremendous amount of money, and simplify the system studies that need to be done on other elements.

It seems to me that MRS is caught in just an untenable catch-22. On the one hand, if you make it a large facility, unlinked to repository development, to me, it represents just the most serious kind of threat to eventual progress in developing a repository, and it does not to me indicate a real break-through or demonstration of progress. To me it indicates a lack of commitment to follow through on a serious question of intergenerational equity of where we're going to place this problem. Are we going to deal with it or pass it on to our children?

So if you make it large and unlink it, you have those problems. If you try to solve those problems by providing a linkage to the repository or by limiting the size of the facility, the linkage to the repository makes it not cost effective, benefit cost ratio does not pan out. And the other problem is, if you make it small enough, only a very small number of utilities are going to actually use it, and you're proposing to fund it out of the nuclear waste fund. There's a serious inequity in this and I would like to see someone propose how to get MRS out of the catch-22 that seems hopeless to me.

DR. NORTH: Would anyone like to rise to this challenge?

Okay, Dr. Starr?

DR. STARR: I think the catch-22 is more forensic than it is a real issue. You've diagnosed a situation which

doesn't exist. The situation that exists is that we have a massive effort on a permanent repository and the MRS is being brought in to amend the system. And the question is whether--this is a question you asked before. Whether bringing the MRS does improve the total system performance or not. I haven't heard anybody raise the issue and I don't know of anybody in the industry that's raised the issue of not having a permanent repository.

The question of the MRS is whether it is an effective add to what already exists, an effort nationally to get a permanent repository and the factual situation of on-site storage. Does the MRS improve that situation or not? And you've heard this morning many of the factors that have to be considered, and I think you asked before and I agree with you; there ought to be some good system analysis on this to see what happens.

But one mustn't overlook the point which I made before. That there are some intangibles involved. One of the intangibles is the credibility of the federal government, not only now but for future generations as well. The government is notoriously fickle when it comes to intergenerational activities, and I think some demonstration of some consistency would be a great benefit.

I think you're straining at the wrong issue. I think the real issue is the one you brought up before.

MR. SMITH: I'm sorry. I just really didn't detect an answer to my catch-22 there. I didn't hear an answer to the equity question either intergenerational or for the small number of users that would have an opportunity to store waste at a limited MRS site.

DR. STARR: Well, the size of the MRS is something that has to be determined by system analysis, so I don't know of how small it's going to be. And again, the intergenerational part is supposed to come out of the total system analysis, the permanent repository is supposed to take care of the intergenerational responsibility. I think you raised the right details. I don't think that the answer's going to come out of picking any one of them alone.

DR. NORTH: There are four cards up. Who would like to participate next on this point?

DR. SINCLAIR: Well, I'd like to address what was just discussed. I think the Congress limited how much you could put in an MRS because the fear arose that if you have an MRS, then you would not go on for a repository. And so, that's the limiting factor. It's not how much waste you have out there to go into an MRS, and I think that's what you mean by a catch-22.

DR. NORTH: I apologize. I didn't see your card behind the water pitcher.

Let's see. Others?

Dr. Price.

DR. PRICE: Yes. I think my card has been up since about ten minutes into the discussion. We passed it down a little ways.

DR. NORTH: So I can see it. Sorry.

DR. PRICE: I didn't want to interrupt those questions on systems analysis anyways, but I want to raise a different question, and that is, are the institutional issues that we've been addressing this afternoon and then the others that we did not address, are they really intractable? Are they tractable? Because one person suggested that if we would find consensus on waste disposal, we must first address the question about waste generation, and I think some people here would find that implication intractable.

People who are running for political office certainly cannot come down very easily in favor of a siting of a facility, and there may be other illustrations. So if institutional consensus is so greatly important, is this intractable?

DR. NORTH: Would anyone like to rise to that challenge?

William Magavern.

MR. MAGAVERN: I think that the institutional problems are really very polarized right now and may well be intractable. I think that's entirely possible. I think we need to find out. I don't think we're at the point now where

we should give up, but I think that we need to really take it to another level and that's why many of us have called for an independent review. I know the Technical Review Board has called for a review of the high-level waste program and Chairman Sharp and Chairman Lehman have done the same thing. We think it should be broader and should go into all radioactive waste. And I don't want to sound like I'm putting all the blame here on DOE, because I want to recognize that DOE is carrying out the mandates of Congress, which has made incredibly cowardly decisions that have been driven not by science but by politics and have been done in the way that most recently last year an 11th hour, back room, dirty deal that was done in conference, and then it leaves DOE and NRC to deal with it.

Now, ultimately if we're going to have change here, it's going to have to come through Congress, but it shouldn't start with legislation. We have important people in Congress like Chairman Sharp and Chairman Lehman who are calling for at least some kind of review, and I would like to see the executive branch, starting with the President and the Vice-President, take this issue and commission a group of experts to look into it. And I'm not talking about another technical review or just review of the finances, but of the whole problem to see if we can arrive at some consensus on these institutional issues.

And just to briefly give two examples of where dealing with the waste generation has led to a resolution on what you do with the waste storage, I thought Mr. Miller's presentation was very interesting. In Sacramento, where you had the only situation ever in this country where a nuclear powerplant was shut down by a popular vote, they had very little opposition to their waste storage plant. So there's that much antinuclear activism, but once they shut it down, they can turn it into a golf course and start building solar facilities which is something I think a lot of utilities here would love to have. And the situation is similar in a couple European countries. Sweden, which has already decided to phase out its plants, and in Germany right now, they're seeking an energy consensus which would involve shifting their waste plant from reprocessing to direct disposal and reaching a consensus on how long the current plants would go on operating and whether or not they would ever build new ones.

DR. NORTH: Bob Mussler?

MR. MUSSLER: I think that we've gotten evidence that it's not intractable. I think the message to us has been it's a challenge of communication. And the evidence we have is when--one of the things is done is citizens are sent to the existing dry storage facilities at County and Surry just to look at it, Calvert Cliffs. Skeptics, antis go and

generally the response is positive. So, the bottom line is that the technology appears to be comprehensible by the average person, if the average person can get the information about it. So as I say, the challenge we see probably is one of communication and being able to get people to understand what it is we're dealing with. And it's intractable if we're unable to adequately meet that challenge, but it's not intractable by the very nature of the thing.

DR. NORTH: Jonathan Kapitz.

MR. KAPITZ: A follow-up comment to the question about inequity of an MRS.

DR. NORTH: Why don't you go ahead.

MR. KAPITZ: Okay. The perception that if you don't actually use--your utility doesn't actually use an MRS you don't benefit from it, I think if you look at the whole scheme of things and the decommission of a plant and that utilities cost be driven on decommission by wanting to get that last fuel assembly out, if an MRS can help the DOE get a jump on starting to accept fuel and start that process that much earlier such that they can get people's fuel out that much earlier, if it gets a ten year jump on accepting fuel while we're working on a repository, just because your fuel somewhat didn't go to the MRS, if your fuel somewhat does get out that much earlier because we had that in the system, then you do benefit from it. It's not just a matter if my fuel

somewhat gets there I benefit from it, and if mine didn't I don't benefit from it. I think if it helps the DOE meet their commitment, start meeting their commitments earlier and finish their commitments earlier, everyone does benefit from that.

DR. NORTH: Ben Smith, would you like to follow that?

MR. SMITH: Well, that view is somewhat subjective and I wasn't intending to follow that. I wanted to talk about this intractable situation. I don't think it's intractable at all. As a matter of fact, I've developed more optimism about the National Spent Fuel program that I've had in years. After I read the DOE report of the Task Force on Alternative Program Strategy, I really had a lot more hope for the program. They were proposing a step-wise development of the repository which I think tends to take away some of the intense pressure the State of Nevada has felt for a crash program to develop the repository. The MPC process allows finally a rationalization and a standardization of what could be done at reactor storage. To me, these two key issues are the ones that have sort of hamstrung the program. The only wild card that you throw in to confuse the whole national program is an MRS, and I think it creates just a tremendous controversy on all sides as to what the intention of the whole program is. And if you take that wild card out, then I think the MPC and the step-wise development of the repository

really offer real hope for the program.

DR. NORTH: Harald, you've been very patiently waiting.

DR. AHAGEN: I've been following this program since I think '79 and I still have not understood what is the U.S. concept, and I divide it up in two parts. What is the technical concept and what is the institutional concept? If I was representing a state that would see the benefits that Robert Mussler put forward here, I would ask it's the negotiator--I mean that process as far as I can tell being questioned. Is DOE for real? Is NRC regulations for real? They're being reviewed by the National Academy of Science. Is this MPC concept here to stay, or will it go away tomorrow? And having said that, if I was a state and I go in there and I know that there will be all these discussions about what the concept is, both institutionally and technically, I don't think I would take that risk.

And then I would like to respond to the Swedish phase-out. It's not that simple. We have a decision in parliament that we're going to phase-out reactors by 2010, but as all laws, that can be changed fairly rapidly. Actually more than 80% of the Swedish population does not believe that we will phase-out our reactors. I don't think that's why we are successful in siting our facilities. I think it's because of the concept we have, a technical concept, that is fairly transparent and has stayed so for

many, many years. And we have an institutional concept. We have an organization that has been very stable for many years. So I think our municipalities walk in and I think they trust, if they start in negotiation, that institutional framework is there to stay.

MR. MAGAVERN: Well, I think you're probably ahead of us.

DR. NORTH: Okay. Phil?

MR. NIEDZIELSKI-EICHNER: I wanted to respond to a couple of points that were made, one by Bob Mussler and one by Ben.

Bob's point about his optimism relevant to the improvements in communication can help remove some of the intractablness of the challenge here I think is part of the answer, but only part of it. I really do feel that a significant part of this is also one of control. We have to recognize that we're dealing with a great deal of mistrust here and the way in which mistrust can be dealt with is to bring down to the lowest level possible some type of control so the local citizenry and/or the state can exercise some meaningful controls such that if they feel health and safety is jeopardized in some form or another, that they have some recourse. And I just think that's in the cards for the future for this issue as well as for other hazardous waste issues. Local controls are a factor and if local control

cannot be exercised, I think it is going to be intractable.

A second point, you know, Ben, the alternative strategies, you know, it's interesting and we feel a lot of effort went into it and we commend the effort to some extent, but let's don't fool ourselves. A small step approach is no less of a problem for Nevada and Nye County in the sense of this institutional control than a big step. If the issue is one of is the site going to be technically sound, is it going to be scientifically considered, or are there political interests going to overwhelm those? And if you have one foot in the door, so to speak, at least our perspective is, then you have--it's the camel with the nose under the tent kind of thing. So I think we have to be realistic that even the alternative strategies, as much thought that was given to that, opens the door for this institutional momentum to be perhaps even greater.

And the second thing related to this is we have no contingencies. So even if there was a small step taken at Yucca Mountain and Yucca Mountain was again found unsuitable, there are no national contingencies and we feel that has a significant bearing on this institutional momentum as well.

DR. NORTH: Thank you.

Any response to that? Ben Smith? Yes.

MR. SMITH: I appreciate your observations on the Task Force report and that gives me another perspective on it. It

does seem that there would be somewhat less pressure to prove a production schedule and go into full disposal in 2010 if you had a step-wise approach where you were continually doing research and proving that you needed to go to the next step. I certainly agree with you that there needs to be a contingency planning process that kicks into place at the very moment that Yucca Mountain might be considered to be unsuitable for a repository and we don't have that. That's a big missing element in the national program.

The other observation I'd like to make is when you turn repository development at Yucca Mountain into a step-wise process, more of a research and development process rather than a purely development process, what gets cut first in hard economic times is research projects. If you have a big MRS sitting out there ready to receive waste, and the Yucca Mountain project is essentially a research project, guess what's going to get cut and guess where the waste is going to be? That's the big fear in the program.

DR. NORTH: Any response on that particular point?

MR. NIEDZIELSKI-EICHNER: If I could just follow up on that. Well, I tell you what; I'll hold off.

DR. NORTH: Any other comments on this particular point?

MR. KAPITZ: I guess if the concern is loss of money and loss of funding that the research might be cut, that might be another good case for what people talked about, about getting

the funds off budget and--pressures that might cause things to be cut that shouldn't be cut.

DR. NORTH: Mr. Holden?

MR. HOLDEN: Robert Holden. It's not budgetary issues. It's also I guess the faith of some tribal governments. You said previously tribal governments do have that ability to do whatever they want, whether it's put together a tribal convenience store, a bingo parlor and MRS project. That comes under sovereignty, attributes of sovereignty--as long as we hope they inform their citizens and to make that internal decision as the MRS process is--it was a long way from a done deal. Remember, a lot of it was internal. But I guess what I've been approached was if the people are brought up to a certain point, does it appear that Congress will force them to take it after they've done all of this negotiation and they decide they do not want it even though they've put it aside and so forth, and so far down the process they can't stop, my response was I don't think that that's the case, but what we're hearing from some tribal leaders in other parts of the country is that there might not be so much on the front end as it is at the back end after 40 years. That tribal government, if it's a host, might be forced to accept that repository or accept that MRS as a true repository, because it wouldn't be the first time a treaty's been broken.

DR. NORTH: Any others on this particular point?

Dr. Sinclair?

DR. SINCLAIR: Not at this time.

DR. NORTH: Or another point?

DR. SINCLAIR: I have another point.

DR. NORTH: Okay. Dr. Rao has been waiting patiently.

DR. RAO: I'd like to add a little bit different perspective.

DR. NORTH: Could you speak a little louder? A little closer to the mike.

DR. RAO: In Canada we have what we call the Atomic Energy Control Board, AECB, which is the counterpart of the NRC here. And one of the documents they put out which is crucial to this whole program is called R-104. And the point that I'd like to sort of mention out of that is the document does not put emphasis on the--disposal. They recognize that disposal is a long-term solution, is needed, but they almost say taking the social and economic factors into account, if you can institutionally manage your spent fuel, you could do so for at least a few hundred years. And this--R-104 has been to my opinion grading the Canadian program in a way where none of the agencies, the AECL or Ontario Hydro talk about the urgency of disposal. We take this program to take its own shape. Some of the issues that need to be discussed are like what we discussed here, will be aired next year as

part of the public hearings. In fact, about nine issues, what we call broad issues all dealing with institutional aspects and the aspects of urgency, aspects of alternatives, all these will be part of the hearings and probably Canada will see what the public has to say, what the government has to say, what the different panels have to say, and additions--probably two years from now. How urgent is disposal? Should we go in for it right away or should we go in for contingency planning like what we call extended storage.

At one time the--it was supposed to go with the reprocessing option but unfortunately it was--not economically--fuel, natural uranium at 25% to 40% weight content sitting in Canada underneath. So the reprocessing is not in the cards at least for the foreseeable future to come. So given this thing, the Ontario Hydro has come up with a corporate plan which was done with a one year study by a special task force appointed by the president of the company. The corporate plan looks at 2025 as a disposal date but in no way is it carved in stone. It recognizes a number of decisions to be made because now we're in 2025 and Ontario Hydro, both Hydro and AECL will do what is needed for the right to--evolve as it goes along and in some way I find the Canadian program is less carved in stone than the American program. I hear you guys talking about 2010 and a squeeze between MRS and the repository. For some reason, we don't

have that kind of an urgency.

DR. NORTH: Yes. There's the perception which is expressed in our Board's special report about the U.S. program being scheduled driven, and it's nice to see an example across our northern border of one that is not.

Bob Mussler, I think you were next.

MR. MUSSLER: Yeah. The issue of the permanence of an MRS that becomes a--repository, if it's sized such that it solves a particular problem, 20%, maybe 30% of the fuel, if you still have 70%, 80% of the fuel out in reactors around the country, I have trouble seeing how those kind of numbers create a solution that then takes pressure off of the permanent repository and the momentum to develop a repository. What it would do would create--there's clearly an urgency we're looking at relative to interim storage. That's one of the issues associated with interim storage, is an urgency associated with the ability to continue to operate. That pressure, clearly if the only thing you have is a repository, there is--we're talking about schedule driven and pressures, if the MRS's purpose is to really in a large part address a particular problem that we have in the intermediate term, I just don't see how with those kind of numbers we no longer continue to working on an MRS.

It's come up many times and everybody says we have an MRS, how can it not be a permanent repository? Won't it

take pressure off? Just a question of numbers. And as I said, 20%, 30% may be--you're still going to have a lot of utilities with a lot of need to--a lot of interest in getting it moved.

DR. NORTH: Responses on this particular point by Ben Smith?

Bob Bernero?

DR. BERNERO: Just one. That you're working on the other side of my catch-22. If you got your small MRS and it's only 20% of the fuel, why is it being funded out of the Nuclear Waste Fund where all the utilities are paying into it as if they were going to use it equally? That's the unfairness part of the catch-22. You may limit it so it's not such a big threat to the repository, but then you got a totally unfair financing of the project.

MR. MUSSLER: Well, okay. Let me respond to that. The way I understand it working is that we have a waste acceptance schedule that is oldest fuel first based, okay? So that will create rights, and those rights will be marketable to allow for adjustments in the system vis-a-vis a utility that doesn't have a full pool, it's got a lot of room but has a right, and another utility who is getting filled up, is going to have to shut down and now can buy that right. So there is--it seems like--I don't know, it's a gut feel from me that there's an incredibly equitable situation if you

accept the Congressional intent of beginning to accept fuel in 1998. If you start with that, if you think that's a bad idea, that the United States shouldn't--that the federal government shouldn't have committed to beginning accepting fuel in 1998, then right, we have nothing to talk about. But that's the law. It's right there and we look at it. So if you look at that, then the question is now, what's a logical purpose of an MRS and what would be the most equitable approach to it. And this just seems--I don't know, maybe I'm missing something.

DR. NORTH: Of the four names I have down, Dean Tousley, Bob Rasmussen, Mary Sinclair, Bob Bernero, who would like to address the point that's up for discussion now? Or are they all new points?

Okay. Bob Rasmussen.

MR. RASMUSSEN: Yeah. Just to hit on that point real quick, I think Bob mentioned the real answer to that, and that is the fact that we have equity built into the system by virtue of the allocation process which is oldest fuel first. It's true that every utility is putting funds into the program and therefore every utility has an investment, is anxious for some response, but I think it's also fair to say that those utilities with the oldest fuel have put more money into the system and that's what really drives the equity situation. On the other hand, too, the trading rights, things of that nature will help level out those needs of

utilities that have--rather that have needs against those that don't really have a need, yet they have the allocations.

Also, I want to point out, too, that related to the size of the MRS and the capacity of the MRS, going back to the 1989 MRS review commission, I think the conclusion that that group made also was that the repository linkages and therefore the capacity of the MRS, both annually and in total capacity, needed to be increased in order for the facility to serve some usefulness for the industry. So I wanted to point that out as well again in relationship to these linkages that seem to hold back the usefulness of the MRS.

Also wanted to explain or mention that I was pleased to hear Lake Barrett this morning start to include the issue of societal impacts. That's something that I think we haven't heard much of in the past and that is the fact that if you include the reactor facilities, the utilities that are the ones that are paying into the fund, once you include those facilities into the total system costs of these decisions, you do conclude that there is a financial benefit to an MRS, and I think this pretty much gets into what John Kapitz referred to a little bit earlier, that there is a benefit no matter what the size. And I think the greater the size, the greater the benefit.

DR. NORTH: Okay. Let's see. On this specific point I have four still; Dr. Sinclair, Dean Tousley, Bob Bernero and

now William Magavern. Who among you would like to speak on the point we're discussing?

William Magavern then.

MR. MAGAVERN: Yeah. Just briefly. I am someone who does think that it's a bad idea for the federal government to accept waste in 1998 and I think that if that line drives decisions, then it's going to force a lot of mistakes that will become very costly to undo later on.

DR. NORTH: Nonetheless, I think responding to that direct point, there is a contract there or what is perceived to be a contract.

MR. MAGAVERN: I think it's unclear whether or not it's a contract.

DR. NORTH: Okay. We can add that as a point for others to address, but at this point let me go to Dean Tousley.

MR. TOUSLEY: As representative of the political branch, I didn't want this discussion to end without raising a fairly controversial political question. And I have to preface it by saying that I worked as an attorney for the Yakima Indian Nation for almost six years and for NCAI for two years in a high-level waste program, and I'm very supportive of tribal sovereignty. Our committee is very supportive of tribale sovereignty. We have jurisdiction over Indian issues as well as nuclear waste issues.

The question I have is, I don't think there's any

doubt the tribes have the sovereignty, both in Indian law, case law, and in the Nuclear Waste Policy Act to decide to do this, to host an MRS or, for that matter, a repository, without the consent of the state or the surrounding communities. Legally they clearly can do that.

The question I have is, is that a wise road to proceed down? It's sort of like the negotiating process was created to try to avoid the political problems of coercive siting. But when you have a volunteer that's relatively small surrounded by larger entities that are violently opposed, it's the same exact situation that Ben had in Tennessee in 1987. The City of Oak Ridge was firmly supportive of hosting an MRS facility and the State of Tennessee was just as firmly opposed. And I'm wondering if we're really achieving what we wanted to from the negotiated process by pursuing this with--I acknowledge also that it was Congress that made this decision.

DR. NORTH: Bob Mussler, you had a response on that?

MR. MUSSLER: Yeah, I guess I need to respond to that. The statute says that the negotiator is supposed to consult with the state and local communities to identify what their interests are and to include those interests in the agreement that is negotiated to the extent practical.

We've interpreted that as create an obligation not to do what you just suggested, which is over the objection,

over the--just to create a problem. We see that the legislators saw it as a--that's part of the solution, is to include the surrounding communities in the discussions for the negotiation and then ultimately their interest in the agreement. The negotiator's job is to present a reasonable agreement to Congress for their consideration and it's the negotiator's--it's his discretion as to whether he has a reasonable agreement or not to present. There's no mandate that he present whatever he comes up with; good, bad or terrible. So by exercising that discretion, I think that a responsible negotiator would approach the job from if he can't create a solution with the agreement and with the process, that's not what was intended and the Congress is not going to be very receptive to receiving such an agreement.

DR. NORTH: You have a follow-up?

MR. TOUSLEY: Does that mean that as a practical matter there will be a veto on the part of states and surrounding communities or--

MR. MUSSLER: No, that's a very important distinction. There are positions and there are interests, and the statute talks about interests. At a sophisticated level that's very important because it says that the agreement has to address the interests of the state and surrounding communities, not the positions. So, to the extent that the interests can be ferreted out, in other words, what are the interests that

support a position, what are the issues that are the cause of a position, the negotiator's challenge is to ferret those out. Find out what the interests are and to seek to address those in the agreement. That is much different than saying a veto would be essentially a position could effect the viability. No, it's not the position but it's the interests. And if genuine interest cannot be adequately addressed, what I'm suggesting is there's a possibility we cannot have a reasonable agreement. It's a different thing than saying positions control.

DR. NORTH: I think at this point we're going to cut off raising cards so we can let the audience participate starting at 4:30. So Mr. Holden, you're the last one.

Okay. Are you responding to this particular point? Okay. Go ahead.

MR. HOLDEN: Just in response, I have to give--credit because when he was talking to the tribal organizations and tribal governments, at one time he stated that a tribe was wanting to become host for an MRS, that if there was too much outcry from the surrounding jurisdictions that they probably wouldn't go through. I guess my question to him was, well, if that's the case, if a tribal--or state didn't like the idea, what's your response to that. And so he said, well, we'll think about that. So from that point on there's some dynamics that he thought about the jurisdiction and true

sovereignty of the tribes which has played itself out. But there are also some local dynamics in my mind and I'm not sure just to talk about the New Mexico incidence where the legislation arose from. Part of it may be that the New Mexico delegation thought that they had contributed enough to the facility but still none of the tribes in the region had been contacted in terms of impact, whether it was transportation or whether it was natural resource or anything for that matter. Also, some of the--litigation in Indian law has come from New Mexico. One of the most longstanding water rights cases was adjudicated along the Rio Grande so out of Mescalero came a significant win for Indians in terms of hunting and fishing rights.

DR. NORTH: Let me ask Dr. Sinclair to go next.

DR. SINCLAIR: Well, I wanted to bring a totally different concept before this group. We've just talked about Yucca Mountain as the ultimate repository, but sometime ago in connection with some studies I did at the University of Michigan, I had the opportunity to interview Walter J. McCarthy and some of you perhaps know him. At that time he was Chief Executive Officer of Detroit Edison and had a lot of experience with the construction and operation of the Fermi 2 plant. And he offered this all of his own accord. He said any idea that you can build, create a hole in the ground where you're going to put this waste, cover it up and

forget about it, is something that we should get rid of that concept because you can't do it. We have to have above ground monitored retrievable storage for high-level nuclear waste and we've got to watch it and it has to be something that we never let go of. We can't lose track of it. And I just thought, you know, we've kind of narrowed our thinking and maybe there are other things we ought to be thinking about.

DR. NORTH: Well, I interpreted Dr. Starr's remarks this morning as somewhat in the same line. I don't think he would have said never. He said a century. And I think he didn't talk about it necessarily being aboveground, that underground was a possibility as well. But certainly some broadening of the dialogue is I think supported by a great many people.

Let me go to Bob Bernero.

DR. BERNERO: I would just like to add a quick observation. For us to take the attitude that Walter McCarthy suggests of committing society to the indefinite custodial care is essentially what we are doing with hazardous waste. RCRA hazardous waste is at surface monitoring with really a 30 year time horizon, and it's perpetual custodial care. I think it's innovative and different for nuclear waste to look for no credit or consideration beyond a hundred years and looking for passive solutions.

DR. NORTH: Phil?

MR. NIEDZIELSKI-EICHNER: Real quick. I just wanted to note, following up on Dean's comment. Oak Ridge's support for the MRS was firm but it was conditional and the conditional part gets back to my earlier point. Their support was conditional upon some element of local control and oversight.

DR. NORTH: Okay. It is now 4:30 and we will have some comments and questions from the audience. I would ask that each of you stay in place because the questions or comments may be directed to you. I would ask that the members of the audience who wish to make a comment or ask a question state their name, their affiliation and keep their remarks to three minutes with no more than one follow-up question.

Yes, go ahead.

MS. THORPE: My name is Grace Thorpe and I'm a health commissioner for the Sac and Fox Tribe in Oklahoma, and I'm also the president of the National Environmental Coalition of Native-Americans.

First I'd like to make a short statement and then I want to ask a question. There are about 365 tribes in the United States today. We have four that are involved in the MRS process. That's roughly 1% of all the tribes, which means that 99% of them don't want to have anything to do with the nuclear waste issue. I think that if it was put to a

vote of the people, as it was in my particular case, my tribe, the Sac and Fox were the first to withdraw from the MRS process. Out of 75 votes, 70 of the people voted to withdraw. The five that voted for it were members of the Tribal Council. I think that you would find that would be a similar situation with the other tribes. I do not know why you have not taken this as a referendum to the tribes that are now in the MRS process. I think you're going to waste a tremendous amount of money if you go through all these individual studies and then you find that the people are going to vote it down. But of course, that relates to the question that Mr. Holden said, that if they go that far into the process, then will they be stuck with it regardless. I agree with the setting up a blue ribbon commission to study the entire process.

Now, I have a little question I think to the Office of the nuclear waste negotiator, but I'm not quite sure where the funds come from. But now that the Phase IIB grants in the monitored retrievable storage, or the MRS process, has been cut, effective October the 26th, what does the law say now about where you can go for funds if you wish to continue the MRS process with the Indian tribes that are involved?

DR. NORTH: Bob Mussler?

MR. MUSSLER: The Department of Energy had and still has the authority to provide financial assistance for

participants in the negotiated siting program. That authority was not affected by the Energy and Water Appropriations Act. I have to tell you that that was an option that was considered in terms of communications with the Hill and the staff, and it didn't happen. They got rid of Phase IIB and they left the legislative authority for financial assistance in tact.

Now, what does that mean? As I said, you know, a couple hours ago, we're anticipating having a negotiator confirmed perhaps as soon as tomorrow, and clearly one of the--and we just had the law that wiped IIB occur last week. So with the closeness of those two activities, I think that the answer is that one of the first things that he's going to have to address is what he wants to do and how he wants to communicate with the Department of Energy with respect to the situation where there is no established grant solicitation right now to cover participation on our program by mature interests. And as I said, that'll be perhaps the first thing he looks into hopefully tomorrow, if it gets confirmed tomorrow.

DR. NORTH: Thank you.

MR. MUSSLER: And one other comment I wanted to say was the fact that there are four tribes, the Nuclear Waste Policy Act amendments that established our office required us to respect tribes as separate entities. The fact that there are

only four, if there was only one we would still have the responsibility as a federal agency to respect their decision as a tribal government to participate in this program, and that's what we've done.

MS. THORPE: Why don't you ask for a referendum sooner? A referendum of the people.

MR. MUSSLER: Yeah. We could get into the involvement in terms of mandating how a particular Indian tribe conducts its internal affairs, but that's not our business whether they have elected representatives that we deal with and to mandate that they are required to do something to satisfy us relative to how they govern themselves is far, far beyond any scope of authority that we would even think of. We basically have to respect the fact they are tribal governments that are established and operating in a representative capacity.

MS. THORPE: Yes, they were established--

DR. NORTH: Thank you very much. You've used your time and your follow-up question.

Okay. Yes, go ahead. Please go to the mike and introduce yourself.

MR. STUART: My name is Ivan Stuart. I'm with the Nuclear Assurance Corporation in Atlanta. I have a request of the Board, and that is that I would like the Board to consider asking the DOE to do a specific evaluation on the subject of multi-purpose containers before the program goes

too much further. And the reason I ask this of the Board is that I have made the same request of DOE for several years now and I'm always told that this study will be done but somehow it never quite gets done.

The study is the following. I would like what I would like to call a zero-based budgeting evaluation of the transportable storage cask in the DOE program. By that I mean start from scratch where you look at the current STC which, if I might be so bold, I think Bob Bernero is telling me I finally found one that he might license. If you take that and you assume that that will be used in the program and you try to evaluate all of its benefits as well as its costs, because I think everyone feels that it is the most costly option. But if you evaluate all its benefits, then I think you will have done what I call a zero-based budgeting evaluation of that option.

Now, the reason I ask that again is that each time I ask DOE, they say it will be done but it doesn't quite get done. And as I listen to, for example, Lake Barrett this morning, he said they looked at the transportable storage casks and showed that it was the most costly option, but that's because he assume you're going to throw the cask away. And I would like to know why we have to throw it away. Perhaps it will be a good burial cask. Likewise, when someone says we must have burn up credit, I think the MPC

program might be in trouble with the NRC and therefore might not happen. Whereas, the transportable storage cask doesn't require burn up credit. So that's my request.

DR. NORTH: Who would like to respond to this? Lake or Ron, would you care to respond on behalf of DOE?

MR. MILNER: I think you start from the STC as the basis. It's an interesting characterization of zero-based budgeting, But presumably, if you're going to do a legitimate look-see at the numbers, the results would be the same whether you started with that as the zero base or multi-purpose canisters as the zero base, or bare spent fuel handling as the zero base. And I think those kinds of studies have been done.

In terms of throwing away the transportable storage cask, I think in essence we do do that unless you can dispose of it, in which case you certainly are writing the cost of that off versus the waste package.

DR. NORTH: Mr. Stuart, would you like a follow-up question?

MR. STUART: Perhaps a clarification. I'm obviously not being very clear in what I mean by zero-based. As I looked at the concept design report for the MRS, what I discovered there is that for the case of the transportable storage cask, it was still assumed, because that was the specification, that 80% of the fuel would arrive at the MRS in the truck

cask. And so, in my view, you didn't take all of the advantages of a transportable storage cask but you took all of the costs.

So what I'm saying is, if you take the transportable cask as it is now conceptualized or about to be licensed, and said I would like to know what it would do for me in the program, assuming it is perhaps burialable, assuming it is transportable and storable and can be transported at any time and so forth. Every time I see a study, it's always a study that says it's a little bit less than some other case but it never starts with the base and says what can I do with this particular product in the program, as for example, Mr. Barrett's case, where he said it's $4 billion more than another case. But that's because he assumed it would be thrown away.

That help to clear up what I mean by zero-based? I mean, start with the cask and say it's transportable, it's storable. And if it were burialable, what would it do to the program in terms of benefits and costs?

DR. NORTH: Please introduce yourself.

MS. SANDERS: I'm Jan Sanders. I'm with Peace Action, a grassroots peace group working over decades in connection with nuclear dismantlement.

Reading the letter that this Board is responsible for defense-created high-level waste, the concerns are

related to the disposal. As many of you know, Pantex, located in Texas, is where all the nuclear bombs were assembled. It is there where they are being disassembled. The plutonium pits that are taken out of the bombs are part of the assignment evidently that has belayed this Board, and I would just like to have some kind of general comment as to whether the location of an eight state aquifer is the best place to put these plutonium pits over an aquifer?

DR. NORTH: Would anyone care to respond to this?

MR. BARRETT: Yeah. I'll comment on that. The plutonium that you're referring to has not be declared under the acts as a high-level waste under the jurisdiction of this Board. That is under the jurisdiction of the Defense Nuclear Safety Board which is another board that actually is--I'm not sure who came first. I think you came first and they were patented after you. But that is the Board that assures the safety aspects of that.

There is I expect with the changed world in the last couple of years, the end of the Cold War and the national focus on nuclear proliferation and what is the world going to do with surplus fissile materials that you can make weapons out of is getting greater and greater emphasis and attention certainly by Secretary O'Leary personally. I expect that there will be some debates on this and it is possible that there may be greater connection at some point

down the road. But at this time, this Board has its--I believe has a--with the material that we've been talking about.

MS. SANDERS: I would just like to say some of the issues that have been raised are relevant in connection with public trust, the involvement of a democratic process, site-specific issues that are at stake, and, you know, on and on. I would like to put in a bid for one last point, and that is that there be serious consideration to the suggestion of new standards to classify radioactive materials that are more truthful, that are more scientifically defensible and that are easier to communicate honestly with the public.

DR. NORTH: Some years ago I was associated with a group within the National Academy of Sciences that developed a report entitled Improving Risk Communication. I still find myself going back to it for some discussion from many points of view about the difficulties and advisable ways to proceed in the process of building public trust. Certainly one important idea there is having clear language with which to communicate with the public. I'd also like to characterize, while the point was brought up, that the jurisdiction of this board is defined in terms of spent nuclear fuel and high-level nuclear waste from the defense program. Whether or not that includes plutonium from dismantled weapons at this point I don't think is something that's been clarified. But our

jurisdiction is one of technical oversight of the program and our statutory requirement is to produce at least two reports a year to the Secretary of Energy and to Congress, and to conduct ourselves in such a fashion so that much of our work is in public, as this panel meeting is. So we don't have jurisdiction in the usual sense of we manage, rather our role is defined something like the umpire or the referee. We get to make critical comments. We do not have responsibility for the management directly.

Yes, Bob Bernero.

MR. BERNERO: I'd just like to add as a matter of information, relative to the disposal of weapons material, plutonium in particular, there is a somewhat public process going on. In July, the Department of Energy published a study on possible alternatives for the utilization, whether by storage or a burning as fuel for such material, or disposal as waste. Ad the Congressional Office of Technology Assessment has just published another study that is now rather widely available on that same subject, and once again discussing whether such plutonium should be held in storage, should be declared as waste and safely disposed of, or whether it should be burned as reactor fuel.

DR. NORTH: Okay. Would you introduce yourself please?

MS. BRINK: My name is Betty Brink. I live in Forth Worth, at 7600 Anglon Drive. I'm a member of Citizens for

Fair Utility Regulation. I'm also a free-lance journalist. I would like to make a statement and ask a question.

I find it a little chilling to what I have heard today and I'm not sure that I want to cross you alls bridge. I think it's on-the-job training project. I find it a little disturbing that 40 years into this process you all don't have a clue as to what to do with this stuff safely. You don't know how to store it safely so that my grandchildren and my great grandchildren will not be exposed to it or will not be dealing with it.

I also would like to ask--and I don't know who to direct this question to--but I would like to know, are there any health physicists on this board? Are there any health physicists on this Board?

DR. NORTH: I'll respond to that question. The Board has been without a health physicist for several years, since our health physicist resigned. It is up to the White House to appoint a successor. We are still awaiting that successor.

MS. BRINK: I don't see how then we can make any real decisions about what we're going to do until we know the health risk that we're exposing ourselves to or our children to; whether it be transportation, whether it be temporary storage, interim storage, on-site storage, or long-term storage. I know that there have been studies in recent years

that are disturbing to me and even disturbing to the NRC, according to their brief history of the NRC. The Massachusetts Department of Health has found a 400% increase in leukemia downwind from the reactor. I understand that on Prairie Island on the reservation there is a dramatic increase in cancer. I don't know the figures. But I cannot believe that we're going forward with this kind of project without a health physicist on your board and without very detailed health studies of the population around the areas where you're going to move the stuff and along the transportation routes.

DR. NORTH: Thank you for your comments and your question to us. We do have a health physicist within the board staff and perhaps Dan Fehringer would like to expand on the comments that I'm going to make.

I was trained originally as a physicist and I've spent much of the last decade and a half working on health related problems with respect to toxic chemicals, and in particular, ten years on the EPA Science Advisory Board dealing with a range of issues on carcinogens and the environment. So I think I am somewhat of a surrogate for a health physicist, though I won't claim the credentials.

Now, Dr. Melvin Carter, who is our board member for health physics in the early years of the Board, within the last few months before he left us, circulated a number of

articles from the literature on the point that the commenter has raised concerning the potential relationships between leukemia and other forms of cancer and nuclear facilities. The best of my understanding of this literature--I read those articles carefully at the time they were circulated among the Board--is that there is essentially no scientific support at this time that nuclear facilities of any kind have induced an epidemic of cancer that we can observe in the human population. Now, there may be some important exceptions to this having to do with the radiation releases at facilities such as Hanford in the United States and of course the Chernobyl accident in the Soviet Union, and perhaps other utilities in the Soviet Union as well that have not been studied yet so intensively. But with respect to a well managed nuclear power plant or other nuclear facilities, I think there is still need for further investigations but not a presumption that there in fact has been a causal relationship above and beyond what might be predicted from, shall we say, noncompliance with the laws that we have in the U.S.

MS. BRINK: Can I have a follow-up?

DR. NORTH: Yes, you may.

MS. BRINK: Are you familiar with the Sellafield in England and the studies surrounding that plant as far as leukemia and children, and are you familiar with the

Massachusetts Department of Health study of the downwind affects of the--

DR. NORTH: The Board visited Sellafield last summer and we asked many of those questions. There certainly are perceptions there. I had a dialogue with a political leader from Ireland, across the Irish Sea, who noted to me that there were many people in Ireland who believe that Sellafield was responsible for health affects there. I would say that is not credible to me from what I understand about physics and transport of radionuclides. The details of whether in the early years of Sellafield there were radioisotopes concentrating in some of the shell fish in the local food supply, that's one where I'd think I'd want to study the literature more before responding. But in response to the questions posed by our board with regard to Sellafield's current operation, we've got a lot of assurance that they had indeed done careful studies.

Now, with respect to the studies done in Massachusetts that you referred to, no, I'm not familiar with those.

MR. KAPITZ: May I address the issue of the first--

DR. NORTH: Yes.

MR. KAPITZ: The Prairie Island community formally intervened in the environmental impact statement and the public utilities process in Minnesota, were represented by

one of the finest law firms in the country, and no time did they ever present any evidence that there was any increase in cancer due to that power plan being next to them.

DR. NORTH: Yes, go ahead. Introduce yourself please.

MR. EGBERT: My name's Lawrence Egbert and I'm a physician in Dallas. I'm with the Physicians for Social Responsibility which is a part of the International Physicians for the Prevention of Nuclear War.

We have as a national organization evaluated about 165 articles which have one way or another supported the--supported by the Department of Energy looking at health issues in amongst employees or amongst the neighbors of nuclear weapons--for the Department of Energy. We--basically in reviewing we had an expert panel looking at research methodology and the conclusion is that the Department of Energy sponsored research projects have been too short. They have--in other words, they're not picking up cancers because they stopped their research when the cancer wouldn't be expected to appear.

And secondly, they are using a population control which is not legitimate because they hire people who are healthier than the average person. It's called the healthy worker effect. So if you have a healthy bunch of people and compare it with the general population, you get an appearance of health which might be--furthermore, the Department of

Energy has systematically not used the same methodology for calculating exposure so that they will have one place--would be using one method, another place would be using another method so you cannot generalize. In other words, use larger numbers than your denomination.

In conclusion, there's a whole book on this subject which is called "Dead Reckoning". It was by Jack Geiger and David Rush. They conclude that basically in a--I will use my language. They don't use the exact words. That if the Department of Energy has done their research, it is probably going to show negative results. It's designed to show negative results. That's the purpose of a research and the publicity, to show negative results that it's healthy to work around the place--these places. And the reason for that is obvious, and that is the purpose of the Department of Energy, and this purpose of the Department of Energy, was to make weapons. And to make weapons, you do not want people constantly nervous about the process, so they tend to play down and cover up the hazards.

DR. NORTH: Anyone wish to respond to that?

MR. BARRETT: I'd say a comment. That in the last few years due to this criticism that the speaker had mentioned, that Department of Energy has financed to various states where the states do their own epidemiological work, I know the State of Colorado did around Rocky Flats, the--

reconstruction in the State of Washington is doing to get rid of the bias that the Department of Energy has slanted or exercised improper control over the contractor, so we gave it to the states to do that. As far as I know, the work that has been done has not detected that there's been a big issue here. But then again, that's a comment.

MR. SMITH: I'd like to comment--

DR. NORTH: Surely.

MR. SMITH: I'm one of the states that has picked up on the opportunity to do so independent health analysis of the releases from the Oak Ridge reservation. We spent about a year and a half doing a feasibility study to see if that was sufficient to go into a further phase, a more expensive phase to really get down to the determining the health effects that might have occurred on populations surrounding the plan. About two weeks ago we made a major programmatic decision that there was sufficient information that we had gathered through searching classified and unclassified sources to warrant going into a second phase of health studies surrounding the Oak Ridge reservation. So we think there's an awful lot that needs to be examined in this area and that the surface has hardly been scratched by studies that were done in the past by DOE.

MR. EGBERT: I might add--can I piggyback a statement on that? You also--Oak Ridge does have a research project that

came out after this book I was reporting which was published in the Journal of the American Medical Association, I think in June, which did show an effect and which was basically showing that there should be more research, and they're getting some positive results. They have used better controls and they also have made a longer period of time for their study. Thank you.

MR. NILES: Thank you. My name is Ken Niles. I'm with the State of Oregon, Department of Energy, and I didn't plan on speaking but had a few comments I wanted to make after hearing some of the discussions.

First, I'd like to encourage Mr. Mussler and Mr. Barrett that in this new process, that whatever comes out of the new work with Mr. Stallings in the voluntary process, first off, that it allows for a sooner involvement by affected entities and also that funding be provided. The State of Oregon requested very nominal funding several months ago for its oversight of activities by the Fort McDermitt Tribe on the Oregon border, and the reason we were given for denial of that funding was that the process was not set up to allow that. So I would like to see if we would request that however the new process shakes out, that there is a way in which affected entities can become involved sooner in these processes.

Secondly, I think Ben Smith's comment earlier, his

challenge earlier to talk about the catch-22 issue of MRS, the fact that basically silence greeted that challenge speaks volumes about the need to have a comprehensive examination of the overall plans and systems for dealing with nuclear waste in the country.

And third, just briefly, there's been a lot of talk this afternoon about trading rights, and I think it's important to stress that don't assume that you can trade these things like you can baseball cards. Don't underestimate the public opposition or the public's need to be involved on issues that deal with how soon spent fuel may leave a reactor site in their state, because I can guarantee you that if utilities trade these simply and just deal with it as a matter of cash, that that's going to generate a great deal of public opposition when the time comes to deal with those issues.

Thank you.

DR. NORTH: Thank you.

Steve Frishman.

MR. FRISHMAN: I can't resist, you know. First of all, I think it's very telling that it took our speaker from Sweden to make a very basic observation about this program, and that's that it's very apparently lacking in both technical and institutional concept. And I've spoken with you on that subject many times before. It's totally elusive

and I think Phil was trying to get to a question that he didn't ask directly, so I will ask it directly. And based on some developing information that makes the program maybe even more elusive. But I'd like to have both Lake Barrett and Bob Bernero maybe comment on the--whether technical and institutional concepts would stabilize or maybe become less stabilized were this new idea about interim storage, whatever you might call the technology, be pointed at Yucca Mountain or NTS, the latest idea in the evolving process of institutional and technological concept.

Do we destabilize the program or stabilize it, given all that you know about the problems involved in both the technical and institutional aspects of this program?

MR. BARRETT: I'm not quite sure--if you're saying that somebody introduces a bill in Congress, something that sticks the pin a hundred miles north of Las Vegas and says that's the place to put the MRS, the whole shebang? Is that what you're referring to?

MR. FRISHMAN: The idea is very much out there and you're well aware of it just as I am, that the concept of just naming the Yucca Mountain area or NTS for some form of interim fuel storage is being discussed, it's being linked with the concept of MPC, and I'd just like to know your maybe previews of whether you think this would help the program in terms of its progress or whether it would create some new

types of institutional or technical problems.

MR. BARRETT: I guess my opinion is that if that were just thrown on the table and said this is what we're going to do without any national discussion and debate about it, it would probably be very destabilizing. I think if there's national debate and discussion like what went on here, and if it's decided that a place is needed, then it becomes a discussion about that in other places, that would probably not be destabilizing. But to try to spring it--somebody said in the middle of the night somewhere--that would probably be destabilizing.

DR. NORTH: Bob Bernero?

MR. BERNERO: Yeah. I agree with that. I have nothing to add to it.

MR. FRISHMAN: Well, I think one of the reasons I wanted you to respond, Bob, is that there is an interesting regulatory problem involved there in terms of a difference in standard for repository siting and interim storage siting. And it would be--maybe it would create some interesting regulatory problems because there is a difference in standard involved.

MR. BERNERO: Well, yes, there are differences because they're licensed under different regulations but there is no really substantive difference. This are arcane differences in the exact letter of the regulation. The substantive

issues of surface protection, that is given that you have high-level waste on the surface of the earth being handled for some purpose or stored, the degree of protection to the public expected or required by both regulations is the same. The focus of Part 60, the high-level waste regulation, is on disposal, not on the surface facility.

MR. FRISHMAN: Okay. Well, just as a final point, I'd suggest that you may consider it in terms of the difference in seismic standard applied to the two facilities. We'll talk more about this.

DR. NORTH: Ron Callen, and I think he'll be the last one because at this point we're beginning to run past our time.

MR. CALLEN: Thank you. I'm Ron Callen from the Michigan Public Service Commission, and I want to make a comment. Anybody who wants to can speak to it.

It seems to me there's an underlying presumption that I've been hearing today, and I'm not sure that we all understand that it's being made. It has the presumption of continuing financial support for all of the work that's going on. Let me point it out in three ways.

First of all, as you all know, reactors were designed a long time ago and the pools were designed to take care of essentially fuel going to reprocess. That's clearly not the case. The pools are integrally designed into the

systems themselves. What it means is, as I think it was Bob Rasmussen who was saying that in some cases we may see another 18 years of pool storage, what that is going to do is it's going to take the decommissioning of an individual reactor off optimal schedule, and that's going to add cost on to the decommission. Not to the disposal of the spent fuel. But because the reactor can't be decommissioned in an optimal way. And if you've seen the numbers recently for decommissioning costs, they've been rising. So the rate payer's going to pay three times. He's going to pay first for the mil per kilowatt hour supposedly. Second, for the storage expansion in the pool, and then thirdly will be asked to pay for the increased decommissioning costs.

The presumption I didn't hear made here is that the rate payer's money is going to be there for that third option at the time that it needs to be. Secondly, the same point. If you'll permit me a very broad generalization. I hear from the DOE presentations generally a lot of discussion about the future program, a lot less discussion about the past program; what went right and what went wrong. That kind of presumption suggests that DOE is presuming that the funds are going to flow for a long period of time, and what we did not get done last year we can make for.

Thirdly, as to the 1998 contract date, however that's read, I can assure you that every utility has its

public utility commission it has a binding contract with the Department of Energy and that what--in return for those one mil payments the utility is going to get its fuel taken starting in 1998. The presumption I'm getting at is, the one I heard today, was, well, maybe the act doesn't precisely say that and therefore the DOE may be "somewhat off the hook." But I can assure you there are a lot of public utility commissions that will tell you if we're not going towards the position of taking the spent fuel starting in 1998, then the funds don't need to flow.

DR. NORTH: Responses?

MR. BARRETT: Clearly, one of the things that Secretary O'Leary is driving at is to get the funds that the rate payers are paying into the waste fund to flow through to the system now that we can use them as we have access to Yucca Mountain and for worthy projects like the MPC. So we are working very much to do that. But that is not an easy issue in the days of deficit reduction, but it is fair and it is the right thing to do and we're trying to do exactly that. And I expect that will be a national debate item also in the very near future.

DR. NORTH: Dean Tousley?

MR. TOUSLEY: Congress passed the Nuclear Waste Policy Act at the very end of 1982. Exactly five years late it passed the Nuclear Waste Policy amendments. Almost exactly

five years after that it passed the Energy Policy Act with further changes to the nuclear waste program last year. I don't think anybody thinks that it's going to be five years before Congress acts again. This off-budget proposal is probably coming next year and it's going to happen, and the question is, what else happens with it? What other of the problems that we've discussed here about management and review and everything else gets addressed with that budget proposal when Congress takes up the issue?

DR. NORTH: Bob Mussler.

MR. MUSSLER: This is unrelated to that. Just want to make two quick points.

The first one was that there was a statement earlier that the Congress pulled the rug out from underneath the Indian tribes with the defunding of IIB. I want to correct that characterization. They did not do that. There were a number of provisions they were looking at. They would have done that explicitly. The defunding of IIB did not do that. It still creates an opportunity. What happens in the future we may look back and say the rug got pulled out, but that was not the action that Congress took in that.

The second point I want to make is I want to thank the Board for creating this forum. I didn't know it was going to turn into somewhat an MRS or no MRS type of debate, but this is very healthy. From the standpoint of our office,

there's not enough forums for the views regarding whether an MRS has a role or doesn't have a role. And, of course as you can imagine, that's a very important issue for our office. So I want to thank the Board for this opportunity to have aired these.

To the extent that the Board follows up with this issue and wants to pursue it further, our agency would be very supportive.

DR. NORTH: Thank you very much. On behalf of the Board I'd like to thank all of you on the round-table panel and all of the people in our audience who made comments or asked questions.

We're limited in our time, but I feel that the sort of discussion that we had this afternoon is exactly the kind of national dialogue that we need to have a great deal more of. There are a lot of important questions outstanding; there are a lot of different points of view. The issues are extremely complicated. I think there is a burden on those of us who have had more technical training and more exposure to some of these issues to share our knowledge with those who have not had that opportunity and who perhaps feel at some disadvantage because of their lack of access to the technical resources.

There is also the issue of what do we want, the objectives of the society. We have this nuclear waste there,

it's existing garbage and it won't go away. It has to be dealt with. We have to find alternatives and go through a process of choosing them. If we don't, the choice is made by default.

So I think there's a clear need to have a lot more discussion and debate on these issues, and yet the timeliness are coming up very rapidly in terms of what a lot of people perceive to be a contract with a 1998 date on it. So the issue of what to do in the interim on the spent nuclear fuel is becoming a very major issue for the nation, and the board is delighted with this opportunity to raise the issue and to have a discussion such as we have had with the group of people here.

So, on that note of thanks and appreciation, I'd like to close the meeting for today and invite you all to join us in the morning, tomorrow when we are starting at--I believe it's 8:30.

(Whereupon, at 5:15 p.m. the meeting was recessed to reconvene at 8:30 a.m. on November 2nd, 1993.)