DOE's HIGH-LEVEL RADIOACTIVE WASTE MANAGEMENT PROGRAM

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND POWER

OF THE

COMMITTEE ON ENERGY AND COMMERCE

AND THE

SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

OF THE

COMMITTEE ON NATURAL RESOURCES

HOUSE OF REPRESENTATIVES

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CONTENTS

	Page
Testimony of:	
Allen, Clarence R., member, Nuclear Waste Technical Review Board	13
Barrett, Lake H., Acting director, Office of Civilian Radioactive Waste Management, Department of Energy	53
Cantlon, John E., chairman, Nuclear Waste Technical Review Board	13
Price, Dennis L., member, Nuclear Waste Technical Review Board	13
Weigel, Dwayne, Assistant Director, Energy and Science Issues, Resources, Community and Economic Development Division, General Accounting Office	38
Wells, Jim, Associate Director, Energy and Science Issues, Resources, Community and Economic Development Division, General Accounting Office	38
Material submitted for the record by:	
Department of Energy: Letter dated September 13, 1993 to Hon. Richard Lehman, responding to subcommittee questions	89
Department of Health and Welfare, INEL Oversight Program: Letter dated June 24, 1993, from David L. Humphrey to Augustine A. Pitrolo, Manager, DOE, Idaho re corrosion and fuel storage problems at Chem Plant, submitted by Hon. Larry LaRocco	8
General Accounting Office: Responses to subcommittee questions	131
Nuclear Waste Technical Review Board:	
Report entitled, "NWTRB Special Report," submitted by John E. Cantlon, chairman, NWTRB	18
Responses to subcommittee questions, by letter dated August 26, 1993	122

DOE's HIGH-LEVEL RADIOACTIVE WASTE MANAGEMENT PROGRAM

THURSDAY, JULY 1, 1993

HOUSE OF REPRESENTATIVES, COMMITTEE ON ENERGY AND COMMERCE, SUBCOMMITTEE ON ENERGY AND POWER, AND COMMITTEE ON NATURAL RESOURCES, SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES,
Washington, DC.

The joint subcommittees met, pursuant to notice, at 10:05 a.m., in room 1324, Longworth House Office Building, Hon. Philip R. Sharp (chairman, Subcommittee on Energy and Power) and Hon. Richard H. Lehman (chairman, Subcommittee on Energy and Mineral Resources) presiding.

Mr. LEHMAN. The hearing will come to order. This morning, the Natural Resources Subcommittee on Energy and Mineral Resources and the Energy and Commerce Subcommittee on Energy and Power are meeting jointly for a hearing on Federal high-level radioactive waste. The Chairman of the Energy and Power Subcommittee, Mr. Sharp, is on his way here, but we will get started anyway, and I will acknowledge him for a statement when he arrives.

We both sit on each other's committees, so we have kind of a rare display of legislative efficiency in that regard. We can hold these hearings together instead of having two separate hearings on the same subject.

We intend to focus the hearing this morning on recent reports issued by two organizations with ongoing oversight responsibilities over the waste program: the Nuclear Waste Technical Review Board and the General Accounting Office. Both reports are fairly critical of the status and the direction of the program.

The Technical Review Board was created by the Nuclear Waste Policy Amendments Act of 1987 to address weaknesses in the Department of Energy's scientific program supporting waste management. Its sole function is to provide independent, scientific oversight and advice on the high-level waste program. Pursuant to statute, the board has issued six semiannual reports, and this past March issued a special report to Congress and the Secretary of Energy. The board is expected to submit the other report as its testimony today, and it will be made part of the record.

We are pleased to have among our witnesses today the chairman and two other members of that 11-member board.

The GAO has a continuing oversight function with respect to the high-level waste program, and has issued numerous reports on the subject during the past few years. In May, GAO issued a special report to the Senate Subcommittee on Clean Air and Nuclear Regu-

lation, entitled "Yucca Mountain Project Behind Schedule and Facing Major Scientific Uncertainties".

The GAO will be represented today by two witnesses from the Energy and Science Issues Office.

There are several comparable recommendations in the recent NWTRB and GAO reports. They both conclude that the program deadlines are having a negative impact on the scientific integrity of the program. They both complain that DOE is spending too much money on program infrastructure and issues other than repository development, such as monitored, retrievable storage and transportation systems. They both criticize the unwieldy management structure and planning process of the DOE program and they both recommend comprehensive, independent reviews of that program.

We will be particularly interested today in hearing about DOE's actions and plans for response to these critiques. The Secretary has already announced several initiatives in the waste program, including her intention to submit to some sort of outside review. Representing the Department today is the Acting Director of the Office of Civilian Radioactive Waste Management.

At this time, since Mr. Sharp is not here, I would like to recognize a person who has a great deal of interest in this subject, and give her an opportunity to make some opening remarks, the gentlelady from Nevada, Mrs. Vucanovich.

Mrs. VUCANOVICH. Thank you very much, Mr. Chairman, and I will thank Chairman Sharp when he gets here.

As you mentioned, this morning we are here to discuss the important issues raised by the reports of the Nuclear Waste Technical Review Board and the GAO. My long-held concerns about the wasted money and poor-mismanagement of the DOE program are well-known and have clearly been validated by these two reports.

As I said in June when Secretary O'Leary testified, the criticism raised by the GAO and the TRB are very, very disturbing.

I have called for an independent review of DOE's activities, having introduced legislation earlier this year, which would mandate such a review.

I was pleased to learn several days ago that Mrs. O'Leary has agreed to an outside review of the program, but I am disappointed that will focus only on the financial aspects. I am also concerned about the lack of detail released so far, which is to say, none. I am hopeful that Mr. Barrett will be able to shed some light on the status of that review this morning.

There are a couple of other issues that I am concerned about that I will look forward to discussing. First, I am disturbed about the recent decision by the President to appoint Mrs. O'Leary to carry out the duties of the Nuclear Waste Negotiator while serving simultaneously as Secretary. The Negotiator's office was created as an independent entity, separate from the DOE, but still within the executive branch, to locate an interim nuclear waste facility and a high-level waste repository.

The office was established in 1987 because the Congress and the public had lost faith in DOE's ability to identify potential sites in an evenhanded manner. While I have the highest regard for Mrs. O'Leary's personal integrity and professionalism, I am deeply trou-

bled about the commingling of the authority vested in the two offices. The President's action appears to permanently taint the independence of the Negotiator's office, and puts DOE in the position of negotiating with itself regarding potential grant awards, site locations, et cetera.

I am most anxious to hear from Mr. Barrett about how the mechanics of this dual responsibility will be carried out by DOE, particularly at the staff level, where some of the key decisions are made.

The second issue of concern that I will be discussing with the witnesses is the possible plan for the siting of an interim nuclear waste facility at the DOE site. This should be of interest to anyone who is aware of the well-documented, horrendous environmental condition of many of those facilities today. Location of an interim facility at any DOE facility should be viewed with deep skepticism.

Finally, Mr. Chairman, I notice in the DOE testimony that serious discussion within DOE continues regarding means to repay revenues from the Nuclear Waste Trust Fund to utilities, due to the expected delay of the 1998 date by which DOE is required to: "take title to the utilities spent fuel."

Delays by DOE have caused utilities to begin to expend unanticipated funds to build on-site storage. I have long advocated on-site storage as an interim solution to the waste disposal problems of this country and believe it should be encouraged. I am pleased to see that Mrs. O'Leary is examining this issue, and I will be looking forward to the testimony of the witnesses.

Thank you, Mr. Chairman.

Mr. LEHMAN. Thank you very much. At this time, I will recognize the Co-Chairman of this hearing, the Chairman of the Energy and Power Subcommittee, Mr. Sharp.

Mr. SHARP. Thank you very much, Mr. Chairman. I appreciate that and regret my lateness. There was a leadership meeting that lasted longer than usual this morning.

I just want to make a couple of comments, because I am very pleased that the Technical Review Board appears to be very seriously and very aggressively approaching examination of the scientific questions, because when, in 1987, those of us urged its establishment, we felt it had an extremely important role to play.

Most of us in the Congress do not feel technically competent to judge many of the conflicting claims that we get about the quality of the science in these various kinds of projects, and it is very important for us to be able to look to credible sources of examination; and that is why we established this as an independent board at a time when there were many accusations that the Department of Energy had an ax to grind and, therefore, could not be counted on for quality science.

The Department may have disagreed firmly with those views, but that was a political question at the time. Naturally, many people in the gentlewoman's State of Nevada have an intense and very serious interest in the question of this quality of the science, and some of them have challenged many decisions by the Department of Energy, as well as the Congress. Our goal was—and I think it is being met at this point—that we would have an independent panel who understood that their overwhelming function is to try to

as objectively as possible make decisions about the quality of the scientific work being done so that all of us have a place in turn to ask questions of individuals involved in the projects, as well as outside observers have a place to go to raise questions and to trigger examination of some of these questions.

So I want to applaud the work of the board and tell its members that we value your work, whether we are always listening or not—and you may sometimes wonder; but it is an extremely important function in an area that anyone who has dealt with the question of nuclear waste disposal knows is unbelievably emotionally charged in this country. And we have a long way to go before we make final decisions, about which—the gentlewoman probably is not disturbed that we have a long way to go before we make final decisions.

Our Nevadian colleagues clearly have a great deal at stake, but all of us have a stake in this board functioning well, so that we can, hopefully, base our ultimate decisions on the best scientific evidence.

Mr. Chairman, I just would add one comment. I hope the Congress and others will not rush too quickly to put everything off budget in the Nuclear Waste Fund. I haven't made a final decision in my own mind as to whether to do this. But we do have a supervisory responsibility over what is a very large investment, and it does give Congress the opportunity to have an input from time to time on that question.

And while I think the cost in this kind of a project is something we always ought to examine, the higher, more critical question is the ultimate safety and scientific questions that we have to respond to; and of course, that is the central role of this board.

Thank you very much, Mr. Chairman.

Mr. LEHMAN. Thank you, Mr. Chairman.

The gentleman from Illinois.

Mr. HASTERT. Well, I thank the chairman. I want to thank our good friend, Mr. Sharp, the chairman of my subcommittee, and you, Mr. Lehman, for holding this important hearing for serious oversight of DOE's civilian high-level nuclear waste program in the 103rd Congress.

My State of Illinois is a major stakeholder in the resolution of the high-level waste issue. On behalf of the ratepayers of my State, I am committed to working to find an environmentally sound solution to the management of spent fuel that ensures that public health and safety are protected.

Unfortunately, the resolution of the high-level waste issue has been characterized only in terms of, we pay and nothing happens. The civilian nuclear waste program has been and continues to be constrained by the lack of available funds, despite a $4 billion surplus in the Nuclear Waste Fund. Despite this surplus and the fact that the program is over 11 years, behind schedule, the DOE is unable to access this money.

I concur with the Nuclear Waste Technical Review Board in their recent report that the lack of funding could impede the progress of the program. One solution to this problem is to create a revolving fund that would permanently appropriate the receipts from the fund for use by the civilian waste program.

In my mind, the DOE has also failed to recognize potential cost savings from a more thorough integration of the storage, transportation and disposal elements of this program. Both the Isaacs report and the NWTRB report address this integration, and I think it is something that DOE should strongly consider.

Let me also address the issue of statutory deadlines DOE is required to meet in the development of the repository. While I believe the schedule is important, I recognize that the integrity of the program must be maintained.

It is important to remember that the technical and scientific oversight of the program is provided by many entities at the Federal level. In addition, ratepayer funds are appropriated from the Nuclear Waste Fund for the State of Nevada to conduct scientific and technical oversight. I only hope that those funds are being used for their stated purpose and not to terrorize residents in States such as Illinois with rhetoric ginned up by their antinuclear public relations campaign that I like to call the NIMBY Road Show.

As nuclear power plants in my State are running out of storage space for their spent fuel pools, it has become clear to me that Illinois has assumed responsibility for 12 nuclear spent-fuel repositories. Before we throw the DOE's statutory deadlines out the window, perhaps we should look carefully at changing the funding mechanism and developing a more fully integrated plan.

Lastly, there is the issue of imposing a moratorium on DOE's site characterization work at Yucca Mountain. I would concur with Secretary O'Leary's remarks, saying it was detrimental to the successful completion of the civilian radioactive waste management program.

Thank you, Mr. Chairman.

Mr. LEHMAN. Thank you very much.

The gentleman from Idaho.

Mr. LAROCCO. Thank you, Mr. Chairman. I appreciate the opportunity to make some opening remarks about the Department of Energy's high-level radioactive waste program, especially in light of some recent events in my State of Idaho on this very subject.

Mr. Chairman, on Monday of this week, U.S. Federal District Judge Harold Ryan placed a moratorium on future shipments of nuclear waste in the Idaho National Engineering Laboratory until the Energy Department performs a comprehensive environmental impact statement on spent nuclear fuel stored there. This ruling covers both commercial and naval reactor fuel.

I want to say for the record that I totally agree with Judge Ryan's decision. In fact, I think this ruling is so important to the subject of this hearing I want to take a minute to read from the Judge's decision:

> The Court notes that DOE's change of heart comes only after many months of vigorous litigation by DOE in this matter. The Court has been continually surprised and dismayed by DOE's reluctance to perform full NEPA analyses of the actions questioned by Idaho in this litigation. DOE's strenuous opposition and the tremendous effort and taxpayer expense associated with such opposition does not seem an appropriate course for an Agency charged with overseeing such important, yet hazardous activities. DOE simply does not seem to understand what this Nation is expecting it to protect the health and safety of all Americans from the dangers associated with its activities. At the very minimum, DOE should always be willing to consider thoroughly all of the potential impacts of its proposed actions.

In light of the fact that DOE now wishes to bring in spent fuel from civilian reactors and from foreign reactors, it appears that DOE is quietly attempting to make INEL the nuclear waste repository for the United States and the rest of the world.

Even if DOE were not technically required to perform this comprehensive site-wide EIS on nuclear waste activities at INEL, one would think that rather than going through all of the effort and taxpayer expense involved in litigating this case, DOE would simply go ahead and prepare the EIS out of a sense of concern for the people, the natural resources and the agricultural industry of the State of Idaho. Such callous disregard for the legitimate concerns raised on behalf of the citizens of Idaho is exactly the type of conduct which tarnishes the image of Federal Government agencies in the eyes of the people.

This latest affidavit shows DOE's persistence in downplaying risks and promising corrective action. The record reveals that significant safety problems have arisen and continue to arise at INEL, that DOE has been advised of these problems, and that DOE has failed to take adequate remedial measures. In addition, the record shows that the risks of serious environmental contamination and loss of life due to increases in additional spent nuclear fuel is brought to INEL under these conditions.

A few weeks ago I questioned Secretary O'Leary about some potential problems with the high-level waste storage facilities at INEL. In his decision, Judge Ryan raised similar questions. Since then, however, an internal Westinghouse report has been brought to light that suggests the potential for a major radioactive mishap at INEL.

This report, dated June 14th, 1993, titled "Fuel Can Corrosion at CPP-603 Underwater Storage Facility," is very disturbing. For example, it states, in a February 25, 1993 corrosion inspection of five cans of high-level spent fuel in building 603: "It was determined that the corrosion of the cans had progressed to the extent that the integrity of the cans could no longer be assumed."

The report also documents how senior managers at INEL knew of the problems with the fuel containers, yet continually put off dealing with them. To quote the report: "There have been a lot of correspondence and plans to get fuel out of CPP-603"—get this—"by the mid-1980's, but the schedules were continually set back. Moreover, there was no criteria for judging the integrity of the cans." Again, the report says: "Because there was no criteria for the corrosion inspection, the situation was never out of specification. There were no actions required to be performed because of the corroded condition of the fuel cans."

It was not like they didn't know they had a problem with corrosion, Mr. Chairman.

To further quote the report, for over 20 years the supervisors of the fuel storage basins have been aware of the problems. Many actions were completed that attempted to correct at least some of the problems, but the actions did not include global fixes, timely fixes or complete fixes. It appears to this Congressman that money and interagency politics had more to do with these decisions than good science or concern about public safety.

On page 16 of the report it says, quote, "There was a perception among the Chem Plant management that keeping the Navy happy was their most important mission. The Navy was the main source of operating money, and they could always pull the funding and the mission of the ICPP if management did not continue to accept and process Navy fuel."

I have a letter from David L. Humphrey, the State of Idaho's INEL oversight coordinator, that I would like to enter into the record at this point.

Mr. LEHMAN. No objection.

[The letter referred to follows:]

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June 24, 1993

Augustine A. Pitrolo, Manager
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785 DOE Place MS1103
Idaho Falls, ID 83402

Dear Mr. Pitrolo:

The State of Idaho has reviewed a copy of WINCO's Standing Root Cause Committee Investigation report: "Fuel Can Corrosion at CPP-603 Underwater Fuel Storage Facility"; OR-93-0012, issued June 14, 1993. The report cites a long history of corrosion and other fuel storage problems at the Idaho Chemical Processing Plant. Of immediate concern, the results of recent inspections show that "the corrosion of the cans (has) progressed to the extent that the integrity of the cans (can) no longer be assumed." (page 1)

Most significantly, the report details a well-documented and disturbing history of repeated failure on the part of Chem Plant management to adequately respond to evidence of fuel storage corrosion and other problems. There is evidence of "much correspondence and plans to get fuel out of CPP-603 by the mid-1980s, but the schedules were continually set back." (page 7) Cancellation of a 1987 proposed policy (TS 10E3.1) is particularly disturbing. This policy would have limited the storage of non-processable fuels to five years but was inappropriately identified as "not being safety related and that violation...would only have programmatic impact." (pages 7-8)

The report indicates that the identified safety problems could have been prevented had certain procedural safeguards been in place. "If these barriers had functioned then the problem would not have developed. Even though most of these were taken credit for in the safety analysis, they did not exist or were severely compromised." (pages 12-13)

"For the last twenty years," the report continues, "the supervisors of the fuel storage basins have been aware of the problems. Many actions were completed that attempted to correct at least some of the problems. But the actions did not include global fixes, timely fixes, or complete fixes." (pages 12-13) "After the activity during the late 1970s and early 1980s there were not a lot of detectable actions to improve the conditions at 603." (page 16)

"There is an abundance of letters and reports to assure that senior management knew about the problems in CPP 603." (page 15) The report also states: "Management did not pay adequate attention to the reports and other information from their technical and staff personnel. The risks of not operating the ICPP fuel and waste processing facilities overrode the risk that the corroding fuel represented." (page 19)

The mission and emphasis at the Chem Plant historically has been to process, not to store, spent fuel. "The company priorities were well documented by their actions." (page 15) The condition of the storage facilities and equipment has been given much lower priority than fuel processing, according to the report. (page 15) Previous Tiger Team and Technical safety appraisal teams have found that "DOE contractors have had conflicts between business risks and operating risks."

There also has been a perception among the ICPP management that "keeping the Navy happy was their most important mission. The Navy was the main source of operating money, and they could always pull the funding and mission of the ICPP if management did not continue to accept and process Navy fuel." (pages 16-17)

These findings are even more disturbing in light of the recent Department of Energy awarding of an "outstanding" quality assurance management rating to WINCO, and a 7.8% increase in bonus fees.

Based on the findings in the report, we are demanding the following:

1. Immediate transfer of spent fuel out of CPP-603. Either the process of transferring fuel to CPP-666 must be accelerated, or the fuel must be transferred to a safe, well-operated facility, either on- or off-site.

2. Immediate cessation of additional spent fuel receipts at CPP-666. There is great concern that there will be inadequate capacity at CPP-666 for fuel transferred from CPP-603 if DOE continues to receive more fuel at CPP-666.

3. Immediate correction of management problems at the fuel storage and handling facility. The investigation report states most of the problems could have been avoided had management listened to their own staff. This must not happen again. Immediate changes in management policies to correct this must be implemented.

4. An immediate meeting with DOE-ID and WINCO personnel to discuss this situation. Oversight Program staff have repeatedly requested information on the fuel storage and handling situation during meetings with DOE-ID and WINCO personnel, but these problems have never been revealed to us.

As far back as 1977, operations management of the Chem Plant said that CPP 603 was regarded as "a dump for all garbage fuels that no one else wants." Apparently, the fuel storage and handling facility management has treated their own facility with similar contempt. This must be changed.

Sincerely,

DAVID L. HUMPHREY
Oversight Coordinator

DLH/ch

c: William Moffitt, WINCO
Jon Carter
Peggy Hinman
Jim Johnston
Steve Hill

Mr. LAROCCO. Over a year ago in this room, the Natural Resources Committee accepted language that I drafted as an amendment to the Nuclear Waste Policy Act to put an end to many of these out-of-State shipments. I said then and still believe today that the Idaho National Engineering Laboratory is slowly becoming the Nation's de facto nuclear waste dump. To put this much potentially leaking high-level radioactive waste on top of one of the largest freshwater aquifers in North America is not right, it is not smart and it is not safe. I, along with Governor Andrus, will continue to fight tooth and nail to prevent this from happening.

In closing, Mr. Chairman, I would like to think that the days of the Department of Energy withholding vital information from the public are over. The days of trying to circumvent major environmental laws are over, and that the days of putting everything else in front of public health and safety are over. It is my sincere hope that our new administration will put the word out to DOE, DOD and everyone else that this type of activity is no longer tolerated and the good old days are indeed over.

Thank you, Mr. Chairman.

Mr. LEHMAN. Thank you, Mr. LaRocco. You sure found the right judge for that case.

Mr. LAROCCO. I sure did.

Mr. LEHMAN. The gentleman from Washington.

Mr. KREIDLER. Thank you, Messrs. Chairmen. I would like to thank the Chairs for calling this important hearing on such a timely topic. Our two subcommittees have a crucial role to play in overseeing the Department of Energy's civilian high-level nuclear waste program, and I am glad we are here working together. A number of recent reports point to the problems of the DOE's high-level waste program, including the need for improved program management, focus and direction from the DOE, adequate funding and an integrated waste management program. While I am concerned about each of these issues, it is the issue of integrated management of high-level radioactive waste that affects my district, particularly regarding multi-purpose canister systems, MPC's.

I strongly support DOE's endorsement of a multi-purpose canister system for the storage, transport and permanent disposal of spent nuclear waste. However, I am concerned that the DOE will opt to redevelop this technology rather than looking to existing private sector canister technology. This is a serious issue to me, because a company in my district, Pacific Nuclear, has developed a reliable MPC system.

I realize that this is—that this system, like all other existing canisters, does not fully address all repository issues. However, even by redesigning the canister, DOE does not expect to be able to address all of these issues for a number of years. It does not make sense for DOE to go to the expense of redeveloping a technology that already exists, since the redesign is not anticipated to improve the product.

I am pleased that the language in the Energy and Water Appropriations report for fiscal year 1994 directs DOE to consider existing canister technology from the private sector, and I am hopeful that DOE will find that this technology is adequate to meet our Nation's current needs for high-level waste disposal.

I have some questions for the witnesses at the appropriate time, and I again thank Mr. Sharp and Mr. Lehman for holding this hearing.

Mr. LEHMAN. Thank you.

The gentleman from Kentucky.

Mr. BARLOW. Thank you very much, Messrs. Chairmen, for holding this joint hearing. I am new to Congress, and look forward to working with you gentlemen.

We have the gaseous diffusion plant at Paducah, which is important to our economy and important to nuclear energy in the Nation and in the world; and we are very appreciative not only of the input from the plant with regard to energy, but we are appreciative of the whole nuclear effort in relation to medicine and industry.

We are a family-oriented district. We are very sensitive to the needs of family health. We defend our air and water and soil quality. I am not here to defend past abuses in the nuclear community over the prior decades, which are well documented, but I would like to help us find a frame for constructive movement in the nuclear area. In that regard, I would like you all to supply us with background information for the record on the radioactive decay that occurs naturally in our environment with regard to the burning of fossil fuels. Granted, radioactive decay, as I understand it—and I am a layman here, not with training in physics—but radioactive decay is going on all the time, just in the natural environment. And it possibly, just in the natural course of things, has implications for human health over time and human evolution over time.

We do need to get the waste under control, and I am very frustrated when I see reports coming that schedules are being let slide, not just by months or a couple of years, but by many years. I am wondering how much of the money that we devote to nuclear cleanup from the Federal standpoint is just paying salaries and shuffling papers, and not actually moving on tying down the by-products or the wastes or the spent fuels, actually physically getting them under control. And I would, just for the sake of debate, put out the ratio of perhaps we are spending 80 or 90 percent on salaries and paper-shuffling and maybe 10 percent on actually getting things physically under control.

I would posit the position that when we come to this area, there is no final solution, that what we are looking at are levels, at best. And if we wait for a final solution, we are going to be waiting forever, and that maybe what we ought to be moving on are levels of best in progression, and from that standpoint, we would be able to be moving now rather than waiting and having Federal judges issue their dictums in frustration.

Thank you, sir.

Mr. LEHMAN. Thank you very much.

The gentlelady from Arkansas.

Ms. LAMBERT. Thank you, Messrs. Chairmen. I, too, would like to applaud the two subcommittee Chairs for working together, bringing our two subcommittees together; and I look forward to reviewing the issue.

I think the issue of storage and management of high-level radioactive waste is a critical one for us in this Nation, and a long-term issue that we have to begin to deal with. I don't have any nuclear

facilities in my district; I am simply interested in the issue. So from that point of view, I guess I come from a little different direction. But I applaud the subcommittee chairmen and look forward to working with you all and the panel as well as the other members of the subcommittees. Thank you.

Mr. LEHMAN. Thank you very much. Certainly the interest this morning indicates how contentious and important these issues are, and we appreciate everyone's attention today, and especially, all of our witnesses for coming.

Let's get right into the testimony, and we will start with Mr. Cantlon—Dr. Cantlon, excuse me.

STATEMENTS OF JOHN E. CANTLON, CHAIRMAN, NUCLEAR WASTE TECHNICAL REVIEW BOARD, ACCOMPANIED BY CLARENCE R. ALLEN AND DENNIS L. PRICE, MEMBERS; JIM WELLS, ASSOCIATE DIRECTOR, ENERGY AND SCIENCE ISSUES, RESOURCES, COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY DWAYNE WEIGEL, ASSISTANT DIRECTOR; AND LAKE H. BARRETT, ACTING DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT, DEPARTMENT OF ENERGY

Mr. CANTLON. Chairman Sharp, Chairman Lehman, and members of the subcommittees. I am John Cantlon, Chairman of the Nuclear Waste Technical Review Board, and with me today are two other board members, Dr. Clarence Allen and Dr. Dennis Price; and we will try to respond to your questions. We are pleased to be here at this joint hearing to discuss the key issues of concern related to the civilian radioactive waste management program.

I will provide a brief statement summarizing the findings of the board's recent special report to Congress and the Secretary of Energy, and with your permission, request that the full text of the report, some 20 pages, be entered into the record.

Mr. LEHMAN. Without objection.

Mr. CANTLON. As you know, the board's congressional mandate is to review the activities undertaken by DOE to evaluate the potential suitability of the Yucca Mountain site in Nevada for a permanent repository for the disposal of civilian spent fuel and about 8,000 metric tons of high-level defense waste. Congress also charged the board with evaluating the DOE's plans to package and transport the waste that would be disposed of at the repository. We are required to report our findings and recommendations twice a year to Congress and the Secretary of Energy.

Our first six reports dealt primarily with the technical aspects of the program. However, as our review has continued, it has become clear to us that in certain cases it is difficult to separate technical decisions from the policies that guide them. Consequently, in March of this year, the board released a more broadly based Special Report and the board's primary objective in writing this report was to make a timely and constructive contribution to the improvement and progress of the civilian radioactive waste management program. Indeed, the board made its recommendations at a time that it hoped would be most useful to Congress and the new Secretary. We would like to thank the chairmen and members of the

subcommittees for providing us this opportunity to present the three major policy and management issues in the board's report.

I will summarize these in just a moment. But first I want to emphasize that the board believes that there are many very capable people working on this program. Also, based on currently available data, we see no technical reason for abandoning either Yucca Mountain as a site or the concept of deep geologic disposal. Furthermore, the board strongly believes that the concerns raised in our special report can and should be addressed without slowing the momentum of important site characterization activities that are under way at Yucca Mountain. I would also like to point out that the board's Special Report was released just as Secretary O'Leary assumed leadership of the DOE. Consequently, some of the issues are apparently being addressed as the Secretary continues her review of the program. That said, then let me summarize briefly the recommendations.

First, the board believes that it is highly unlikely that the DOE will meet the 1998 date for waste acceptance at an MRS or its 2010 deadline for beginning repository operations. The board is concerned that attempting to meet these unrealistic deadlines may cause the DOE to make important decisions without performing sufficient long-term testing and scientific analyses. This could cause licensing problems, increase overall program costs, and ultimately delay the program.

For example, in its fifth report, the board stated that the DOE's baseline thermal loading strategy lacked an adequate technical basis. This is especially important because the thermal loading strategy that is selected may be fundamental to the performance of the repository and it affects many of the aspects of waste disposal, including the size and design of the repository, the aging of spent fuel, and the design of the waste package. The board recommended that the DOE undertake a comprehensive evaluation of alternative thermal loading strategies, and the M&O contractor has initiated some work in this area. However, the repository level heater tests needed to support this important decision are not planned to begin until 1996. Several DOE contractors have commented to the board that these tests could take up to a decade or more to complete. The board is concerned that the DOE's repository development schedule may not allow sufficient time to complete these and other special scientific tests.

Therefore, recognizing the need for a schedule and to measure progress to maintain program momentum, the board recommended that the DOE concentrate on establishing and meeting important intermediate goals, such as getting underground, determining site suitability and completing essential scientific testing. Adopting this approach could help the DOE avoid costly errors, save money and speed real program progress. It also could facilitate the licensing of the facility, should the site be found suitable. Secretary O'Leary has recently indicated that final deadlines will not compromise technical requirements. The board welcomes this assurance and looks forward to seeing tangible evidence of such a policy.

The board's second major concern relates to the DOE's overall plan for managing civilian spent fuel and defense high-level waste. Since it issued its first report, the board has repeatedly rec-

ommended that the DOE approach the management of spent fuel and high-level waste as an integrated system that includes storage, transport and disposal. Many advantages of this approach are enumerated in the board's Special Report. Unfortunately, the DOE's current plan is not yet well integrated and contains significant gaps.

For example, even if the currently planned monitored retrievable storage facility and a repository are constructed and operating by the dates in the DOE's current optimistic schedule, substantial amounts of spent fuel will continue to remain at utility reactors for decades. Despite this, the DOE's current plan does not consider the implications of extended at-reactor storage or other parts of the waste management system. In addition, the impact on the repository of the disposal of high-level defense waste and other high-level wastes has not been thoroughly evaluated and integrated into an overall program plan.

The DOE has recognized the existence of these problems, and in 1991 hired an M&O contractor to help integrate the various aspects and entities involved in the program. The M&O has made some progress in meeting this objective. However, the board believes that more work on developing an overall systems framework for the program is needed. And I believe the DOE has agreed to this.

To that end, the board recommended in its Special Report that the DOE place a high priority on developing a comprehensive, well-integrated plan for managing all of the spent fuel and high-level waste that eventually may find its way into a permanent repository. Such a plan should take into consideration the interdependent nature of the system and the subsystem components involved in storage, transport and disposal of radioactive waste. Secretary O'Leary has recently called for the appointment of a chief scientist for the Yucca Mountain Project Office. This is one step that could improve the integration of site-characterization activities.

The third and final issue raised in the board's Special Report focuses on the organizational structure and program management of the Office of Civilian Radioactive Waste Management. As I mentioned before, there are many very capable people working in this program. However, the large number of organizations involved, the program's multilayered organizational structure and the fact that entities are geographically dispersed create substantial challenges for program managers. And the responsibility for decisionmaking seems to be shared among people at headquarters, the project office, the M&O contractor and other private contractors, the national labs, and the U.S. Geological Survey. Furthermore, in the board's view, the M&O contractor which was hired to integrate the program could probably be used more effectively than it has been.

The board also is concerned about the allocation of program funds. The very high overhead and infrastructure costs for the program leave limited amounts for actual site work and other important research and development for the system as a whole.

In light of these concerns, the board recommended that an independent evaluation of the OCRWM's management and organizational structure be undertaken. By this, we do not mean to suggest reconsidering the overall objectives or policies underlying the devel-

opment of a deep geologic repository. I would also like to clarify that such an independent management evaluation would, by definition, not be an internal review conducted by the DOE itself.

The board notes with interest that several issues raised in its Special Report, specifically the optimistic nature of the schedule, the risk of short-circuiting important scientific tests and the relatively small amount of funding available for site-characterization activities, are quite consistent with the independent findings of the GAO report that also will be discussed here today. However, there are different bases for the findings in these two reports that are worth noting. For example, the conclusion in the GAO's report that site investigation may take 5 to 13 years longer than currently scheduled is based primarily on its evaluation of past and projected DOE program funding requests from the base plan cost projections; whereas the board arrived at its observation that the current schedule is unlikely to be met by estimating the actual time that will be required to complete some critical scientific tests.

Although we have said that adequate and predictable funding is required for the program, and we think this is important, the board believes that simply increasing program funding will not ensure that the DOE will meet its 1998 and 2010 deadlines. In addition, in making its observations about the limited availability of funding for site work and the total research and development of the system, the board considered only the impact of the Yucca Mountain Project's infrastructure costs. The GAO considered in its calculations the funding requirements for transportation casks and siting a centralized, monitored, retrievable storage facility.

As pointed out in the GAO report, the funding priorities given to siting a monitored retrievable storage facility and investigations on transporting spent fuel to such a facility by 1998 have substantially shifted support away from activities related to repository development. This is an example of how decisions made about one component of the waste management program may have significant consequences for another part of the program. It also demonstrates the importance of resolving the policy issues associated with beginning to accept spent fuel. These difficult issues need to be addressed by Congress, the DOE, the utilities and other stakeholders.

Chairman Sharp and Chairman Lehman, in closing, I would like to emphasize that the job that Congress has given the DOE is nationally important and necessary, but it is also extremely difficult and complex. This is true not just because of the scientific and technical questions associated with the development of this first-of-a-kind geologic repository, but also because of the many political, institutional and public acceptance considerations that are involved. However, the board believes that without a strong and defensible scientific and technical underpinning, the other challenges facing the program will be even more formidable.

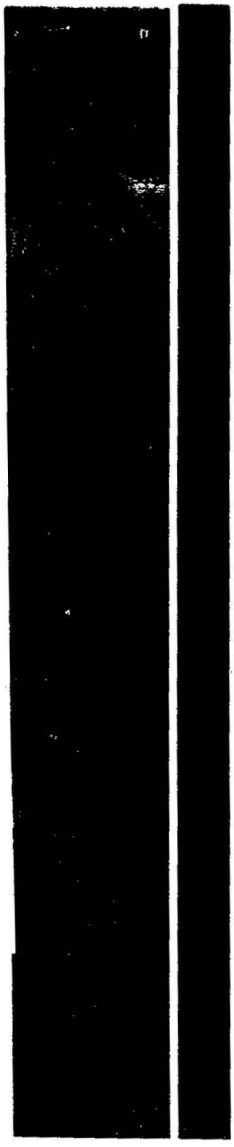
We are all working toward the same objective: finding a safe and environmentally acceptable long-term option for managing the Nation's spent fuel and high-level waste. The board looks forward to continuing to play its role in this crucial national effort.

Let me thank you once again for allowing the board to present its views. My colleagues and I will be happy to respond to questions.

Mr. LEHMAN. Thank you very much for that very comprehensive statement. We will hold our questions until all of the witnesses have testified.

[Testimony resumes on p. 38.]

[The NWTRB Special Report follows:]



NWTRB Special Report

to Congress and the Secretary of Energy

Nuclear Waste Technical Review Board
March 1993

Nuclear Waste Technical Review Board

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Executive Summary

Ten years have passed since the enactment of the Nuclear Waste Policy Act of 1982. During that time, the Department of Energy's (DOE) Office of Civilian Radioactive Waste Management has been developing a system to manage the disposal of spent fuel from the nation's 108 commercial nuclear reactors along with some defense high-level waste. The DOE currently is characterizing a site at Yucca Mountain, Nevada, to determine its suitability for construction of a permanent radioactive waste repository. Surface-based testing at the site is well under way; underground exploration, although delayed for the past three years, is slated to begin in 1994.

Based on its evaluation of the technical aspects of the program, the Nuclear Waste Technical Review Board (the Board) believes that three critical concerns should be addressed to increase the integrity of the scientific and technical program and to improve program effectiveness.

First, the DOE's program is being driven by unrealistic deadlines to begin federal acceptance of spent fuel from utilities in 1998 and to commence repository operations in 2010. The repository development schedule does not reflect a realistic assessment of the technical requirements and nontechnical considerations associated with the development of a geologic repository. The Board is concerned that attempting to meet unrealistic long-term deadlines may force the DOE to make important technical decisions without first performing the appropriate technical and scientific analyses. This could lead to mistakes and costly remediation or potential licensing problems. The Board believes that schedules should be based on realistic target dates for achieving important *interim* goals, such as getting underground, completing critical testing, and determining site suitability.

Second, existing DOE plans for managing spent fuel and high-level waste are not well integrated and contain significant gaps. In developing its plans, the DOE has not considered sufficiently the interdependent nature of storage, transport, and disposal of the waste. Consequently, some important decisions may be made without an adequate technical evaluation of their implications for other components of the waste management system. The Board believes that the DOE should place a high priority on developing a comprehensive, well-integrated plan for the overall management of *all* spent fuel and high-level defense waste from generation to disposal. This plan should be based on a systematic assessment of options related to storage, transport, and disposal.

Third, the large number of organizations involved in the implementation of the U.S. program and the diffuse nature of its organizational structure create substantial challenges for program managers. As a result, management problems seem to be affecting some critical technical aspects of the program adversely. The Board believes that an independent evaluation of the Office of Civilian Radioactive Waste Management's organization and management should be undertaken. Taking a look at approaches used in other countries could be helpful in such an evaluation.

As the new Secretary of Energy assumes her duties and the 103rd Congress begins its work, the opportunity exists to creatively evaluate the status of this important program. The Board believes that any needed changes to the program can and should be accomplished without slowing the progress of important site-characterization activities at Yucca Mountain.

Introduction

The Nuclear Waste Technical Review Board (the Board) was created by Congress in 1987 to review the scientific and technical validity of the Department of Energy's (DOE) civilian radioactive waste management program. The goal of the DOE's program is to design and develop a system to manage and safely dispose of the spent nuclear fuel being produced at the nation's 108 commercial nuclear power plants[1] along with some high-level reprocessing wastes from defense-related activities.

During its review of the program, the Board has witnessed considerable progress, especially in site characterization and data collection at Yucca Mountain, and, given existing data, there appear to be no scientific or technical reasons to reject the site at this time. In general, the Board believes that individuals working on the program — mostly scientists and engineers — are enthusiastic and very competent in their fields.

However, designing and implementing a nationwide high-level radioactive waste management system is a uniquely challenging undertaking. For example, a disposal system for spent fuel has never been developed before, and the regulations require that after disposal the waste will not pose a threat to human health and the environment for the next 10,000 years. As a result, there are many different, sometimes conflicting, views about the scientific, organizational, and public policy issues facing the civilian radioactive waste management program. Furthermore, questions persist among the public about all things nuclear and about the DOE's ability to manage radioactive waste.

This *NWTRB Special Report to Congress and the Secretary of Energy* briefly outlines three of the Board's major concerns: (1) the program's unrealistic deadlines, (2) the need for an integrated overall waste management plan, and (3) the effectiveness of program management. The Board believes that these concerns should be addressed immediately, concurrent with ongoing site-characterization work, to ensure that the program has a strong technical and scientific base and to facilitate program progress.

1 108 units with operating licenses, 8 additional units have been granted construction permits (USCEA 1993).

Spent Fuel and Defense High-Level Waste Management — Evolution of the Current Program

The safe disposal of the country's spent fuel and high-level defense wastes is an issue of long-standing importance. In 1957, the National Academy of Sciences first examined nuclear waste disposal and recommended permanent burial of the waste in underground repositories (NAS 1957). The Board concurs with current worldwide scientific consensus that no technical or scientific factors appear to exist that would prevent the development of a safe underground repository for high-level waste *at a suitable site.*

Before a judgment can be made about a given site's suitability or final decisions made about components of a radioactive waste management system, extensive surface-based testing and underground excavation and testing must be undertaken and the resulting data carefully analyzed. Presently, the DOE is carrying out surface-based testing at a site at Yucca Mountain, Nevada, as part of a site-characterization program to determine its suitability for a radioactive waste repository. The DOE plans to begin construction of an underground exploratory studies facility using tunnel boring machines in March 1994. Preparation of the tunnel entrance and construction of support facilities for tunnel boring are presently under way at the site.

... no technical or scientific factors appear to exist that would prevent the development of a safe underground repository for high-level waste at a suitable site.

The selection of Yucca Mountain, Nevada, evolved from a series of scientific, budgetary, and political considerations. In 1982, after the DOE and its predecessor agencies had tried for more than a decade to find a potential repository site, Congress passed the Nuclear Waste Policy Act, which established a process for evaluating sites for two repositories. A number of potential sites were being studied in both the eastern and western United States when the Secretary of Energy in 1986 deferred the search for a repository site in the East. Critics contend that because the majority of the nuclear reactors are located in the East, the decision to proceed with a repository in the West placed an unfair burden on that region, where sites in Nevada, Texas, and Washington were being evaluated. Finally, after considering a number of issues, including the expense associated with characterizing three sites, Congress amended the Nuclear Waste Policy Act in 1987, selecting Yucca Mountain, Nevada as the sole site to be characterized for the possible development of the first high-level radioactive waste repository.

Yucca Mountain is located in southern Nevada, about 100 miles northwest of Las Vegas and adjacent to the Nevada Test Site. The DOE's 1988 baseline repository plan calls for the burial of spent fuel and high-level defense waste in a repository consisting of more than 100 miles of tunnels excavated in rock about 300 meters below the surface of the mountain but well above the water table (DOE 1988). The repository would be sealed approximately 50 years after initial waste emplacement.

Federal standards and regulations (some of which currently are under review) will serve as a basis for determining site suitability and for authorizing construction and licensing operation of the repository if the site proves suitable.

Observations about the DOE's Program

During its detailed review of the DOE's program to manage the nation's civilian spent fuel and high-level defense wastes, the Board has made numerous technical recommendations in six previous reports. The following discussion, however, addresses three concerns the Board believes have major implications for the scientific and technical integrity of the program and for eventual program success.

Unrealistic Deadlines are Driving the Program

Observation 1: The DOE's civilian radioactive waste management program is being driven by unrealistic deadlines to begin federal acceptance of spent fuel from the utilities in 1998 and to commence repository operations in 2010. Repository development schedules do not reflect a realistic assessment of the technical requirements associated with the development of a first-of-a-kind geologic repository. Attempting to meet these unrealistic deadlines may force the DOE to make important technical decisions without first performing the appropriate technical and scientific analyses.

... unrealistic deadlines may force the DOE to make important technical decisions without first performing the appropriate technical and scientific analyses.

The Current Schedule

The 1982 Nuclear Waste Policy Act authorized the DOE to enter into contracts with the utilities for the acceptance, transport, and disposal of their spent fuel. According to the Act, federal acceptance of spent fuel for disposal in a repository was to begin by January 31, 1998. In January 1987, realizing that this deadline could not be met, the DOE changed the planned start-up date for repository operations to 2003 (DOE 1987), only to change it again two years later to 2010 (DOE 1989). The Board has examined similar programs in other countries, and the U.S. program is the only one the Board is aware of that has been given a *legislatively* mandated date to begin disposal of spent nuclear fuel (NWTRB December 1992).

Because a repository will not be available by 1998, the DOE has planned to site and construct a centralized interim storage facility to store commercial spent fuel until repository operations can begin. Since 1989, the Secretary of Energy's two primary goals for the program have been to (1) begin receiving spent fuel at a centralized interim storage facility in 1998 and (2) begin repository operations in 2010 (DOE 1989). Congress established the Office of the Nuclear Waste Negotiator in 1987. Since his appointment in 1990, the Negotiator has initiated a voluntary process to find a site for the storage facility. Although the Negotiator

has made some progress and a few interested parties have been identified, it appears that insufficient time remains to find a voluntary host site and construct an interim storage facility to begin spent fuel receipt by 1998.

On December 17, 1992, in a letter to Senator Bennett Johnston, Chairman of the Senate Committee on Energy and Natural Resources, then-Secretary of Energy James Watkins acknowledged that no voluntary site had been identified that would allow the DOE to meet the 1998 deadline and asked Congress to authorize and direct the DOE to select alternative candidate sites for interim storage of spent fuel at federal government sites. Considering initial reactions from potential host states, this option also may prove difficult to implement. It therefore appears unlikely that any centralized interim storage facility will be available to accept spent fuel from the utilities by 1998.

... given all of the necessary scientific, regulatory, and institutional activities ... it seems optimistic to assume that a spent fuel repository will be operating by 2010.

There May Not Be Time to Complete Essential Testing

The original 1998 date for repository operations had to be changed because it was not based on a realistic assessment of the technical requirements of the program, and, given all of the necessary scientific, regulatory, and institutional activities integral to repository development, it also seems optimistic to assume that a spent fuel repository will be operating by 2010. According to the DOE, to meet the 2010 goal it will be necessary to apply by 2001 to the Nuclear Regulatory Commission for authorization to construct the repository. However, there may not be time to complete essential technical activities before that date.

1. *Exploratory studies facility.* Before filing an application for authorization to construct a repository, it is necessary to demonstrate whether or not the site at Yucca Mountain is suitable for repository development. Suitability cannot be determined, however, until an underground exploratory studies facility is constructed at the site. Scientists will then have direct access to the complex underground geology at Yucca Mountain and can begin some of the testing necessary to evaluate site suitability and predict repository performance. The DOE plans to initiate underground tunneling in March 1994, but testing in the tunnels may not begin until 1996.

2. *Underground testing.* Long-term heating and other underground experiments are needed to provide critical information on the effects of heat from the waste (the thermal load) on the surrounding rocks. This information is crucial for determining site suitability and designing the repository system. The Board is concerned that, since the tests have not been initiated, *there may not be enough time* to complete them by the 2001 deadline. Several DOE contractors have

commented to the Board that some of this testing could require a decade or more. If testing at the repository level does not begin until 1996, only five years remain to collect the data on which to base important licensing and repository design decisions.

3. *Waste package design and development.* The waste package is a key component in the radioactive waste management system. The Board has emphasized the importance of adequately and dependably funding research and development of waste package designs (NWTRB November 1990, May 1991, December 1991, June 1992). Yet the DOE has reduced funding to this program during the last three years, thus delaying important research. Deciding which waste package design is most appropriate requires extensive testing of materials — gathering data on how a variety of materials will hold up over thousands of years under various underground conditions. Under the current schedule, sufficient time may not remain to perform this testing adequately.

... technical activities ... have been postponed repeatedly during the last three years, and future delays cannot be ruled out.

These and other technical activities crucial to gathering the information required to determine site suitability and to make repository design decisions needed for licensing the repository have been postponed repeatedly during the last three years, and future delays cannot be ruled out. As a result, there may not be enough time to do the testing and analyses necessary to support important technical decisions.

Other Factors Could Impede Program Progress

A number of other factors beyond the DOE's control also could contribute significantly to further delays in program progress and affect the current schedule.

1. *Funding uncertainties.* To meet its 2001 deadline, the DOE has said that it will need an average of approximately $600 million per year for the next seven years just for *site-characterization* activities.[2] The DOE has never submitted a request to Congress for funding at this level (GAO December 1992). Current funding for the entire program is approximately half this amount. Given ongoing concerns about the large federal budget deficit, it appears far from certain that the Administration will request, or Congress approve, such increases.[3]

2 Carl Gertz in a presentation to the Nuclear Waste Technical Review Board, January 5-6, 1993.

3 According to an attachment to a January 12, 1993, letter to Senator Bennett Johnston, the DOE recommended to the Office of Management and Budget that the Nuclear Waste Fund be taken off budget.

2. *Changes in radiation safety standards.* In the fall of 1992, Congress passed legislation establishing a three-year process for promulgating a revised radiation safety standard and for subsequently revising the Nuclear Regulatory Commission's current regulations and technical requirements for waste disposal (Congress 1992a). Changes in the current standard or in the Nuclear Regulatory Commission's requirements could affect test plans and also could require changes in the design of the waste package and the repository.

3. *Delays in the legislatively mandated process.* The Nuclear Waste Policy Act requires the program to meet a series of milestones prior to applying for construction authorization, including submission of a final environmental impact statement and subsequent approval of the site by Congress by 2001. However, given the history of opposition to the program in the state of Nevada and the general lack of public confidence in DOE decisions,[4] court challenges and procedural delays are quite likely.

The DOE already seems to have made some important choices based on expediency without first performing a thorough technical analysis ...

4. *Unforeseen problems.* There is no allowance in the current schedule for accommodating unforeseen technical uncertainties or institutional problems that inevitably arise during such first-of-a-kind projects.

Considering past delays and the potential for future delays, the Board seriously doubts that either the 2001 construction application deadline or the 2010 repository operation deadline can be met.

Deadlines May Force Premature Technical Decisions

The Board is especially concerned that attempting to meet current unrealistic deadlines may force the DOE to make important technical decisions without first performing the appropriate technical and scientific analyses. This could lead to mistakes, costly remediation, or licensing problems.

The DOE already seems to have made some important choices based on expediency without first performing a thorough technical analysis of the data or of possible alternatives. An example of this is the DOE's selection of a thermal-

4 See Flynn et al. 1992. In addition, the Secretary of Energy Advisory Board Task Force on Radioactive Waste Management was assigned the task of considering what additional steps the DOE could take to increase public trust and confidence in the DOE's civilian radioactive waste management program. Its draft report was completed in December 1992 (SEAB December 1992).

loading strategy for its baseline plan.[5] In its fifth report, the Board pointed out that there is not an adequate technical basis for the DOE's choice of a thermal-loading strategy. The baseline strategy is consistent with accomplishing two objectives. First, it would allow the DOE to quickly demonstrate a capability to dispose of spent fuel (by 2010) and, second, it would minimize the need for long-term spent fuel storage. Attempting to meet these goals seems to have led program management to select a single baseline thermal-loading strategy without first performing a thorough analysis of alternative, perhaps better, thermal-loading options.

Unrealistic deadlines also are forcing the DOE to undertake activities simultaneously that might better be conducted sequentially. For example, it appears that to meet the 2001 construction application deadline and the 2010 date for repository operation, the DOE has selected 25- to 30-ft tunnels for the exploratory studies facility. Although perhaps appropriate for a repository, they are much larger than the Board believes is necessary for testing for site suitability and performing site characterization (NWTRB December 1991, June 1992).

Excavating such large tunnels may only add to existing concerns that: (1) large investments of time and money are creating institutional momentum that inevitably will lead to the selection of Yucca Mountain regardless of its suitability and (2) with no alternative or back-up site, Yucca Mountain must become the repository. These perceptions tend to undermine the DOE's credibility, which already has suffered as a result of problems associated with the management of radioactive wastes at defense facilities.

Summary

The Board ... fully supports the need for schedules with target dates and interim goals to measure program progress.

The Board understands and fully supports the need for schedules with target dates and interim goals to measure program progress. However, keeping to the current unrealistic deadlines may force premature technical decisions before sufficient data can be gathered and analyses performed to support these decisions. This ultimately may undermine the technical validity of the program *and* delay program progress. It also may further undermine the program's credibility among the technical and lay communities.

The Board supports adopting the approaches of other countries it has visited, where efforts are focused on achieving *interim* technical milestones, and where schedules for repository operation are tentatively set based on a realistic assess-

5 The *thermal loading strategy* is a plan for achieving the desired temperatures within the repository over a chosen time period. To develop a strategy, a number of issues must be considered, such as ageing, waste package design, and repository size and design. (See NWTRB June 1992).

72-587 O - 93 - 2

ment of program requirements. Most other countries visited by the Board have set goals for repository operation for 2020 or later. There could be many advantages associated with establishing a new, more flexible long-term schedule that incorporates *firm target dates for interim goals*, such as getting underground, determining site suitability, and completing essential testing. Because decisions made under pressure can lead to mistakes and costly remediation or potential licensing problems, adopting a more realistic schedule may actually speed *real* program progress over the long run.

The Program Needs an Integrated Waste Management Plan

Observation 2: *Existing DOE plans for managing spent fuel and high-level waste are not well integrated and contain significant gaps. In developing its plans, the DOE has not considered sufficiently the interdependent nature of the system and subsystem components involved in the transport, storage, and disposal of radioactive waste. Consequently, some crucial decisions may be made without an adequate technical evaluation of their impacts on other system components.*

From the time it issued its first report in early 1990, the Board has recommended that the management of spent fuel and high-level waste be viewed as a system of interrelated components. Looking at the generation, storage, transport, and disposal of the waste as a system is essential for several reasons.

1. Decisions made about one component of the waste management system may significantly affect other components, and a choice made in isolation could foreclose alternatives that might later be shown to be better for the system as a whole.

Looking at waste management as a system is the most efficient way to set priorities ...

2. Making decisions without adequately assessing their systemwide consequences could jeopardize the licensing of the proposed repository.

3. Developing program plans based on a sound analysis of the system helps avoid errors that may require costly and time-consuming remediation.

4. Looking at waste management as a system is the most efficient way to set priorities, to determine the logical sequence of activities, to integrate the activities of various entities involved in the program, and to develop contingencies to deal with the many uncertainties associated with this first-of-a-kind program.

Important concerns related to the three main components of the waste management system — storage, transport, and disposal — are discussed below.

Interim Spent Fuel Storage

... substantial amounts of spent fuel will remain in storage at reactor sites for decades.

The DOE's baseline plan for the interim storage of radioactive spent fuel requires constructing a centralized interim storage facility in time to begin accepting spent fuel from the utilities by January 31, 1998. Currently, there are approximately 25,000 metric tons of spent fuel stored at reactor sites around the country,[6] and this amount is being added to at the rate of about 2,000 metric tons per year. Under existing law, the capacity of the interim storage facility is limited to only 10,000 metric tons before repository operations begin. Therefore, even if such a centralized interim storage facility and a repository are constructed according to the DOE's schedule, substantial amounts of spent fuel will remain in storage at reactor sites for decades. The implications of extended interim storage have not been addressed in systems planning.

Safely storing spent fuel does not appear to present any serious technical problems. Spent fuel can continue to be stored at the reactor sites in the spent fuel pools (if capacity is available) or in dry casks, as is presently the case at some utilities.[7] The Nuclear Regulatory Commission has determined that spent fuel may be stored safely — wet or dry — for at least 100 years.[8] However, as spent fuel pools near capacity, some utilities have met with resistance in obtaining permits from state and local authorities to use dry cask storage, due in large part to lack of strong evidence that a repository will be available in the foreseeable future.

As discussed in the Board's sixth report, the need for extended interim storage for all of the spent fuel is anticipated in other countries visited by the Board and has been integrated into their waste management plans (NWTRB December 1992). Spent fuel and high-level waste in these countries will continue to be stored at a centralized facility or at reactor sites until final decisions are made about repository development. Because extended interim storage has not been planned for in this country, it is viewed by some as signifying a failure to meet program goals.

In addition to expanding pool and dry cask storage, some nuclear utilities, faced with the prospect of long-term on-site storage, have investigated multipurpose container concepts that could be used to store, transport, and, perhaps, to dispose of the spent fuel.[9] The DOE also is increasing its efforts to develop a

6 By 2030, approximately 87,000 metric tons of spent fuel will have accumulated.

7 Dry cask storage is being used by Virginia Power at its Surry Station, by Duke Power at Oconee, and by Carolina Power and Light at its Robinson Station.

8 This determination is set forth in the Nuclear Regulatory Commission regulation 10 CFR 51.

9 Such concepts have been assessed by others in the past, including the state of Tennessee in the mid-to-late 1980s.

multipurpose container. The state of Nevada has provided important and constructive technical comments on proposed multipurpose container concepts. And the Nuclear Regulatory Commission has been quite positive in its comments about the prospects of licensing such containers. The Board has long advocated the development of alternative container concepts, including the multipurpose container, and is encouraged by these recent developments.

Transport

Spent fuel has been shipped routinely and safely for the past 40 years. However, transport to a repository involves more than shipping. It includes removing the spent fuel from storage at the reactors, loading it into the transport cask, loading and unloading it at points of origin and destination, storing it, and finally placing it in a repository. Once repository operations are under way, the number of annual shipments of spent fuel and high-level radioactive waste will increase dramatically from historic levels. And with the much higher levels of activity and the greater number of people involved, opportunities for human error and equipment failures will increase, and hazards not apparent in the past may become evident. Therefore, measures are needed that will enhance current DOE safety practices. Since its first report, the Board has continued to urge the DOE to incorporate the principles of system safety and human factors engineering into its program to enhance safety performance. The use of a multipurpose container also could help minimize handling and reduce risks associated with transporting radioactive spent fuel.

Disposal

The *thermal-loading strategy* selected for the repository has implications for other components of the waste management system, including the ageing of the spent fuel and the design of both the waste package and the repository.[10] The DOE's baseline plan calls for the disposal of relatively young spent fuel to create above-boiling temperatures within the repository for 300 to 1,000 years, and below-boiling temperatures thereafter. It is not clear that this is the most desirable strategy. In its fifth report, the Board recommended a systematic evaluation of alternative thermal-loading strategies (NWTRB June 1992). Although the DOE

10 Spent fuel assemblies produce substantial amounts of radioactivity and heat (thermal energy) after they are removed from the core of a nuclear reactor. The thermal output of spent fuel decreases significantly over time (especially during the first several decades). Storing spent fuel to reduce its thermal output before disposal (ageing) is one way of controlling or manipulating the thermal load of a repository.

has initiated some work in this area, a comprehensive and systematic analysis of alternative, and potentially better, thermal-loading strategies for the proposed Yucca Mountain site has not been completed. As a result, an adequate technical basis for the DOE's choice of a baseline thermal-loading strategy has not been established. Yet decisions tied to that choice are being or soon may be made about multipurpose container concepts and repository and waste package designs.

... the Board believes an engineered barrier system that includes a robust, long-lived waste package should reduce overall uncertainties about the performance of a repository.

The thermal-loading strategy also has implications for the *engineered barrier system*.[11] Federal licensing standards require the engineered barrier system to work together with the natural barriers to isolate radionuclides from the accessible environment for many thousands of years. Although engineered barriers may have shorter lifetimes than do natural geologic barriers, it will be possible to predict the performance of engineered barriers with greater confidence than is possible for natural barriers. For this reason, no matter where a repository is located and no matter what the geology of the site, the Board believes an engineered barrier system that includes a robust, long-lived waste package should reduce overall uncertainties about the performance of a repository. As indicated previously, the DOE has not given sufficient attention to waste package design.

Other aspects of waste disposal should be more thoroughly evaluated and addressed in a plan to manage *all* high-level radioactive waste. For example, since 1985, federal high-level defense waste disposal policy has been to commingle canisters of solidified high-level defense waste with containers of spent fuel in the same repository.[12] Current estimates of the number of defense waste canisters are very broad — ranging from 15,000 to more than 200,000 — resulting in a more complicated and difficult design process for the disposal system. Other high-level radioactive wastes, such as the Three Mile Island-2 core, spent naval reactor fuel, and other defense reactor spent fuel, will probably require disposal in a repository (NWTRB December 1992). The special problems posed by the disposal of *high-level defense wastes* and *other high-level wastes* should be evaluated and integrated into the DOE's plan.

Another issue that should be considered is how long the spent fuel should remain *retrievable* after it has been placed in the repository. Current indications are that the DOE intends to design the Yucca Mountain repository to meet the

11 The engineered barrier system (in contrast to the natural geologic barrier) is made up of the constructed, or engineered, components of a disposal system designed to prevent the release of radionuclides from the underground facility into the geohydrologic setting. It includes the thermal-loading strategy, repository design, waste form, waste containers, material placed over and around such containers, and backfill material.

12 President Ronald Reagan announced this decision in a memorandum to Secretary of Energy John Herrington, "Disposal of Defense Waste in a Commercial Repository," April 30, 1985.

50-year retrieval requirement.[13] However, a longer retrieval period for spent fuel may offer some advantages, such as being able to monitor waste package performance or recover spent fuel for economic reasons. There also are disadvantages, such as costs associated with monitoring and maintaining the repository. The pros and cons associated with long-term retrievability options should be analyzed thoroughly, before repository design decisions are made.

... the DOE should ... set priorities among the many scientific investigations being planned.

The same principles that are used to evaluate decisions related to the overall system also should be applied to the repository. *Performance assessment* is the primary tool being used to evaluate the safety of waste disposal at Yucca Mountain. It is used to compare predicted repository performance with health and safety standards. Since its first report, the Board has been urging the DOE to begin a process of iterative performance assessment, by which periodic evaluations point out those areas of investigation that need emphasis, to determine site suitability and to ensure safety. In 1992, the DOE completed its first iteration in the performance assessment of the proposed repository at Yucca Mountain. Although additional work may be needed to improve the level of sophistication, the DOE should use this and other similar studies to set priorities among the many scientific investigations being planned.

Summary

The Board has urged the DOE to conduct top-level, systemwide waste management trade-off studies and performance assessment studies while the program is still in its conceptual phase so that decisions made now do not preclude options that may later be shown to be preferable. The management and operations contractor, who was hired to provide program integration, has recently initiated some work in this area. However, as stated in its sixth report, the Board believes that the studies undertaken to date are seriously limited by a number of assumptions being made by the DOE. This will foreclose a serious evaluation of some potentially viable alternatives (NWTRB December 1992).

13 Nuclear Regulatory Commission regulation 10 CFR 60.111.

Program Management Needs Improvement

Observation 3: The large number of organizations involved in the U.S. program and the diffuse nature of its organizational structure create substantial challenges for program managers. As a result, management problems seem to be adversely affecting some critical technical aspects of the program.

The civilian radioactive waste management program encompasses work undertaken by the DOE, its dozen or so private contractors, a number of national laboratories, and the U.S. Geological Survey, as well as many others. The number of people working on the program now totals almost 2,000 (roughly 200 DOE employees and 1,750 contractor employees).[14] The program's organizational structure is multilayered, and the entities are geographically dispersed. Responsibility for decision-making is shared among the program director and associate directors,[15] the management and operations contractor, other private contractors, subcontractors, national laboratories, and the U.S. Geological Survey. Consequently, responsibility for program decision-making seems to be diffuse.

... lack of integration remains a major problem that contributes to inefficiencies in the program ...

The large and unwieldy organizational structure of this DOE program also creates substantial integration problems. The management and operations contractor was hired in 1990 in an effort to consolidate and integrate program activities. However, the management and operations contractor is not being used effectively.[16] Thus, the Board believes that lack of integration remains a major problem that contributes to inefficiencies in the program, especially in the development of a well-integrated waste management plan. This remains a major concern to the Board because, as discussed in the previous section, the lack of a plan affects every aspect of the technical and scientific program.

Another area of Board concern is funding allocation decisions. For example, in fiscal year 1993, funding for overhead and infrastructure — according to the DOE, the basic costs necessary to keep the program operating — will account for approximately 56 percent of total funds for site characterization (Edison Electric

14 In communications with the DOE Office of Civilian Radioactive Waste Management, November 1992

15 The program has had seven directors in ten years. Five of the seven served in the capacity of acting director

16 Edison Electric Institute commented in a recent report that the management and operations contractor was being used as if it were "just another contractor." The suggestion was made to allow them to do the job they were hired to do. (Edison Electric Institute 1992).

Allocating such a high proportion of funds to overhead and infrastructure ... may have contributed to delays in the initiation of underground excavation and in the development of a long-lived waste package.

Institute 1992). Allocating such a high proportion of funds to overhead and infrastructure leaves limited funding for important testing and research and may have contributed to delays in the initiation of underground excavation and in the development of a long-lived waste package.

Other countries visited by the Board provide interesting alternatives to the U.S. program's organizational approach. For example, in some countries, a government-sponsored corporation or organization has been created to implement waste management programs. In addition, in most of the countries the Board has visited, spent fuel producers are responsible for safely managing nuclear waste — including, in most cases, planning, financing, and executing all research, interim storage, transportation, and disposal activities. There seems to be more financial and managerial accountability in these countries, and their programs appear to be managed more effectively than the program in the United States (NWTRB December 1992).

Alternatives to the current U.S. organizational and management approach were evaluated in two congressionally mandated studies in the mid-1980s (OTA 1985, Advisory Panel 1984). Since then, no detailed comparison of the U.S approach with alternative approaches has been undertaken. However, Secretary of Energy Hazel O'Leary, at her confirmation hearing in January, indicated that she might undertake an evaluation of the civilian radioactive waste management program. The Board believes that an independent review of the program's organizational structure would be needed and welcome part of that effort.

Summary

The Board believes that the effectiveness of program management and integration needs to be improved and that the program would benefit from a thorough independent review of its organizational structure. Reviewing the approaches being used in other countries could be useful in such a review.

Board Recommendations

Ten years have passed since the enactment of the Nuclear Waste Policy Act of 1982. The Board has concluded from its review of the program that, although significant progress has been made in site characterization and the collection of data at Yucca Mountain, much more remains to be done. Critical interim milestones, such as constructing the underground exploratory studies facility and determining site suitability, have not yet been achieved. There may not be time to complete the testing and analyses necessary to make important repository and waste package design decisions before the 2001 construction application deadline, and circumstances beyond the DOE's control could make it impossible to meet the 2010 deadline for beginning repository operations. Furthermore, the program still lacks a well-integrated overall radioactive waste management plan.

In light of the high cost of the program and the many uncertainties surrounding program progress, it is not surprising to hear public debate escalate over the DOE's radioactive waste management program. In its draft report to then-Secretary of Energy Watkins on January 14, 1993, the Secretary of Energy Advisory Board's Task Force on Radioactive Waste Management recommended measures the DOE might take to strengthen public trust and confidence in the civilian radioactive waste management program. Although somewhat pessimistic about increasing public trust and confidence over the short term, the report does recognize that without a strong technical and scientific program that is based on sound technical analyses, the DOE has little chance of improving public confidence in its radioactive waste management program (SEAB December 1992).

Recent initiatives on the part of the DOE suggest that program managers sense a need for change. In December 1992, the DOE recognized the need to look at alternatives to finding a voluntary host for an interim storage facility. This could result in the serious consideration of a range of options for the interim storage of spent fuel. The DOE also recently announced several new initiatives, including efforts to develop a multipurpose container for the storage of spent fuel and plans to investigate modifications to the existing waste management strategy.[17]

In addition to these new proposals by the DOE, regulatory changes may come about. The federal standards and regulations to be used in siting, constructing, and licensing a repository will be reevaluated in the next few years through a process established in the Energy Policy Act of 1992. Problems with the standards and regulations have been discussed to varying degrees in previous Board reports. Standards and regulations were addressed in more detail in the National Academy of Sciences report *Rethinking High-Level Radioactive Waste Disposal* (NAS 1990).

17 Letters dated December 17, 1992, and January 12, 1993, from the Secretary of Energy James Watkins to Senator Bennett Johnston.

... any program review should be conducted concurrently with ongoing work at Yucca Mountain ...

At her confirmation hearing in January, Secretary O'Leary suggested convening a broad-based group to review the waste management program. The Board supports Secretary O'Leary's suggestion and believes that as she assumes her duties and the 103rd Congress begins its work, a unique opportunity exists to review the program's current status, to evaluate new proposals, and to address concerns about and make needed improvements to the program. The Board believes any program review should be conducted concurrently with ongoing work at Yucca Mountain to ensure that current site-characterization activities continue.

The Nuclear Waste Technical Review Board hopes that the following recommendations will prove helpful to Congress and the Secretary of Energy as they make important decisions about the future direction of the civilian radioactive waste management program.

Amend the Current Schedule

The Board recommends a more flexible schedule for the development of this first-of-a-kind geologic repository. Such a schedule should contain realistic target dates for achieving important interim goals, such as getting underground, determining site suitability, and completing critical testing. The DOE should set testing and funding priorities to achieve these interim goals. Once some of the interim goals have been achieved, it should become easier to realistically predict long-term schedules for repository operation.

Develop a Comprehensive Waste Management Plan

The Board recommends that the DOE place a high priority on developing a comprehensive, well-integrated plan for the management of all spent fuel and high-level waste, including its storage, transport, and disposal. This plan should be based on a systematic assessment of the interdependent nature of the various waste management components. It should include an evaluation of the following:

- a range of options for accomplishing the long-term storage of *all* spent fuel;
- the development of a multipurpose container concept that will help minimize handling of the spent fuel;
- the incorporation of system safety and human factors engineering to enhance the safety performance of the total system;

- the relative trade-offs associated with choosing among the various alternative thermal-loading strategies;
- the potential contribution of engineered barriers, including a robust, long-lived waste package to reduce the uncertainties associated with the long-term performance of the repository;
- the potential impacts of various options for incorporating disposal of other types of wastes into the waste management system; and
- the desirability of maintaining retrievability of the spent fuel beyond the currently projected period of 50 years after initial emplacement.

Review Program Organization and Management

The Board recommends that an independent evaluation of the Office of Civilian Radioactive Waste Management's management and organizational structure be undertaken. Reviewing approaches used in other countries could be useful in such an evaluation.

Mr. LEHMAN. And I will recognize Mr. Wells at this time.

STATEMENT OF JIM WELLS

Mr. WELLS. Thank you, Messrs. Chairmen.

As I begin, I would like to introduce my associate, Dwayne Weigel, who is our Assistant Manager, who did the most recent work on Yucca Mountain, but over the years has been involved in the waste disposal program. We are pleased to be here today to discuss Yucca Mountain as a potential disposal site.

As evidenced by these hearings today and the attendance, this program has had a troubled history and is facing a complex future. In our most recent May report, we found that DOE has given relatively low priority to scientific investigations at the mountain. DOE is only requesting about half of the funds that it estimates are needed to complete the investigation project on schedule because of competition for the funds among all of its energy-related programs and competing activities, even within the disposal program.

If DOE continues to request and allot funds for the investigation project at recent levels, the project could take at least 5 to 13 years longer than planned and increase the total cost of the disposal program.

To streamline the project, DOE has compressed the time permitted for various scientific studies and is considering similar measures to reduce costs. These initiatives, Messrs. Chairmen, are increasing the risk that the investigation of the site will be inadequate.

Since our report, DOE has gone on record wanting to establish a revolving fund to ensure that adequate funds are made available to this disposal program. While the Department's proposed legislation would make more funds available to accomplish existing program objectives, it does, however, have implications for the Federal deficit, for congressional oversight and the program's financial health over the long term that need to be fully considered.

Turning now to the specifics, if I may. As you know, in 1989, DOE established the current schedule for the investigation of Yucca Mountain. DOE estimated that the investigation of the site and the preparation of the license application could be completed by the year 2001 at a total cost of $6.3 billion, and that if the site proved to be suitable, a repository could be in operation in 2010. As DOE has tried to meet this schedule, a significant gap exists between the amount of funds that DOE has estimated are needed to complete the investigation on schedule and the amounts actually budgeted and appropriated.

For 1991 and through 1993, where we took a look, DOE requested only half of the $1.2 billion that it itself had estimated it would need for that time period. The budget proposed for the fiscal year 1994 would basically continue this trend.

There are two reasons why the actual funding requested by DOE is so much less than the estimated needs. First, the disposal program competes with other DOE programs for the available funds. Although the disposal program is funded by a special fund in the Treasury called the Nuclear Waste Fund, it competes within DOE

for not only departmentwide budget allocated each year by the OMB, but competes with programs within the disposal program.

Second, with the appropriation that DOE receives for the disposal program, site-investigation activities have had to compete for funds with other program objectives and priorities. In 1989, DOE told us that they established two program objectives of equal rank, number one being to begin accepting waste in 1998 by transporting it to an interim facility for temporary storage; and the number two priority, to begin permanently disposing of waste in the repository by the year 2010.

Although the budget for the disposal program has not been adequate to fund all of the program activities at the planned level, DOE has continued to try to meet both objectives. We found that site investigations have gotten low priority. For example, in January of 1992, DOE's disposal program director told us that DOE would not take any action that would prevent DOE from beginning to accept waste in 1998, such as deferring any procurement of transportation casks. When faced with the shortfalls in appropriations, the director said that DOE would fund in descending order of priority, one, the foundation or the infrastructure of Yucca Mountain, basically to maintain its continuity; the second priority, activities that would be related to developing the MRS facility and a transportation system at levels sufficient to allow adequate acceptance of waste in 1998; and third, site investigation activities that would enable DOE to maintain its schedule at the repository.

These priorities, quite frankly, for the disposal program have in fact limited progress on the Yucca Mountain Project because the scientific and the technical activities that must compete to investigate the site have been last in line for funding. In 1992, for example, after program prioritizations, only $60 million, or 22 percent of the program appropriation was left for scientific and technical activities. This amount is only one-third of what DOE had estimated in its costing schedule that it would need for the scientific and technical activities.

If DOE continues to request and allot funds for the investigation of Yucca Mountain at these same levels, as it has in recent years, it could take at least 5 to 13 years longer than the 2001 to complete all planned investigative activities. A longer site-investigation period, quite frankly, would also increase the cost of the disposal program.

According to DOE cost estimates for the project, about 45 percent of the required funds would be used for scientific and technical activities, and about 55 percent would be used for infrastructure activities. In 1992, when we did our audit, however, based on the data we were able to obtain, DOE allocated only 36 percent of the Yucca Mountain Project allotment of funds to its scientific and technical activities; and a similar situation had occurred in 1991. Unless DOE reduces this proportion of spending on infrastructure activities and uses more of the available funds for science and technical activities, the project's total cost incurred over a longer period will definitely increase.

For example, DOE estimated that it would spend approximately $1.25 on infrastructure activity for every $1 that it spent on science and technology activities. In 1992, we found, however, that DOE

was spending approximately $1.77 on infrastructure activities, funding for these costs and slippages.

DOE recently compressed the time allowed for various site-investigative activities in an attempt to maintain its schedule for the Yucca Mountain Project, and it may take similar steps to reduce costs.

In 1992, DOE began efforts to adjust the scope of the site investigation and to reduce the total cost of the project by as much as 10 percent. DOE has instructed its contractors that all data required for its licensing application in the year 2000 would have to be gathered no later than 1999, and that planned—work that they had planned to do would have to be adjusted as necessary. Thus, adjustments made during this study to the contractors' scope of work has compressed the time that will be allowed for completing various scientific and technical activities.

Lawrence Livermore Laboratory, which is working on the packaging for the nuclear waste, expressed the concern to DOE that a credible license application could not be prepared by the year 2001 under the revised constraints, and added that these constraints perhaps reflect DOE's growing tendency to focus on superimposed milestones rather than on genuine technical capabilities. Even the Geological Survey, which is also responsible for much of the scientific Earth science investigation work at the mountain, is also telling DOE that further reducing the scope of the survey's work would increase the licensing risk, and that perhaps they would not be able to allow the Survey to resolve any scientific questions that would be raised later.

Not only are the project scientists expressing concern, but the board even today has expressed similar concern that DOE's reliance on its current schedule may not allow enough time to collect, to analyze some data, and to resolve unanticipated technical problems and questions about the unpredictable conditions that are so important to the repository's performance.

Examples of just a few of the emerging technical issues include how best to manage the heat generated by the spent fuel over thousands of years and even new concerns raised about the Ghost Dance Fault which crosses Yucca Mountain.

If I might just turn a minute to the revolving fund issue, most recently the Secretary of Energy has asked OMB to propose legislation that would establish a nuclear waste revolving fund to provide an appropriate level of funding for the disposal program. The Secretary noted that the nuclear waste fund annually receives about $600 million in disposal fees, earns $200 million in interest, and has a current balance of approximately $4 billion.

This proposal, on the one hand, would help ensure that the increased level of revenues would be available to the Agency to accomplish the objectives of timely acceptance and disposal of the nuclear waste and we do not disagree with that.

However, on the other hand, the proposal does raise several issues that also need to be considered. First, it could increase outlays for the disposal program from the current rate of under $300 million to as much as $800 million, which would certainly, as it currently stands, increase the Federal deficit unless corresponding reductions were made in other programs under the existing budget.

Second, the proposal would reduce congressional control over the disposal program because expenditures from the revolving fund would not be subject to annual appropriations.

And third, the proposal does have some implications on the long-term financial health of the disposal program, how funds for the disposal program may be used and how they would be expended. For example, the proposal provides DOE general authority to use revolving funds to construct or expand facilities. This appears, based on our review by our general counsel, to provide a broader grant of the authority than DOE now currently enjoys under the act.

Under current law, no funds from the nuclear waste fund may be expended by the Secretary for the construction or expansion of any facility unless such construction or expansion is expressly authorized by the Congress. The proposal also would allow, perhaps, storage of spent nuclear fuel at reactor sites as a permissible use of funds from the revolving funds. Allowing funds to be used for this purpose would, according to the Secretary, enable DOE to possibly compensate utilities for their on-site spent fuel storage costs after 1998 if the Department is unable to accept waste by that date.

Finally, I think by the year 2010, when, according to DOE's schedule, the repository at Yucca Mountain will be ready to operate, utilities' nuclear plants will, in increasing numbers, be reaching the end of their 40-year operating licenses. As these plants are retired, the fee base that the program now receives and the revenues will decline. However, the costs of shipping the waste to the repository and operating that repository will still lie ahead for DOE.

The Department's most recent cost estimates for the disposal program, made in 1990, shows that the cost to dispose of waste in the repository over a 30-year period would be about $12 billion. Therefore, as you consider such proposals, any increase in the use of disposal program revenues, whether by means of a revolving fund or even higher annual appropriations, must be carefully monitored to ensure that these funds will be available to pay the costs of the program once a repository has been completed.

If I could just briefly, in conclusion, DOE is only requesting about half of the funds that it estimated that it would need. Funds spent have not emphasized the central science and technology activities with most of the funds in the years we looked at allocated to the project to maintain project infrastructure.

DOE is reducing the scope and trying to reduce costs. DOE will almost certainly not have a MRS facility available in 1998, and having an operational repository is definitely moving further in the future.

We and others are raising questions today about the pace and the direction of the disposal program. We know that the Congress wants a repository and you passed laws to make it happen. These laws have included certain assumptions that may no longer be applicable or perhaps invalid. Examples are having an earlier repository, being able to obtain a willing host, and even getting at the linkage that currently exists in the acts between developing an interim storage and final storage.

DOE, quite frankly, has marched to designing a program that follows the course like building a construction project. In reality, we are probably dealing with a one-of-a-kind project here that basically needs a lot of flexibility in making some course changes. Ten years have passed. We believe that an independent review of the disposal program is in order.

Let me say, as Dr. Cantlon of the board said earlier in his testimony, that their concerns can be addressed without slowing the momentum of site characterization. We also are not suggesting that the program be stopped while this review takes place.

We recommend that the Secretary of Energy review the program goals and objectives in the context of the program's current low funding priority that is occurring. We also believe that the Congress should defer consideration of the legislation that would change the method of funding for adding funds for DOE until the Secretary of Energy has completed her review of the program and, most importantly, an independent review of the program has been completed.

This concludes my remarks and we will be glad to answer questions at the appropriate time.

Mr. LEHMAN. Thank you, Mr. Wells.

[Testimony resumes on p. 53.]

[The prepared statement of Mr. Wells follows:]

STATEMENT OF JIM WELLS, ASSOCIATE DIRECTOR, ENERGY AND SCIENCE ISSUES, RESOURCES, COMMUNITY, AND ECONOMIC DEVELOPMENT DIVISION, GENERAL ACCOUNTING OFFICE

Messrs. Chairmen and Members of the Subcommittees:

We are pleased to be here today to discuss the Department of Energy's (DOE) disposal program for highly radioactive waste. Our testimony will be drawn primarily from our May 1993 report on the scientific investigation of Yucca Mountain, Nevada as a potential disposal site.[1] In this report, we reviewed whether the level of funding for the site investigation project would permit DOE to meet its schedule and, if not, how long the investigation might take. We also examined whether DOE's initiatives to streamline the investigation could affect its technical quality. In addition to summarizing our findings on these issues, our testimony today will address DOE's recent proposal for establishing a revolving fund for the disposal program.

In summary, we found that:

-- DOE has given a relatively low priority to scientific investigations of Yucca Mountain. DOE is only requesting about half the funds it estimates are needed to complete the investigation project on schedule because of competition for funds among all of its energy-related programs and competing activities within the disposal program.

-- If DOE continues to request and allot funds for the investigation project at recent levels, the project could take at least 5 to 13 years longer than planned and increase the total cost of the disposal program.

-- To streamline the project, DOE has compressed the time permitted for various scientific studies and is considering similar measures to reduce costs. These initiatives increase the risk that the investigation of the site will be inadequate. Moreover, they have come at a time when unanticipated technical issues have emerged that could lengthen the investigation project.

-- DOE wants to establish a revolving fund to ensure that adequate funds are made available to the disposal program. The Department's proposed legislation would make more funds available to accomplish program objectives; it does, however, have implications for the federal deficit, congressional oversight, and the program's financial health over the long term that also need to be considered.

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[1]Nuclear Waste: Yucca Mountain Project Behind Schedule and Facing Major Scientific Uncertainties (GAO/RCED-93-124, May 21, 1993).

BACKGROUND

The Nuclear Waste Policy Act of 1982, as amended in 1987, requires DOE to investigate Yucca Mountain and, if the site is selected for a repository, to apply to the Nuclear Regulatory Commission (NRC) for a license to construct a repository. The amended act also authorizes DOE to develop a monitored retrievable storage (MRS) facility for storing nuclear waste temporarily before disposing of it permanently in a repository. However, the amendments prohibit, among other things, construction of an MRS facility until NRC has authorized DOE to construct a repository.

In 1989, DOE established the current schedule for the investigation of Yucca Mountain and defined the technical requirements to determine the site's suitability and prepare a license application. It also developed a formal estimate of the annual cost to complete these requirements on schedule. DOE estimated that the investigation of the site and preparation of a license application could be completed in 2001 at a total cost in year-of-expenditure dollars of $6.3 billion[2] and that, if the site proved to be suitable, a repository could be in operation in 2010. DOE also said it would work with the Congress to modify the statutory links between the repository and an MRS facility and that it would embark on an aggressive program to develop a facility and begin accepting nuclear waste there by 1998 or soon thereafter. DOE has since relied on the Office of the Nuclear Waste Negotiator to negotiate an agreement with a state or Indian tribe to host an MRS facility on DOE's schedule.

SITE INVESTIGATION IS LOW PRIORITY

A significant gap exists between the amounts of funds that DOE has estimated are needed to complete the investigation of Yucca Mountain on schedule and the amounts budgeted and appropriated. For fiscal years 1991 through 1993, DOE requested only about one-half of the $1.2 billion that it had estimated it would need for that time period. The budget proposed for fiscal year 1994 would continue this trend. There are two reasons why the actual funding requested by DOE is so much less than estimated needs.

First, the disposal program competes with other DOE programs for funds. The Budget Enforcement Act of 1990 established procedures for reducing or limiting growth in the federal budget deficit each year through fiscal year 1995 by, among other things,

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[2]DOE arrived at this figure by first estimating the total cost of the site investigation in constant 1992 dollars. The total estimated cost was almost $5.7 billion. DOE then applied escalation rates to the constant dollar estimates for each year after 1992 to determine the estimated cost in year-of-expenditure dollars.

setting yearly spending limits on discretionary spending. Thus, although the disposal program is funded from a special fund in the Treasury, called the Nuclear Waste Fund, it competes with all other programs within DOE for the Department-wide budget allocation provided each year by the Office of Management and Budget.

Second, within the appropriation that DOE receives for the disposal program, site investigation activities have had to compete for funds with other program objectives and priorities. In 1989, DOE established two program objectives of equal rank: (1) to begin accepting utilities' waste in 1998 (by transporting it to an MRS facility for temporary storage) and (2) to begin permanently disposing of waste in a repository in 2010. Although the budget for the disposal program has not been adequate to fund all of the program's activities at planned levels, DOE has tried to meet both of its program objectives.

For example, in January 1992, DOE's disposal program director stated that DOE would not take any action, such as deferring the procurement of transportation casks, that would prevent DOE from beginning to accept waste in 1998. When faced with shortfalls in appropriations, the director said that DOE would fund, in descending order of priority, (1) the foundation, or infrastructure,[3] of the Yucca Mountain project to maintain its continuity; (2) activities related to developing an MRS facility and a transportation system at levels sufficient to allow acceptance of waste in 1998; and (3) site investigation activities that would enable DOE to maintain its schedule for the repository.

These priorities for the disposal program have limited progress on the Yucca Mountain project because the scientific and technical activities that must be completed to investigate the site have been last in line for funding. In fiscal year 1992, for example, DOE used $106 million of its program appropriation of $275 million for infrastructure activities and used another $110 million for other program activities, such as developing a waste transportation system. This left only $60 million, or 22 percent, of the program appropriation for scientific and technical activities. The latter amount is only one-third of what DOE had estimated that it would need for scientific and technical activities.

We and others have questioned DOE's pursuit of dual program objectives. For example, in a September 1991 report, we said it

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[3]According to DOE, infrastructure costs are incurred to manage contractors' activities; provide assistance to Nevada, its university, and affected local governments; operate and maintain facilities and equipment; comply with applicable laws and regulations; and provide training to staff, communicate with the public, and implement a quality assurance program.

was highly unlikely that DOE could develop an MRS facility by 1998 because, among other reasons, it was unlikely that a state or Indian tribe would be willing to host this facility.[4] Also, in a March 1992 report, we concluded that in the absence of an MRS facility, DOE would not need to procure transportation casks for nuclear waste until about 2005.[5] We therefore recommended that the Department bring its cask development activities to an orderly close. DOE disagreed with our positions because it believed that it would meet its 1998 objective for beginning to accept waste for storage at an MRS facility. Subsequently, however, DOE acknowledged that the Office of the Nuclear Waste Negotiator had not succeeded in finding a site for the facility in time to permit the Department to meet its schedule for accepting waste at an MRS facility.

CURRENT FUNDING PRIORITY WILL ADD YEARS TO PROJECT SCHEDULE

If DOE continues to request and allot funds for the investigation of Yucca Mountain at the same levels it has in recent years, it could take at least 5 to 13 years longer than the Department had estimated to complete all of the planned investigation activities and increase the total cost of the disposal program. For example, surface drilling at the site, through which core samples of rock are extracted from the ground for study, has been slowed in part because of funding limitations. Completing the drilling program on schedule would require working 24 hours a day, 7 days a week, but current funding can support only one 8-hour shift, 5 days a week. At this rate, collecting core samples for analysis will take at least 3 years longer than planned.

We estimated how long it could take DOE to complete the originally planned scientific and technical activities if annual funding for the Yucca Mountain project continued at assumed levels --$200 million, $250 million, and $300 million (in 1992 dollars). These funding levels are similar to recent actual funding levels for the project. According to DOE's cost estimate for the project, about 45 percent of the required funds would be used for scientific and technical activities and about 55 percent would be used for infrastructure activities. Using this ratio of costs, we projected the number of years it would take to complete the planned scientific and technical activities at the three funding levels we had selected.

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[4]Nuclear Waste: Operation of Monitored Retrievable Storage Facility Is Unlikely by 1998 (GAO/RCED-91-194, Sept. 24, 1991).

[5]Nuclear Waste: Development of Casks for Transporting Spent Fuel Needs Modification (GAO/RCED-92-56, Mar. 13, 1992).

Our estimates show that it would take from 5 to 13 years beyond 2001 to complete the planned scientific and technical activities. These estimates are conservative because they assume that DOE would be able to maintain the same ratio of spending on scientific and technical activities and infrastructure activities--45 percent and 55 percent. In fiscal year 1992, however, DOE allocated only 36 percent of the Yucca Mountain project's allotment of funds to scientific and technical activities, and a similar situation occurred in fiscal year 1991.

Unless DOE reduces the proportion of funds for the Yucca Mountain project that it has been spending on infrastructure activities and uses more of the available funds for scientific and technical activities, the project's total cost, incurred over a longer period, will increase. The increase will occur because, for each dollar of scientific and technical work performed, DOE is incurring higher infrastructure costs than it had projected in the project's cost estimate. For example, DOE estimated that it would spend about $1.25 on infrastructure activities for every dollar it expected to spend on scientific and technical activities. In fiscal year 1992, however, DOE spent about $1.77 on infrastructure activities for every dollar it spent on scientific and technical activities.

A longer site investigation period would also increase the cost of the disposal program. DOE's $6.3 billion cost estimate for the project includes only the costs of DOE's contractors for the Yucca Mountain project. It does not include the project's share --about $46 million in fiscal year 1992--of the costs of programwide managerial and technical support. If the site investigation takes 5 to 13 years longer to complete, the program's costs could increase from $230 million to $600 million (in 1992 dollars).

EFFORTS TO STREAMLINE THE PROJECT CONSTRAIN SCIENTIFIC INVESTIGATIONS

DOE recently compressed the time allowed for various site investigation activities to maintain its schedule for the Yucca Mountain project and may take similar steps to reduce costs. Project scientists have expressed concern that these initiatives increase the risk that DOE will not be able to demonstrate that the site meets all licensing requirements. At the same time, the Nuclear Waste Technical Review Board has concluded that DOE may not be allowing enough time to study complex technical issues as thoroughly as necessary to complete a sound license application.

In September 1992, DOE completed a study leading it to conclude that, by adjusting the scope of the site investigation, it could still submit a license application to NRC in 2001. In conducting the study, DOE assumed that funding for the Yucca Mountain project would be adequate to complete all investigation

activities on time. DOE instructed its contractors that all data required for a license application in 2001 would have to be gathered by 1999 and that planned work would have to be adjusted as necessary. Thus, adjustments made during the study to contractors' scope of work compressed the time allowed for completing various scientific and technical activities.

Lawrence Livermore National Laboratory, which is responsible for developing the packaging for the waste that would be put into a repository at Yucca Mountain, expressed its concern to DOE that a credible license application could not be prepared by 2001 under the revised constraints and added that these constraints reflect DOE's growing tendency to focus on superimposed milestones rather than on genuine technical capabilities.

DOE also began an effort in September 1992 to reduce the total cost of the Yucca Mountain project by as much as 10 percent. Project contractors are concerned that reducing their funding will also reduce the amount of scientific and technical work that can be completed and, therefore, jeopardize the scientific quality of a future license application for a repository. For example, the U.S. Geological Survey, which is responsible for much of the scientific investigation of Yucca Mountain, stated in a September 1992 letter to DOE that further reducing the scope of the Survey's work would increase the licensing risk and would not enable the Survey to resolve questions raised by the National Academy of Sciences and the Nuclear Waste Technical Review Board.

The Nuclear Waste Technical Review Board has expressed concern that DOE's reliance on the current schedule may not allow enough time to (1) collect and analyze some data, (2) resolve unanticipated technical problems and questions about unpredictable conditions important to the repository's performance, and (3) evaluate the repository's design and the alternatives for the waste management system. In a recent report, the Board urged DOE to consider a management approach under which existing schedules would be taken seriously but not allowed to drive the program's scientific and technical goals. The Board said that attempting to meet unrealistic long-term deadlines might force DOE to make important technical decisions without first performing the appropriate technical and scientific analyses.

Emerging technical issues illustrate the Nuclear Waste Technical Review Board's concern over DOE's schedule. For example, the Board is concerned that DOE's strategy for managing the heat generated by spent fuel in the repository over thousands of years is not supported by scientific evidence. Therefore, the Board has recommended that the agency complete extensive, previously unplanned, testing. This issue has implications that go beyond safety to the potential disposal capacity of the site and to the length of time that nuclear waste might need to be stored for cooling before it is emplaced in a repository.

In addition, new findings at the Ghost Dance Fault at Yucca Mountain could affect the time needed to adequately characterize the site. Recent findings by the Survey indicate that this fault, which crosses Yucca Mountain, may be more complex than originally thought. If this is the case, according to Survey officials, they may need to expand their examination of the site, and their examination results could affect the location and design of the repository and a determination about the suitability of the site. The Survey's representative said that the scientific investigation of the fault illustrated how unanticipated geologic findings might require additional time and resources for further investigation but that DOE's planned cost reductions would not, if implemented, permit the Survey to resolve this issue.

DOE WANTS TO ESTABLISH A REVOLVING FUND TO INCREASE PROGRAM FUNDING

On May 25, 1993, the Secretary of Energy asked the Office of Management and Budget to approve proposed legislation that would establish a Nuclear Waste Revolving Fund to provide an "appropriate" level of funding for the disposal program. The Secretary noted that the Nuclear Waste Fund annually receives about $600 million in disposal fee payments, earns $200 million in interest from Fund investments, and has a current balance of about $4 billion.

Under DOE's proposed language, beginning in fiscal year 1994, all income realized on the total face value of amounts in the Nuclear Waste Fund would be credited to a separate account in the Treasury known as the Nuclear Waste Revolving Fund. In addition, beginning in fiscal year 1995, all nuclear waste fund revenues received by the Secretary and income realized on this revenue would be credited to the revolving fund account. These funds would be available to the Secretary for waste storage, disposal, and related activities, including the acquisition of real property, the construction or expansion of facilities, and the storage of waste at reactor sites, without further appropriation. In addition, the Secretary could request an appropriation from the Nuclear Waste Fund if the balances in the revolving fund account were insufficient to carry out these activities.

In our May report, we discussed the implications of a revolving fund at a conceptual level because the details of DOE's proposal for a revolving fund were not then available. Since then, however, we have reviewed DOE's specific proposal. The proposal would, on the one hand, help ensure that an increased level of revenues were available to the agency to accomplish its objectives of timely acceptance and disposal of nuclear waste. On the other hand, the proposal raises several issues that also need to be considered. First, the proposal could increase annual outlays for the disposal program from the current rate of under $300 million to

as much as $800 million. This would increase the federal deficit unless corresponding reductions were made in other programs.

Second, the proposal would reduce congressional control over the disposal program because expenditures from the revolving fund would not be subject to annual appropriations. As we pointed out in our report, congressional appropriations committees recently expressed their concern about the "spiralling" cost estimates for investigating Yucca Mountain and conducting other aspects of the program and stated that they were prepared to give DOE specific line-item direction in the future. This type of committee scrutiny would be missing under DOE's proposal.

Third, the proposal has implications for the long-term financial health of the disposal program. Not only would the program revenues available to DOE be greatly increased, as discussed above, but DOE's proposed language would modify and expand how funds for the disposal program may be used. For example, the proposal provides authority for using the revolving fund for such activities as constructing or expanding facilities. This appears to be a broader grant of authority than DOE now enjoys. Under current law, no funds from the Nuclear Waste Fund may be expended by the Secretary for the construction or expansion of any facility unless such construction or expansion is expressly authorized by the Congress. The proposal also adds storage of spent nuclear fuel at reactor sites as a permissible use of funds from the revolving fund account. Allowing funds to be used for this purpose would, according to the Secretary, enable DOE to possibly compensate utilities for their onsite spent fuel storage costs after 1998 if the Department is unable to accept waste by that date.

By 2010, when, according to DOE's schedule, a repository at Yucca Mountain will be ready to operate, utilities' nuclear plants will, in increasing numbers, be reaching the end of their 40-year operating licenses. As these plants are retired, the fee base for program revenues will decline. However, the costs of shipping the waste to the repository and of operating the repository will still lie ahead for DOE. The Department's most recent cost estimate for the disposal program, made in 1990, shows that the cost to dispose of waste in the repository over a 30-year period would be about $12 billion in constant 1988 dollars. Therefore, any increase in the use of disposal program revenues, whether by means of a revolving fund or higher annual appropriations, must be carefully monitored to ensure that funds will be available to pay the costs of the program once a repository has been completed.

CONCLUSIONS AND RECOMMENDATIONS

In 1989, DOE established dual objectives of beginning to accept waste at an MRS facility in 1998 and having a repository ready to operate in 2010 by, in part, submitting a license

application to NRC in 2001. Budget requests, however, show that DOE has requested only about one-half of the funds for the Yucca Mountain project that it had estimated would be needed. Furthermore, DOE's priorities for using the funds have not emphasized essential scientific and technical activities. Instead, DOE has pursued its objective of accepting waste in 1998 and has used most of the funds allotted to the project to maintain the project's infrastructure.

DOE has reduced the scope of the investigation of Yucca Mountain in an effort to adhere to its schedule and is considering further measures to reduce costs. The Department has also developed proposed legislation to change the way the funds are provided for the disposal program so that annual funding would be based on need rather than on ability to compete with other programs for limited appropriations. These initiatives fall short of the mark, however, because they address only specific problems perceived by DOE. The initiatives do not comprehensively address the disconnection between funding and policies for the disposal program.

Specifically, DOE will almost certainly not have an MRS facility available by 1998, and it is uncertain whether any state or Indian tribe will volunteer to host an MRS facility on any schedule. Yet, the time when DOE might have an operational repository is moving farther into the future, in part because of the relatively low priority DOE has assigned to funding essential investigation activities at Yucca Mountain. These conditions raise questions about the pace and direction of the disposal program that must be answered if the program is to proceed in an orderly fashion:

-- What are the federal government's obligations to begin accepting nuclear waste in 1998?

-- How can considerations about the investigation of Yucca Mountain be separated from considerations about the temporary storage of nuclear waste until a repository has been developed for permanently disposing of the waste?

-- Should essentially all of the funds appropriated for the disposal program be used to investigate Yucca Mountain?

-- Can enough funds be made available to investigate Yucca Mountain, meet appropriate short-term objectives of the program, and ensure the long-term solvency of the Nuclear Waste Fund?

-- How might DOE reorganize and manage the Yucca Mountain project to increase the efficiency with which it uses the funds allotted to the site investigation and thereby minimize the duration and cost of the investigation?

These questions are not all-inclusive but are ones that have arisen from our recent review. Some of these questions address basic policy issues pertaining to the management and disposal of nuclear waste. For this reason, we believe that an independent review of the disposal program is in order. We are currently working on a report that will, among other things, suggest ways that such a review might be carried out.

Meanwhile, it is imperative that DOE, as the federal agency charged with implementing the disposal program, address questions pertaining to the interrelationships between program funding and objectives and decide how the Yucca Mountain project should be organized and managed before it asks the Congress to change the method of funding the program. Therefore, we recommended in our May report that the Secretary of Energy review the program's goals and objectives in the context of the program's current low funding priority. In addition, we recommended that the Secretary review and adjust the project's cost and schedule each year in view of actual allotments of funds to the project, realistic assessments of future funding for the project, and progress in resolving technical issues.

We also recommended in our May report that the Congress defer consideration of legislation that would change the method of providing funds to DOE for the disposal program until (1) the Secretary of Energy has completed the review of the program that we recommended, (2) an independent review of the program has been completed, and (3) appropriate legislative, policy, and/or programmatic changes to the program have been implemented.

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Messrs. Chairmen, this concludes my prepared remarks. I will be pleased to respond to any questions from the Subcommittees at this time.

(302092)

Mr. LEHMAN. At this time we will recognize Mr. Barrett.

STATEMENT OF LAKE H. BARRETT

Mr. BARRETT. Thank you, Mr. Chairman.

My name is Lake Barrett. I am the Acting Director of the U.S. Department of Energy's Office of Civilian Radioactive Waste Management.

I am pleased to be here today to present an overview of that program and to discuss the recent findings and recommendations of the Nuclear Waste Technical Review Board and the General Accounting Office.

I would like to submit my formal statement for the record and briefly highlight my testimony.

Mr. LEHMAN. Without objection.

Mr. BARRETT. Thank you.

I would like to talk briefly about the recent accomplishments of the program as well as the steps Secretary O'Leary is taking in her ongoing review of the program.

We are making significant progress in our characterization of Yucca Mountain. A more detailed discussion of the progress is contained in the formal statement.

Last November, we began surface preparation for the Exploratory Studies Facility, the underground laboratory that will consist of some 14 miles of tunnels where our scientists will conduct vital geotechnical studies critical to determining whether or not Yucca Mountain is suitable for development of a geologic repository.

We started actual underground construction using the drill and blast method this April, and we are now approximately 130 feet into the mountain. Next year, we will switch our construction method to mechanical excavation with a 25-foot diameter boring machine. This past May, we awarded a contract for purchase of this machine. And we plan to begin installing the tunnel boring machine in the starter tunnel late next spring and begin tunnel boring operations approximately 60 to 90 days later.

With this machine, we expect to complete a one-mile tunnel and reach the main test level, approximately 1,000 feet below Yucca Mountain, late in the fall of 1994.

In addition, we have an extensive surface-based testing program that operates in parallel. We have developed our LM-300 specialized deep dry drilling rig. We have now reached approximately 880 feet of our second deep borehole which we began after completing drilling our first deep borehole to a depth of nearly 1,700 feet. The purpose of these deep boreholes is to conduct tests of air permeability, hydrogeochemistry, matrix hydrologic properties, and to do seismic profiling.

We intend to start closure on scientific issues with the Nuclear Regulatory Commission as early as practicable as site characterization proceeds. This should result in overall cost and schedule savings.

For example, by the end of fiscal year 1994, we hope to reach closure with the Nuclear Regulatory Commission staff on the issue of extreme erosion and to present a rationale to the Commission supporting resolution of the seismic hazard issue. If the erosion issue

can be closed, we project a $2 million to $4 million savings by the elimination of unneeded work in this area.

It must be noted that our activities to study Yucca Mountain are now only limited by funding. We agree with the recent GAO report that, due to less than optimum funding, the project schedule has slipped resulting in increased total project costs. If we had additional funds we could, for example, be doing around-the-clock drilling and buying additional drilling and excavation equipment.

Aside from the activities on Yucca Mountain, we are moving forward to develop a standardized multi-purpose canister system. This concept will facilitate a more efficient handling of spent fuel at reactors during at-reactor storage, during transportation, for storage at a Federal receiving facility, and would also be compatible with the ultimate geologic disposal system. This multi-purpose canister system is building upon current technology that Congressman Kreidler referred to earlier. And, in fact, this morning I met with 150 representatives of the industry, including Pacific Nuclear, to build upon that to be sure this is integrated in our program along the lines that Dr. Cantlon referred to earlier.

In order to secure a consistent and adequate budget for the program in the future, we are now fully involved with the Office of Management and Budget in developing an alternate funding mechanism so the ratepayers' funds will be fairly applied to this program.

Secretary O'Leary is reviewing the program, as was stated. She has met with many external parties, reviewed numerous reports, and has been reviewing the status of the program. During this ongoing review, she has found that the program needs to refocus its efforts to improve in two broad areas: Increased emphasis on the highest quality scientific work and the more effective inclusion of external parties in program development and its implementation.

During the past several months, the program has received recommendations from a number of sources. Earlier this spring, as has been described, the General Accounting Office published its report that criticizes the program for continuing to pursue dual objectives of developing a repository by 2010 and accepting utilities' spent nuclear fuel by 1998, while under budgetary constraints.

As I stated before, we agreed that, due to less than optimum funding, schedules have slipped resulting in increased project costs.

The GAO findings are based on program funding levels and activity allocations for fiscal years 1991 and 1992 and do not account for changes in allocations for fiscal year 1993 and those we have projected for 1994. For example, we have approximately doubled the amount of scientific funding relative to 1992.

In addition, the GAO report does not reflect a number of corrective actions that have already been implemented. Examples are: Transferring funds from headquarters to the Yucca Mountain site so that the Yucca Mountain site characterization is number one in our priority scheme. And we have decreased the emphasis on storage facility and on transportation as well.

We also have initiated significant efforts to reduce characterization costs including monthly review of all contractor activities at Yucca Mountain.

Further, it must be understood that when GAO categorizes costs as infrastructure, this category includes legislated and necessary oversight and compliance activities, such as funding for the State of Nevada and affected local counties; compliance with environmental laws, such as the Resource Conservation and Recovery Act; and the interaction with the Nuclear Regulatory Commission and the Nuclear Waste Technical Review Board. In fact, we believe that over half of the so-called "infrastructure costs" could be categorized as compliance activities which are necessary before most scientific or technical work can begin.

Secretary O'Leary has taken a number of initiatives that respond directly to the GAO findings, including the initiation of a collaborative consultative process for external review of the program and instructing the program to develop a more flexible schedule based on interim milestones.

We believe that collectively these actions accommodate many of the valid concerns raised by GAO. We will continue to examine its recommendations and findings in an effort to further improve the program.

In March of this year, the Nuclear Waste Technical Review Board issued its "Special Report" which has already been described.

Secretary O'Leary has acknowledged that the program has fallen into the untenable position of attempting to meet rigorous schedules without adequate funding. As mentioned above, the Secretary has directed the development of a program plan that is not schedule-driven but that demonstrates measurable progress and places increased emphasis on performing the highest possible quality scientific work.

We are also evaluating system concepts and working with the Nuclear Waste Technical Review Board to develop a program approach that addresses its specific concerns. For example, on July 13 and 14, in the next 2 weeks, a meeting will be held in Denver to discuss thermal loading, a subject which is an important feature in its Special Report, and is a very important issue to us also.

Secretary O'Leary will consider these GAO and TRB reports and other past recommendations regarding program management and organization as she prepares her new guidance for the program.

We believe that the recent initiatives and future program plans combine to form a sound program that is responsive, cost-effective, and productive, while allowing us to continue to maintain our momentum to show that significant progress is being made on this program.

I will be happy to answer any questions that the committee would like.

Mr. LEHMAN. Thank you very much and, again, I will thank all the witnesses for their testimony today.

[The prepared statement of Mr. Barrett follows:]

STATEMENT OF LAKE H. BARRETT, ACTING DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT, DEPARTMENT OF ENERGY

Chairman Sharp, Chairman Lehman and members of the subcommittees, I am pleased to be here today to present an overview of current activities of the Office of Civilian Radioactive Waste Management at the Department of Energy, including its fiscal year 1994 Budget request. This program has responsibility for implement-

ing permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste as directed by the Nuclear Waste Policy Act of 1982. By its 1987 Amendments to the Nuclear Waste Policy Act, Congress directed that site characterization activities be focused only at Yucca Mountain, Nevada to evaluate whether or not that site is suitable for development of a repository for spent fuel and high-level radioactive waste. Achieving success in implementing this program is very important to the Nation, not only because it will solve one of the greatest environmental challenges facing us—that is safe, permanent disposal of high-level radioactive waste—but also because it will allow us to maintain the significant contribution which nuclear energy currently makes to our energy demands.

With the current direction of the Civilian Radioactive Waste Management Program and the fiscal year 1994 budget request, we are responsive to President Clinton's plans for achieving National economic renewal and to his promise to make government more responsible, accountable, and cost effective. We are also directly responsive to Secretary of Energy O'Leary's recent guidance that we place greater emphasis on achieving the highest quality in our scientific work, and that we include external parties more effectively in program development and implementation.

Secretary O'Leary is continuing the review of the Civilian Radioactive Waste Management Program she began shortly after her confirmation. Last April she announced early results of her review and identified activities within the program which should proceed as planned. These included beginning construction of the Exploratory Studies Facility (ESF) and underground exploration, which she believes to be absolutely necessary to determine whether or not Yucca Mountain is suitable for a geologic repository, as well as continuing the surface-based site characterization activities where the program has realized significant gains since initiating new work in July 1991.

We are making significant progress in these areas. By the end of fiscal year 1993, we expect to complete the 200-foot starter tunnel for the ESF. As of June 29, we were 130 feet into this starter tunnel. Our budget request for fiscal year 1994 will permit tunneling of approximately 5,000 feet into the Mountain by the end of fiscal year 1994. In the spring of 1994 we expect to begin tunnel boring with a 25-foot diameter tunnel boring machine for whose purchase we have just awarded a contract to Construction & Tunneling Services, Inc. of Kent, Washington. Our budget will also permit us to continue necessary surface-based drilling and to complete two additional deep boreholes for downhole testing below the water table, as well as 17 shallow boreholes for natural infiltration studies. We also plan to achieve closure with the Nuclear Regulatory Commission staff on the issue of extreme erosion, establish that volcanism is not a site disqualifier, and complete and present to the Nuclear Regulatory Commission a rationale to support resolution of the seismic hazard issue.

Secretary O'Leary also directed that the program continue developing a multi-purpose canister system concept that would provide canisters for storage, transportation, and eventually, disposal. In fiscal year 1994 we plan to complete conceptual design and initiate certification of the design of this multi-purpose canister system.

Finally, the Secretary directed us to continue developing an alternative funding mechanism which would consider the unique aspects of the ratepayers' payments to the Nuclear Waste Fund, in order to secure a consistent and adequate budget for the program in the future. We are now actually engaged with the Office of Management and Budget on developing an alternative funding mechanism. We expect shortly to inform Congress on a proposal to change the current approach, including the possibility of amending the Nuclear Waste Policy Act.

Also as a result of her early review, the Secretary identified two new activities to be initiated immediately. These are creation of a Chief Scientist position with the Yucca Mountain Project Office; and initiation of negotiations with eligible parties on the Payments-Equal-to-Taxes issue. Regarding the Chief Scientist position, the Secretary is currently evaluating a proposal for creating such a position to oversee the scientific investigations at Yucca Mountain. The purpose of this position is to enhance the program's scientific credibility, especially with interested parties, affected governments, public interest groups, and the public. Regarding Payments-Equal-to-Taxes, we have received requests from three eligible jurisdictions: Benton County, Washington; Washington State; and Nye County, Nevada. We are now analyzing these requests and working with these jurisdictions to come to closure on the appropriate amounts for these payments. As a point of information, Payments-Equal-To-Taxes to Benton County, Washington and the State of Washington are one-time payments based on their eligibility as candidate repository sites for the period May 1986 to December 1987.

The Secretary continues to consider activities that she intends to evaluate with substantive external consultation. These include:

—ability to accept spent fuel in 1998, including possible utility compensation alternatives should that goal not be met;

—options for obtaining early spent fuel storage pending disposal, such as:

—continued support of the voluntary negotiated siting process for a Monitored Retrievable Storage Facility;

—departmental siting initiatives including the use of existing Federal facilities;

—private sector opportunities; and

—alternative repository licensing strategies.

These are issues on which it is difficult to reach consensus. Over the past months, the Secretary and her staff have evaluated many previous comments, studies, and reports prepared on this program, and have held numerous meetings and conversations with external groups and other interested parties to elicit views and suggestions. Because of the diversity of these groups with their strongly differing viewpoints and varying interests, it is a challenge to accommodate them all as we develop policies and strategies on major issues. While it may not be possible to reach consensus on all issues, we strive for that goal, especially on major program issues. Where consensus is not achievable, we will at least identify views and concerns with the objective of responding to them wherever possible.

As the next step in this process, we are preparing to hold a series of issue-oriented meetings to discuss major policy issues facing the program and to elicit opinions of participants. The proceedings of these meetings will be recorded and will be publicly available. The first meeting to discuss the overall process is planned for August 3.

Since mid-1991, the program has made significant progress in conducting scientific investigations and gathering the data necessary to evaluate Yucca Mountain and to determine whether or not that site is suitable for development as a repository. New work was begun after issuance of required permits by the State of Nevada, and consisted of extensive surface-based activities including hydrologic and geologic drilling, trenching, seismic monitoring, and soil sampling. This work is directed at characterizing site hydrology, geologic features, existing faulting conditions, seismic activity and volcanism. A series of technical models and reports will be developed in 1994. These models and reports will represent the synthesis and integration of information supporting the geology, hydrology, climatology, and geochemistry studies. Extensive environmental studies were conducted to establish the existing baseline and to provide the basis for any mitigation and restoration activities that may be required. These activities will be continued, along with our extensive public outreach activities.

To build on our continuing progress in characterizing the Yucca Mountain site, our fiscal year 1994 budget request for the Civilian Radioactive Waste Management Program is $380 million. This includes $260 million from the Nuclear Waste Fund, which is funded through fees paid by ratepayers of nuclear-generating utilities, and $120 million from the Defense Nuclear Waste Disposal appropriation. Our first priority in this budget is Yucca Mountain site characterization, and $262 million of our request is for those activities. Also, in response to the Secretary's guidance, in 1994 we are requesting $15.7 million in the spent fuel storage area that focuses on development of the multi-purpose canister. The remainder of the budget is allocated for systems integration efforts; regulatory compliance activities; interactions with the Nuclear Regulatory Commission and the Nuclear Waste Technical Review Board; international cooperative agreements in support of Yucca Mountain activities; State and local oversight of the Yucca Mountain project; and program administration.

To further enhance site characterization progress, a total of $22 million has been shifted within the Program to Yucca Mountain scientific investigation activities. This comes from two sources. First, over $12 million has been shifted from Headquarters activities to the Yucca Mountain Project. Second, approximately $10 million has been shifted from Yucca Mountain infrastructure costs to scientific work.

During the past several months, the Civilian Radioactive Waste Management program has received input from a number of sources, including the fiscal year 1993 Appropriations Conference Report, the General Accounting Office, and the Nuclear Waste Technical Review Board. We have carefully evaluated this input, prepared responses, and developed plans to implement recommendations wherever possible.

The fiscal year 1993 Appropriations Conference Report expressed continuing concern over cost estimates for the site characterization of Yucca Mountain. In response to this Conference Report, we have taken a number of corrective actions: (1) increased emphasis on, and funding for, Yucca Mountain site characterization; (2) decreased emphasis on monitored retrievable storage and transportation; (3) shifted funding from DOE Headquarters to scientific studies at Yucca Mountain; (4) initi-

ated a significant effort to reduce site characterization costs, including strengthening our oversight of contractor accounting and cost reporting, our control of project baselines and our direction of program activities through guidance and work authorization; and (5) conducted a program business management review. We believe that, as a result, we have a program plan and budget request for fiscal year 1994 that is based on cost containment and productivity enhancement, while still assuring full compliance with all safety, environmental, health, and quality assurance requirements.

Earlier this spring, the General Accounting Office GAO published a report entitled "Nuclear Waste: Yucca Mountain Project Behind Schedule and Facing Major Scientific Uncertainties." In this report, GAO criticizes the Civilian Radioactive Waste Management Program for continuing to pursue the dual objectives of developing a repository by 2010 and accepting utilities' spent nuclear fuel by 1998 while under budgetary constraints. It also recommends that the program undergo independent evaluation.

This study was initiated a year ago and therefore does not reflect a number of corrective actions that have already been implemented. The GAO findings, based largely on program funding levels and activity allocations from fiscal years 1991–92, do not account for changes in allocations for fiscal year 1993 or proposed activity levels for fiscal year 1994. As previously discussed, Secretary O'Leary has already initiated a collaborative, consultative process for an external review of the program. She has also instructed the Civilian Radioactive Waste Management Program to develop a more flexible schedule based on interim milestones. We believe that collectively, all of these actions work to accommodate many of the valid concerns raised by the GAO. We will continue to examine the GAO recommendations and findings in a context of ways for improving the program.

The Nuclear Waste Technical Review Board (NWTRB) was created by the Nuclear Waste Policy Amendments Act of 1987 and is charged with evaluating the scientific and technical validity of activities undertaken by the Department of Energy in its civilian high-level radioactive waste management program. This includes evaluating the characterization of the Yucca Mountain site as a potential location for a repository. In March of this year, the NWTRB issued a "Special Report to Congress and the Secretary of Energy" in which it observes several areas where modifications are needed and recommends corrective actions. This report observes that unrealistic deadlines are driving the program, specifically the 1998 date for Federal acceptance of spent nuclear fuel from utilities, and the 2010 date for commencement of repository operations. It also observes the need for an integrated waste management plan, and the need for improvement of the program's management.

Secretary O'Leary acknowledges that the program has fallen into the untenable position of attempting to meet schedules without adequate funding. She has directed that a program plan be developed that is not schedule-driven, but that recognizes that measurable progress must be made. Recognizing the importance of a well-integrated plan, we are currently evaluating system concepts and working with technical staff of the NWTRB to ensure development of a program approach that will address their specific concern. In addition, the review currently underway by Secretary O'Leary will consider these and past recommendations regarding program management and organization as she prepares her new guidance for the program.

Section 801 of the Energy Policy Act of 1992 requires that, based upon and consistent with the findings and recommendations of the National Academy of Sciences, the Environmental Protection Agency will promulgate new public health and safety standards for protection of the public from releases from radioactive materials stored or disposed of in a repository at the Yucca Mountain site, if it is found suitable. The National Academy of Sciences is currently evaluating this issue and plans to release their report by December 1994. The Department interacts with the Academy upon its request to provide information to support their evaluations. In addition, the Academy holds regular public meetings in which the Nuclear Regulatory Commission, the Environmental Protection Agency, the State of Nevada, as well as the Department and others, participate to provide information for its consideration. The first such meeting was held last May 27–29 in Las Vegas, Nevada.

Section 803 of the Energy Policy Act of 1992 requires that the Department of Energy prepare and submit to Congress a report discussing whether current programs and plans for management of nuclear waste as mandated by the Nuclear Waste Policy Act of 1982 are adequate for management of any additional volumes or categories of nuclear waste that might be generated by any new nuclear power plants that might be constructed and licensed after the date of the enactment of this Act. A draft of this report was released for public review and comment last month. Two public meetings will be held later this summer to answer questions about the report

and its findings. We are on schedule to submit the final report to Congress by the end of October.

We believe that the recent initiatives and future program plans described above combine to form a sound program that is responsive, cost-effective, and productive, and will allow us to continue to maintain our momentum and show significant progress toward meeting our program goals, especially our first priority of determining whether or not the Yucca Mountain site is suitable for development as a repository. They will also allow us to increase the number, and ensure the quality, of our scientific investigations. Finally, we believe these initiatives will also allow us to move forward to establish new and more effective methods of external interaction and to seek consensus with interested parties, affected governments, public interest groups, and the public itself wherever possible.

Mr. LEHMAN. I guess what we have got here basically is a conflict between deadlines that have been set in law and the financial constraints that are there and the need on the other hand for comprehensive, credible, politically and legally, sustainable scientific analysis.

Mr. Barrett, both Dr. Cantlon and Mr. Wells representing the Technical Review Board and the GAO are very critical of where they see DOE coming down here, that is, on cutting back on what they think is the emphasis on scientific analysis and research and some potential problems that that might create not just for safety but for the credibility of the whole program and our ability to go forward with it up against what are going to be an enormous number of challenges. They both note that you proposed to reduce both the duration and the scope of the scientific tests at Yucca Mountain in response to those scheduling and funding measures.

Some of your project scientists, in addition to that, have been very critical of those reductions. For example, the project officer at the Lawrence Livermore Laboratory a year ago said: "It is my firm view and that of my technical staff that a credible license application cannot be prepared by 2001 given the constraints prescribed in this recent work plan request. The recent work plan exercise reflects a growing tendency of the project office and M&O to rely on superimposed milestones rather than the genuine technical capabilities. We are deeply concerned that this specious information will be used to persuade senior DOE management and ultimately Congress that a 2001 licensing date is achievable when, given the constraints in this budget exercise, that is highly questionable."

And similarly, the project officer at USGS wrote last August: "This strategy does result in less earth science knowledge about the potential repository site and therefore increased risk of failure at licensing. For example, some of the questions or concerns addressed by the National Academy of Sciences, the Nuclear Waste Technical Review Board and others will not be resolved by the reduced program."

I guess my question is, in light of that, the criticism that your scientific program has long received from so many quarters, the high likelihood of unexpected scientific questions arising during characterization, and the Secretary's directive that this program should be driven by science rather than schedules, how can you justify, then, pursuing a reduced science program at this time?

Mr. BARRETT. The report that has been quoted here is the 2001 study that we did within the program to evaluate what could be done with various funding scenarios. It is only a study. It has not changed the baseline program. The science still drives the program

and that exercise was to see what could be done for what costs. If you had infinite dollars, the scientists would still wish to do more.

There needs to be adequate science done and it has to be good quality science that would sustain a proof to the overseers, the Nuclear Regulatory Commission in the licensing process, the State of Nevada, the Nuclear Waste Technical Review Board, that the decision of DOE regarding the site suitability would be sustained. We will not short the science by the schedule.

That was an exercise to see what we could do. We have not changed the baseline. The science will drive the program. Some of the science may be deferred and that would then defer the schedule. The science will come first to ensure that the proposed site suitability decision would be environmentally and safety sound.

Mr. LEHMAN. Is the Department at this time legally obligated to begin accepting utilities' spent fuel by 1998?

Mr. BARRETT. We have an obligation per the contract to accept fuel in 1998. I am not an attorney so I don't know exactly if it is a legal obligation or a moral obligation, but we are obligated and we are doing everything within our power to achieve that.

It is very difficult as you all know, with trying to find a host volunteer site, that we can put the fuel at. That is the main problem we have and the lack of substantial progress in that area has caused us to reallocate substantial funds from those programs of fuel acceptance to Yucca Mountain.

The only substantial work we are doing in the fuel acceptance area is along the lines of the multi-purpose canister system, which we think has great advantages for the entire Nation, the Department of Energy, and the utilities. That is the only work we are doing other than Yucca Mountain in a programmatic sense.

Mr. LEHMAN. You state that the Secretary has directed the program to develop a more flexible schedule based on, I guess, interim milestones. What does that mean with respect to the status of the ultimate milestones, 1998, and 2001, 2010 that have been driving the program in the past?

Mr. BARRETT. The 1998 date is one that is specified in the contract and is specified in the 1982 statute. The 2001 and the 2010 dates were the Department's 1989 estimates of, if we had had certain funding profiles, what we would be able to do. Those funding profiles that were projected in the 1989 study did not come to pass and, therefore, those schedules became compressed and they were very hard to recover.

If you go back in history in the 1991, 1992, 1993 budget activities, you would have seen that always in the next year there would have been almost a doubling of the program's available funding. Those never took place under the overall national budgetary concerns with the deficit. We reached a point now where the 2001 date, as both groups have stated, is probably not recoverable even if we were not under funding constraints.

Part of the long-term problem here, as the Secretary so stated, is finding some mechanism that would allow appropriate funding so that the fees the ratepayers do put into the system can be used so this important task can go forward.

Mr. LEHMAN. Assuming you got the funds that you think you need, then what is your best estimate of the time and the expense

that would be required before we get—assuming Yucca Mountain is formally accepted, when would you be able to file a license application?

Mr. BARRETT. That all depends on what the funding profile would be. If we were not funding limited——

Mr. LEHMAN. Let's suppose you got what you want.

Mr. BARRETT. If we got what we wanted, it would be shortly after 2001 if we were not funding constrained. If that is 2002 or 2003, it all depends on whether it was 1994 when we got the funds or 1995 when we got the funds and how much those funds were.

Mr. LEHMAN. What is the answer, 1 or 2 years after 2001?

Mr. BARRETT. It could be just a few years.

Mr. LEHMAN. A few years.

Mr. BARRETT. It could be a couple of years after 2001 but——

Mr. LEHMAN. What you are saying is you don't know. I hear you saying you don't know.

Mr. BARRETT. No, sir, I don't know because I can't predict what the funding will be.

Mr. LEHMAN. Assuming you got the funding—do you know what you need?

Mr. BARRETT. If we had unconstrained funding starting in 1994, 2002 would be attainable based on the work plans without cutting back along the lines that you were concerned about in your earlier question.

Mr. LEHMAN. Do you know what funds you need?

Mr. BARRETT. Yes, sir. We have a work plan that is based on the plan, yes.

Mr. LEHMAN. I guess I want to be more precise here, what we are up to. We have a requirement first for the 1998 deadline, then we have got the 2001 date. We know that based on what is occurring now you won't make those deadlines. So obviously what I am hearing you saying is we are not going to make those deadlines no matter what, so we have to have I guess in our minds some timeframe out there based upon some level of funding to get it there, and what I want is to help us help you. Tell us what that is.

Mr. BARRETT. I did not say we would not make the 1998 date. The 1998 date is a very difficult date to make. That all really hinges upon finding the volunteer host for a Federal fuel receipt facility. It is possible to make 1998 if a volunteer host can come forward fairly soon. That is the hard one to do.

Mr. LEHMAN. Everyone else is very certain you are not going to make the 1998 date. At least when the Technical Review Board has talked to me, they made that clear, and I think the GAO study does as well.

If you got the same level of funding that you got in fiscal year 1993 and projected that out, when would you be able to get the job done then?

Mr. BARRETT. It would be post 1998 as far as receipt and the repository would slip substantially. GAO made an estimate of 5 to 13 years, and I wouldn't argue with that under that scenario.

Mr. LEHMAN. OK. Let me ask you—I will move on because I know other members will have questions about this—I will ask several questions about the revolving fund.

The Secretary's proposal would add payment of utilities' at reactor storage costs as an activity for which money in the revolving fund could be used. Would DOE have to increase the fee rate charged to utilities so as to recover this new type of authorized program cost and, if so, wouldn't the net result be that the added costs to some utilities of storing waste after 1998 would merely be shifted to all the utilities to pay the disposal fees?

Mr. BARRETT. That is a very complex issue as you stated. The Secretary has expressed her desire to enter into a consultative process with the various constituent parties to discuss exactly that issue and how that could be done in a fair, equitable way.

What she had asked for in the recommendation on alternative funding was to have the flexibility if that consultive process produced a proposal, that would give her the authority to address that from a financial point of view.

Until that consultive process takes place, I can't put a cost estimate as to how much that would be and if it would really change the waste fund fee.

As Congressman Hastert mentioned, there is $4 billion in the fund and we do receive approximately $600 million every year from the ratepayers to address this issue, and the main thrust is to allow those funds to be used for the purposes that they were intended to be in the original 1982 act.

Mr. LEHMAN. The law requires the Secretary to evaluate the adequacy of that fee, I think, annually and propose any adjustments to it. When was the last time that was done?

Mr. BARRETT. I believe that was 2 years ago.

Mr. LEHMAN. So we have not done it on an annual basis?

Mr. BARRETT. We are in the process of doing another one at this point, but that is correct.

Mr. LEHMAN. When would you expect the new one, then?

Mr. BARRETT. We probably won't have a total cycle cost and fee analysis done until after the Secretary has finished her review and we adjust the program accordingly. Then, with input we receive from the Congress, we would rebaseline the program and see where we are and see where the fee is.

Mr. LEHMAN. Thank you.

Before I surrender the mike here, I wanted to ask another question at this time of Mr. Cantlon. Your report is somewhat of a departure from prior practices in that you address the management issues as well as the technical issues. Why?

Mr. CANTLON. Chairman Lehman, it was the feeling of the combined board that in order to look at the technical issues and the scientific issues there, independent of the management of those scientific and technical issues, was very complex. In other words, the scientific answers aren't going to get you where you want to be.

If the system is being managed or the funds are being allocated in different ways where there is not a real total systems approach of linking the individual scientific parts together into a coherent story, we could not serve the function we thought Congress had assigned us to achieve.

So we felt that it would be useful this one time to give an instruction to the Secretary and to Congress that while it isn't our charge to look at the management issues, the management issues

needed to be looked at in order that the scientific and technical components could actually be arrayed in a way that would be useful in looking at the safety and indeed the suitability of the Yucca Mountain site.

Mr. LEHMAN. Does DOE ask your advice on technical issues?

Mr. CANTLON. We have several meetings a year of panels and the total board and in those sessions, we have our specialists both on the board and our technical staff interacting with the scientists in the DOE and its contractors and there is a great deal of discussion.

Mr. LEHMAN. So you are satisfied with the amount and quality of the dialogue?

Mr. CANTLON. Yes. We have every one of our recommendations responded to in writing by DOE and we publish those responses in our subsequent reports.

Now, not surprisingly, they don't take all of our advice and recommendations but they do respond, and in some cases where they haven't taken them, we have come back to that issue and raised it again in a different context. For instance, we have had thermal loading for a number of our sessions and, as you just heard from Dr. Barrett here, we are going to be meeting in a few weeks again in Denver on that issue, so we keep needling them to come back to that issue to address it. So we can't quarrel with the response.

Mr. LEHMAN. Yes. Mr. Wells.

Mr. WELLS. Mr. Chairman, might I interject here with a question about why they got involved in management? We in GAO are not scientists and we have kind of looked at the board to do the technical side of the program. We actually welcome their participation in helping us in some of the management issues. So it was nice to have them with us.

Mr. LEHMAN. Thank you. Mr. Sharp.

Mr. SHARP. Thank you very much, Mr. Chairman.

We appear to be at a natural point here for a thorough review of where we are. We obviously have a new administration, a new Secretary. We have some significant reports here that are being discussed here publicly today that have been with us for several months now from GAO and from the Technical Review Board. And so my question really relates to whether we are fully seizing this moment and making the most of it?

Mr. Barrett, you obviously are well aware, and the discussion was just about the question of management and that means many different things to many different people; and I understand that you folks at the Department have an independent examination going on on the issue of fiscal management, how the money is managed, if I understand, and of course in our corporate systems and in Congress and what not, that is always a central piece of judging management; and it is the most obvious and it is the one we can get our hands on. But there are obviously other very significant management questions.

Dr. Cantlon was alluding to how one organizes the various projects so that they seem to end up at the same time when they are needed and how answers in one may impact on decisions in another part of the program. So my question is: What kind of review of the broader question, which gets at the other issue raised by the TRB, the question of the integrated plan, and whether you take ex-

ception to what the review board has said about the existence of an integrated plan—I have sort of jumbled the questions up.

Mr. BARRETT. No, we don't take exception with the TRB on an integrated plan. We would like to do much more technical integration of the program. Unfortunately, what starts to happen with a limited budget, we are trying to get the scientific data first on Yucca Mountain, as GAO has eloquently spoken. They don't think we are spending enough money on the science on that.

To do some of this technical integration, you have to look at the reactor situation, the transportation, the storage, and you have to keep a lot of options open because we have no designated MRS storage site. So you have to look at all kinds of options there. As we try to get our arms around these very complex, not well-defined surface locations and what options the whole system might look like, that takes a lot of time and energy and expertise and we haven't been able to do as much in that as I would like to have done, or my predecessors would liked to have done, and certainly not as much as the Technical Review Board would like to see being done.

We are trying to get underground and get the underground scientific data, as the Technical Review Board has urged us to do. It is hard to balance this on a very limited budget based on what the needs are as the GAO has described. We don't take exception to what they have said.

Mr. SHARP. Let me turn to—part of that question is what kind of review is underway. You mentioned you have used the language, the ongoing review of the Secretary, and certainly she, in my view, has done a great job coming into office in this horrendous array of complex issues and organizational and programs that really don't all fit together. But I am asking when the issue is ongoing, is there a plan at this point in a sense to conclude? There is always an ongoing review on everything. Is there a plan of action or a plan of analysis here at what point you sort of hope to have concluded, how much more needs to be done on the fiscal side, how much more needs to be done on integrated planning, or how much more or different needs to be done in terms of other management issues?

Mr. BARRETT. I believe the Secretary's review that she has initiated and that is underway will include the broad range of issues through this consultative process.

You mentioned the financial aspects of the review but I also believe it will include the technical management of things, the balancing, the situation of how to find a DOE site for an interim site, et cetera. I believe her review will include the broad range of the entire program and include the management aspects and the technical management as well.

The details of that I do not have, as she is formulating that. And I am not the reviewer, I am the reviewee in this case, so I really don't know all the details of it. I know she has various proposals and she is actively involved in determining how she is dealing with it.

Mr. SHARP. Let me ask Mr. Wells and Dr. Cantlon if they have any suggestion on how the independent outside review of the broader questions might occur. How can we do it elsewhere in gov-

ernment agencies? I am sure Mr. Wells is in the habit of that, I should start with him.

Mr. WELLS. Yes, sir, I would be glad to.

First, let me say that we in GAO—it is a good thing that DOE is doing something, and that the Secretary has announced she is going to do, some internal look at the program as well as some external look. We are in agreement that it is probably not enough, that alone, if you consider the independence and the credibility of DOE, they need to go somewhere other than DOE. And again we still don't know a lot about the details, the scope, the limits, and what kind of membership that might exist, but I think from a GAO perspective and the independent review we recommended, we are in agreement with Dr. Cantlon and the board that this definitely needs to be led perhaps and managed by someone other than DOE, and we think it ought to be at a very fairly high level.

We are 10 years into this program and they have had a number of successes but probably more failures, and I think it raises a lot of fundamental questions even getting at the national nuclear waste management policy.

Our current thinking is not only does it have to be at a high level but from the past experience, that performing this review may not be able to be done by just the stakeholders alone, but it is important that all the stakeholders be heard. But what really is needed is an objective evaluation of the program.

There are several possible models, as GAO has looked over the years at other Federal programs, to suggest not only hearings by the appropriate congressional committees, maybe a specially constituted committee of the Congress. There have been special commissions that have been established through legislation that might be applicable. What comes to mind is one like the Monitored Retrieval Storage Review Commission, or even an existing body such as the National Academy of Public Administration.

And why I say that is that a lot of the questions and problems in existing programs are not necessarily scientific. A lot of them are of a management and organizational structure and there is a governmental entity out there that is extremely good at recommending management and organizational changes.

Another option might be a presidential commission such as the presidential commission that was established after the accident at Three Mile Island a number of years ago. Again, I need to point out that we at GAO are currently studying this very thing in terms of trying to get information over the next several months about various options and what perhaps could be done and who could lead that study.

Mr. SHARP. So you say in the process of providing information on what options——

Mr. WELLS. We are looking at these various options and the advantages and disadvantages, and we hope to have that together in the next couple of months to be made available to this body. It is part of our ongoing responsibility to review the Nuclear Waste Act.

Mr. SHARP. Dr. Cantlon, I don't know if you or your board had recommendations or suggestions on how that might be accomplished.

Mr. CANTLON. Our board being composed of scientists and engineers are probably not the most highly qualified to talk about these kinds of management issues. In our special report, we did point out the possibility of including some of the top managers from other countries who have this identical challenge, recognizing that the social context in which this works is totally different from ours because their utility industries are for the most part government-operated utilities and so the challenge is very different.

On the other hand, it would give whatever body is designated to do this external review an opportunity to see how some of the countries have put together an extremely efficient management.

I would suggest that some countries other than England be looked at. We just returned at looking at theirs and I would not want to emulate that.

Mr. SHARP. I recently read this is a bad year for Great Britain in many respects. They seem to be jumping right on the bandwagon. Well, let me just quickly indicate, and I will close my questions here, that certainly it seems worthy, logical, and both at GAO and Mr. Wells and the board have suggested that we do such a review and indeed the Secretary, Mr. Barrett, understanding or seeking various reviews of that.

The caveat, to qualify the occasion, is that we have done all this stuff many times on many agencies on many programs and oftentimes the reviewers are not particularly well organized or well informed and we don't always get the quality of what we want. We all know there is a greater ideal out there somewhere and the congressional committee doesn't strike me as necessarily the role model to follow for organization, management, discipline, and quality work.

We have great staff. But it does strike me that we are at a time when we ought to seriously pursue these opportunities because once individuals become a part of the system, they naturally, as we do—well, I mean no congressional incumbent would be this way—naturally get wedded to certain practices and things, and it is difficult to open our eyes.

So I think it is very important that we seize this opportunity and I would urge the Secretary and the DOE to capitalize on this time period. I think those of us on the outside looking in must be careful not to just fall into what is the easiest criticism we ever made, "Well, somebody else ought to run it better." We never know quite who that is, or where that is.

Corporate America is struggling with that today, after all, and some of the great corporate bureaucracies are not performing at the peak of efficiency at the moment. But I nonetheless, with Dr. Cantlon, feel that there obviously are models and possibilities we are to follow and this is really the moment to look at in terms of the broad context.

We obviously up here at some point are perhaps going to have to deal with issues of timetables and funding mechanisms, and we have got to be prepared to take that responsibility. I think the administration will serve themselves, us, and the program well if they will review before we start darting out on one aspect, because I might indicate it is unlikely we will be able to discretely take just one of these issues if we get into the legislative arena. Those who

simply want to deal with off-budget I think will quickly find that others will feel compelled to deal with other issues at the same time. So I think the wisdom is to try to get as many of these ducks in a row before we start trying to clean them up, up here.

With that, I do thank everybody here, including Mr. Barrett, for their work on this. Because we have a responsibility on the congressional side, and you folks have responsibility for something that is horrendously complex to carry out in a politically charged environment in which most of us, we are counting on you not being among this most, really don't have a very good comprehension of the technical side of things.

But these are profound issues for our society; and so I do appreciate the work of all of you; and I want to go back to the board simply because I want to make sure that we keep this board an integral and important part of an objective review where I think it has a very important function in helping us to clarify issues and to reduce the misunderstandings that will occur politically. Thank you.

Mr. LEHMAN. Thank you.

Mrs. Vucanovich.

Mrs. VUCANOVICH. Thank you, Mr. Chairman.

And I was thinking back when Chairman Sharp was speaking that he was instrumental in the Nuclear Waste Technical Review Board being formed, and as a matter of fact I remember thinking, gosh, that is not such a good idea, but since then I have changed my mind. I think it has turned out very well.

Of course, Mr. Barrett is the target here and I would like to ask him a couple of questions but before I do, Dr. Cantlon is a former Nevadan and I would like to ask him a question or two, and also Dr. Allen but, Dr. Cantlon, you know, in your testimony, you indicate that attempting to meet these unrealistic deadlines, 1998 and 2001, could cause licensing problems, increase overall program costs and ultimately delay the program.

Would you explain what the licensing problems might be and particularly what the extent of delay in the program would be—would happen, would result?

Mr. CANTLON. Yes. And I think it is important here to give this caveat that what I am talking about are "for instances" not things that have actually happened.

Mrs. VUCANOVICH. Sure.

Mr. CANTLON. But there was some early interest expressed to us on the part of some of the program managers to very quickly settle on the thermal strategy for the repository because that so pervasively influences everything from the design of the repository to the feed system of the spent fuel coming in, all of those things are really determined by the thermal strategy chosen.

And it was our feeling that the technical basis for choosing one or the other of an array of different thermal strategies was totally inadequate, so in trying to move quickly on one of those, we felt would really put in the minds of the critics of the program a technical basis for essentially attacking the way in which it was being put together. That is one illustration.

The other illustration, I think, in trying to address the 1998 date of accepting fuel, was driven to select a particular cask and whether or not that cask is ideal for the way the repository will actually

be designed and the system of delivering it, the human safety factors in where you have to load or unload that fuel. All of those things should be in the final design, but 1998 drives us to need some kind of a container early, so those are two illustrations.

Mrs. VUCANOVICH. You are sort of talking about the heater tests and some of those things, is that——

Mr. CANTLON. Right. Yes. In order to choose a thermal strategy, one must understand what heating for long-term periods of time in that volcanic tuff does. Does it alter the capacity of that rock to continue to retain radionuclides that will eventually escape from the containment?

Mrs. VUCANOVICH. I know with your scientific background you know you would be able to help on this, but it would seem to me that it is pretty hard to get that information over when you are looking at a 10,000 year storage.

Mr. CANTLON. Oh, yes. No one has done a 10,000 year experiment.

Mrs. VUCANOVICH. Not that we know of.

Mr. CANTLON. What we would have to do, obviously, is to run experiments for a certain time period where various of the physical processes have begun to change. We have used the analogy elsewhere that if you wanted to speed up baking a cake, you can't run the oven at 500 or 800 degrees in order to speed up the cake baking. The chemistry and the physics of the cake change, and similarly one has to heat up that rock at a temperature that is compatible with the way the water crystallization makes the different minerals behave and you drive off the shelves of water around the particles.

All of those things have physical limits and parameters and so one must run those heating experiments in a particular kind of way to generate the type of information that will permit the modelers then to make these long range extensions of behavior. So that is why we think don't rush it, do it right.

Mrs. VUCANOVICH. Sure, well, it makes sense.

Dr. Allen, you sat patiently for 1½ hours, so I want to ask you a question to allow you to speak.

You know about a year ago the Little Skull Mountain earthquake rocked Yucca Mountain, and about a week prior the largest U.S. quake in nearly two decades hit Yucca Valley in California, and I was in Las Vegas, about 20 floors up, when the ground motion shook Nevada quite noticeably, and so the TRB has questions about the Ghost Dance Fault at Yucca Mountain.

Can you tell the subcommittee about scientific concerns regards seismic activity and the repository? How the effects—what the effects would be?

Mr. ALLEN. In the first place, let me state that although I can't claim to be a Nevada native the way Dr. Cantlon is, I grew up just across the border in Owens Valley, California, even closer to Yucca Mountain.

The subject of seismic hazard to the test site is one of great concern to everybody, particularly the public. The public has considerable concerns about that and that is among the reasons why we have to look at it very carefully. It has been a very important part

of and continues to be an important part of the Department of Energy's program, particularly through the U.S. Geological Survey.

There are numerous faults within the Yucca Mountain area, even much closer than the locality of where the Little Skull Mountain earthquake occurred last year. And it has long been recognized that these potentially could cause earthquakes even larger than the Little Skull Mountain earthquake and that, as far as I know, is being considered in the planning of the facilities, the tunnels, and the handling facilities.

Of particular interest, of course, is the Ghost Dance Fault which goes right squarely through the repository. I think it is not surprising to any geologist to discover that even though it was initially mapped by the geologic survey with a single line, as we look at it more carefully it turns out to be a more complicated feature than initially had been thought, and that is one of the reasons why we are anxious to get under ground and see what that fault zone looks like at the repository level.

Three items are of particular concern here. One, is the fault an active fault in the sense that it could generate an earthquake or suffer fault displacement during an earthquake in the foreseeable future? If it hasn't moved, for example, in the last 5 million years, then I don't think we are concerned in the next 10,000. On the other hand, if it has moved in the past 10,000 years, which is possible, then one has to recognize maybe it could move during the next 10,000 years.

Second, we are concerned about how many branches of the fault there are. If it is just a single feature, it is much easier to deal with and step back from. And if it turns out to be a number of branches, it is a concern to look at these branches and see how important they are relative to the main branch.

And third, the problem of, even if the fault does break or even if the branches break, does that necessarily violate the integrity of the waste packages and so forth, so the nature of the waste packages comes back to the system of planning.

The nature of the waste package also is relevant to the seismic hazard and must be considered in the overall picture and how the waste packages are placed in the underground facility so the Ghost Dance Fault is an important feature.

Studies are vigorously underway, particularly by the geological survey. I would say that the board is already on record as saying that we know of nothing at this time that necessarily makes the site unsuitable.

There is still a lot of work to be done including work on the Ghost Dance Fault to relieve any lingering doubts that may be there concerning the possible effects of that fault and other faults adjacent.

Mrs. VUCANOVICH. So the deadline is really pressuring a little bit probably more than we need. I won't belabor this point any longer, but I would like to ask Director Barrett a couple of questions.

How is DOE carrying out the dual role of fulfilling the responsibility of the Nuclear Waste negotiator's office and the activities associated with the Office of Civilian Radioactive Waste Management?

Mr. BARRETT. There is no connection between the Office of Civilian Radioactive Waste Management and the Office of the Negotiator. We are a staff apart from the Office of the Negotiator. They report to Secretary O'Leary. My organization reports to Secretary O'Leary. The Office of the Negotiator does not work for me and there is independence between the two.

Mrs. VUCANOVICH. So you are satisfied that they are really two separate entities?

Mr. BARRETT. Yes, ma'am.

Mrs. VUCANOVICH. Well, there are some of us who might not agree but I am concerned about that particular situation.

What is the status of the proposal DOE is considering regarding possible use of a Federal facility, a Federal facility as the location for an interim nuclear waste site?

Mr. BARRETT. The Secretary wants that to be considered by the consultative process, involving the various constituents on how we should handle the immediate and near-term issues with the program, that is, basically the 1998 date through 2010. That issue needs to be dealt with by that broad group so that we can get the external input that the Secretary wishes and that a consensus be reached by the various parties on what is the right thing for the Nation to do concerning the 1998 date.

When you start to deal with the 1998 date, you immediately get involved in siting. So that will be all intertwined together.

Mrs. VUCANOVICH. What criteria would be used for a Federal site, for a candidate site?

Mr. BARRETT. If it is technical criteria or?

Mrs. VUCANOVICH. What criteria, period.

Mr. BARRETT. The issue here——

Mrs. VUCANOVICH. Technical or scientific or political. Political, probably.

Mr. BARRETT. The issues of siting are primarily dominated by what I say are institutional issues. The technical issues are minor and inconsequential. Almost any existing DOE sites are fairly large sites. Technically, the storage of spent fuel could be handled at any of the DOE sites. The issue here becomes institutional, 99.9 percent.

Mrs. VUCANOVICH. Thank you.

I am going to ask one question of Mr. Wells and then yield back the balance of my time.

Mr. Wells, you indicate that DOE is not adhering to its Mission 2001 document with respect to its baseline projections for site characterization. Is the Mission 2001 document still in place as the guiding document for the Yucca Mountain project?

Mr. WELLS. As far as we know, yes. I was interested in listening to Mr. Barrett's discussion that this was a planning document and estimate and it doesn't necessarily direct the schedule to what was happening. I also listened with interest when you raised the question about a heater test and how important that was.

We would like to relay what the scientists at Lawrence Livermoore discussed with us and perhaps have Mr. Barrett respond to that, but basically the people at Lawrence Livermore who have the responsibility for conducting the heater test which is critical and important had indicated and designed their test around a

12-year focus of getting that scientific work done. When asked by DOE to respond to their Mission 2001 request to compress and look at reducing costs, the scientists responded in the order of magnitude of getting the test down to approximately 6 years and we understand what was actually agreed to and somewhat demanded by DOE as a result of the study is that, no, that test had to be conducted in 3 years. So it would be interesting to see on where they stand on actually doing that heater test.

Mrs. VUCANOVICH. I have some other questions for all of the panelists and I will submit them for the record. I appreciate all of you being here. Thank you.

Mr. LEHMAN. Without objection, all members will be allowed to submit questions of the panel and we ask that you respond to those.

Mr. LEHMAN. Since I allowed Mr. Sharp to speak as Chairman of the Energy and Power Subcommittee, I would like to recognize Mr. Bilirakis, the ranking member of that subcommittee.

Mr. BILIRAKIS. Mr. Chairman, thank you, but Mr. LaRocco has been sitting here very patiently all of this time. If you don't mind, I would like to yield to him in a sense of fairness.

Mr. LEHMAN. I was trying to keep the mike away from him, but—the gentleman from Idaho.

Mr. LAROCCO. Thank you, and I thank the gentleman for yielding.

Mr. Barrett, I would say that in response to Mrs. Vucanovich's question about the DOE's policy on Federal facilities being looked at as interim storage that your answer is in contradiction to what the Secretary told this committee about a month ago in direct questioning from me.

I said that Admiral Watkins, walked out the door and left the committee a hand grenade with the pin pulled out of it on the floor. She said she was going to put the pin back in.

Obviously, my concern is over how the DOE regards the facility in Idaho Falls, in the Idaho National Engineering Laboratory. So I think more coordination needs to be made between yourself and the Secretary. It is not my understanding that this is being looked at in the framework that you presented this committee, at least from the Secretary's standpoint.

We have an aquifer out there in Idaho. We are not a repository. Yet, we have a facility that has served historically as an advanced research facility but now it is being used as a repository and I think we should examine what the DOE's position is.

The judge, I am quoting from the judge's decision, but I think it is germane. He said: "Idaho represents to the court that its present challenge was triggered in part by DOE's announcement that the spent fuel being brought to INEL would no longer be reprocessed." Would no longer be reprocessed. That was the initial role at the installation. So spent fuel is being sent there just to be stored.

This announcement signaled a potentially significant change in the entire purpose of INEL, which for much of its history has served as an advanced research facility.

In light of the fact that DOE now wishes to bring in spent fuel from civilian reactors and from foreign reactors, it appears that

DOE is quietly attempting to make INEL the nuclear waste repository for the United States and the rest of the world.

I have a copy of a consolidated contract request for proposal. In the discussion about spent fuel on this request for proposal, it says, "The contractor will manage the DOE's national spent fuel program." It covers the whole spectrum for the entire DOE system. And my question simply is, are we a repository out in Idaho, or are we a research facility? And what should we expect of—I mean, why has the mission gotten so off track?

Mr. BARRETT. I believe there is some confusion as to which spent fuel is being referred to here. The Civilian Radioactive Waste Management Program deals with commercial spent fuel from commercial electricity-producing power reactors. When we use the word "spent" fuel—and I have used the word "spent" fuel—that is what I have been referring to.

In the research and development activities at Idaho, that has been Navy fuel, Department of Energy research and development fuel that is being talked about there. That is not the fuel that I have referred to in my testimony.

Mr. LAROCCO. Well, but you know, this court decision started with the discussion about the spent fuel from the civilian reactor at Fort St. Vrain.

Mr. BARRETT. Which was a demonstration plant, and there were contracts between the Department of Energy and Public Service Colorado where that fuel was done by the research program.

Mr. LAROCCO. I understand about the contracts, but in the court decision they say that Fort St. Vrain had actually made an application with the Nuclear Regulatory Commission to store spent fuel at their site and that, in total disregard of the fact that they could store it in an on-site facility that was licensed, instead, they sent it to Idaho which is not established as a storage facility and a repository.

That is what triggered this whole thing, that there has been a constant, continual effort by the DOE to just keep bringing waste into Idaho; and I don't think there is any such thing as temporary waste storage or an "interim" storage facility. I think the judge is right, that the DOE had intended and quietly attempted to make INEL the nuclear waste repository for the United States and the rest of the world.

It is not designed for that. It is a research facility. And I thought that the Secretary was backing away from Admiral Watkins's cavalier approach to our water and way of life out in Idaho; and you are now telling me that that is not true. I think we are going to have to reexamine that.

But what is your reaction to this, about making INEL the nuclear waste repository? Why has this gone on this way?

Mr. BARRETT. Well, the civilian high-level waste program is not making Idaho a repository. When the——

Mr. LAROCCO. They are just storing it there forever?

Mr. BARRETT. Well, but that court ruling and that material has nothing to do with the material that is in this program. What the Secretary stated when she was here last time before this committee, when she referred to the hand grenade, was that the way it

was left by Admiral Watkins was, the Department of Energy was going to start off by itself and identify Federal sites.

We are not—the Department of Energy does not today have an active Federal siting program to identify a Federal site. That will not be done unilaterally by the Department of Energy. That would only be considered if it was to ever be considered, through the consultative process; and the State of Idaho would certainly be involved in that before any such thing would be done.

So I don't see that there is an inconsistency between what the Secretary said and what I previously said.

Mr. LAROCCO. Well, I know, but the State of Idaho has been run over in the past in spite of the Nuclear Waste Policy Act. The reason I attempted to amend the Nuclear Waste Policy Act is because the State was totally ignored by saying that there was an existing contract in force; never mind the fact that PSC had the storage facilities; it was just keep the trucks moving and just keep them headed towards Idaho, keep the trains going.

I am just trying to get some commitment from the DOE that INEL is not viewed as a repository. We want to keep the research going out there—I am not trying to stifle those attempts—but I think the judge has pointed out here that there is a long history of the DOE just using that site out there for storage. Also, there is another problem here.

On this Westinghouse report, on page 12 it says, "In addressing storage building CPP-603, it stated there were no established criteria for corrosion inspection of the fuel storage cans." Because there were no criteria for inspection, the cans were never out of specification, so there is no criteria. They just kept corroding.

So how could this be? Doesn't DOE have an established method of inspecting corrosion of its fuel storage vessels? I mean, they just kept corroding. This is an alarming report. It just came out on June 14th. After all of the concerns of the State of Idaho over the years, here we have this. Are there any criteria? Or does DOE have an established method of inspecting corrosion of its fuel storage vessels?

Mr. BARRETT. That is out of the jurisdiction of this program. I will be happy to take any questions back for the record to the Department and have the appropriate people address those questions, sir.

Mr. LAROCCO. Well, that would be appreciated. Because this is causing quite a bit of concern out in my State, and I think the rubber has just finally hit the road here. I agree with Judge Ryan's decision wholeheartedly. I think that he has put his finger on something here that we have been saying for a long time out in the State, to just keep trucking the waste in, is not OK.

There are rooms out there that aren't safe; they have known it for years. The gentlelady from Nevada talks about seismic activities. We have reports that say that if there is any seismic activity there could be a calamity out there; it could leak into the aquifer, the Snake River aquifer, one of the Nation's greatest resources. So that is why I am at this hearing today, to try and determine what the policy is of DOE. I heard some contradictions, quite frankly, between your statement and the Secretary's, and I hope we can get that resolved.

Thank you, Mr. Chairman.

Mr. LEHMAN. Thank you.

[The following information was received for the record:]

The mission of the Idaho Chemical Processing Plant (ICPP) is to develop advanced technologies to process spent nuclear fuel for permanent off-site disposition while minimizing waste. It is not the intention of the Department of Energy that the ICPP act as a permanent repository.

The Department does agree that there are major safety concerns at the old Fuel Storage Facility (CPP-603). These concerns are being actively addressed and include: (1) systematically identifying fuel storage issues and root causes of problems, (2) prioritizing resolution of critical issues in fuel storage consistent with governing safety documents, (3) developing a complete program to identify corrosion concerns early, (4) upgrading storage equipment, racks and procedures, and (5) applying lessons learned from spent fuel storage activities within the Department and in the private sector.

A program and schedule to remove all fuels from CPP-603 has been developed. Current plans call for all spent fuel to be removed from the CPP-603 North and Middle basins by the end of calendar year 1997 and from the South basin by the end of calendar year 2005. We are evaluating this schedule and any feasible option that can expedite the schedule is being explored.

Mr. LEHMAN. The gentleman from Florida?

Mr. BILIRAKIS. Thank you, Mr. Chairman. I hope you didn't mind my yielding the way that I did.

Mr. LEHMAN. I did, but that is OK.

Mr. BILIRAKIS. Mr. Wells, did GAO talk to State regulators who are, I assume, so frustrated by the DOE's slow pace?

Mr. WELLS. State regulators?

Mr. BILIRAKIS. State regulators.

Mr. WEIGEL. Our discussions for the May report that we issued were confined to the National Association of Regulatory Utility Commissioners.

Mr. BILIRAKIS. All right. Well, you didn't talk to State regulators directly; you did talk to the National Association. What did you learn?

Mr. WEIGEL. They would like to see this program move.

Mr. BILIRAKIS. I guess that is no surprise.

Does GAO have any opinion as to how much Secretary O'Leary's recent decision to review the program—to, quote, "review the program," might delay completion of the siting and construction of the repository?

Mr. WELLS. As I commented earlier, quite frankly, we have heard and seen in the trade press various announcements about what is planned to do, but quite frankly, they lack a lot of details, so I have seen no more details about the membership of this committee or even objectives on how far they are going to go. I haven't seen anybody talking about how long that would take.

Mr. BILIRAKIS. The law was created—the Nuclear Waste Policy Act was created in 1982. The board was created in 1987. This is now 1993, and we are still at that point.

Dr. Cantlon, you said that your board is familiar with what I call the real world problems that DOE might be having regarding the repository?

Mr. CANTLON. If you are referring to the political and the social concerns——

Mr. BILIRAKIS. That is all part of it.

Mr. CANTLON. We are certainly aware of it, and we try as meticulously as we can to make certain that what we are addressing

are the scientific and technical aspects of concern. We have had a hearing or two in which people have come before our group with an attitude about risk that we felt was certainly not based on any technical or scientific understanding of the——

Mr. BILIRAKIS. Well, now, who are these people? In other words, people living in Nevada?

Mr. CANTLON. Some.

Mr. BILIRAKIS. You hold, in other words, public hearings?

Mr. CANTLON. We have. As we started, we felt it was important to hold some public hearings so we could make certain that as we looked at the technical and scientific aspects of what DOE was doing, that we were focusing on the areas of concern.

Mr. BILIRAKIS. Have you been the chair of the board since it was created?

Mr. CANTLON. No. I just assumed the chair last year.

Mr. BILIRAKIS. And who preceded you?

Mr. CANTLON. Dr. Donald Deer, University of Florida.

Mr. BILIRAKIS. University of Florida.

Well, Doctor, in your opinion—I am not trying to pit you against Mr. Barrett here, so please don't take it that way. But I guess I am trying to learn; that is what these hearings should be all about.

Should your board—and Mr. Sharp mentioned the words "hands-on," should your board have more operational authorization, more hands-on authorization? You have talked about meeting periodically, and then being faced or discussing with DOE certain problems that they have run into and that they would like to get opinions from you. This is the way at least I picture those gatherings. But if they don't bring up a point to you, and if the public in your public hearings don't bring up a point to you, do you have what we call here, I guess, "oversight authority"?

Mr. CANTLON. Yes. Our agendas are fixed by us. As we looked at the statements, we looked at the site characterization plan, which is the base starting point from which DOE has been operating. This is a 1988 document that, you know, in many ways is now being departed from, but——

Mr. BILIRAKIS. What is a 1988 document?

Mr. CANTLON. The site-characterization plan, how they were going to go about characterizing the site and articulating that repository proposal to the total waste system. That is the point of departure.

Mr. BILIRAKIS. Well, in the discussions, the exchanges between Mrs. Vucanovich, who has left, and Dr. Allen, they talked about the fault—the faults in that locale; and I assume when you are talking about investigating the faults, or the activity, you are talking about seismographic types of information, Doctor. Or are we well past that point now?

Mr. ALLEN. Yes. The study of faults involved not only seismographic, but also geological, both of these areas, and some engineering. That is, what effect the ground shaking will have on this.

Mr. BILIRAKIS. How much of that have we already done?

Mr. ALLEN. I don't quite understand your question.

Mr. BILIRAKIS. Well, how much study of this fault and whether——

Mr. ALLEN. A great deal.

Mr. BILIRAKIS. A great deal?

Mr. ALLEN. And a lot of work is still underway. It is one of those issues that we may be approaching some sort of closure on—I shouldn't say closure; we are approaching the end. That is—the question was brought up earlier, when is enough, enough—and I think that is one thing this board is concerned about; and the scientific and technical efforts, when is enough, enough.

And so the seismic effort is one that a great deal of effort has gone into; and I think maybe a few years down the line we will say that we have done enough.

Mr. BILIRAKIS. Yes.

Mr. ALLEN. I might point out that we worked closely with the scientists from the State of Nevada, many of whom have the same sort of local concerns as Mrs. Vucanovich.

Mr. BILIRAKIS. In the meantime, we are putting billions of dollars into this repository. Are we likely to reach a point a couple of years from now or 5 years from now where we come to a conclusion that the—there has been enough activity, fault activity, over the last so many thousands of years; and therefore, this makes this site not appropriate?

Mr. ALLEN. I suppose that is a possible conclusion, because the studies are not yet completed.

Nevertheless, as I pointed out earlier, this board, looking at the situation very carefully, sees no reason at this time to say the site is necessarily unsuitable for this or any other reason.

Mr. BILIRAKIS. So all of this seismographic and geological activity has been taking place during this period of time, ever since the site was selected?

Mr. ALLEN. It has been a major effort for many years, including the years before the Yucca Mountain was identified as the one site for characterization. There was a great deal of work by the Geological Survey that went on before that time.

Mr. BILIRAKIS. All right. If you reach the point, God forbid—maybe I shouldn't put it that way, but if you reach the point that fault activity would dictate that it is the wrong location, that it is dangerous for future generations, are we going to shut it down?

Mr. ALLEN. Well, certainly our board is——

Mr. BILIRAKIS. Certainly your board will recommend it?

Mr. ALLEN. We will make a review of the scientific and technical work. If we felt that that represented a problem that made the site unsuitable, we will certainly say so. We cannot declare it, but we will say so.

Mr. BILIRAKIS. You have no political pressure as far as your board is concerned; you are above all that?

Mr. ALLEN. No political pressure, and nothing——

Mr. BILIRAKIS. Not even the Congress, I would like to think—well, you feel that way, no political pressure. All right.

Let me ask you—and less significant I think in the scheme of things—my gosh, you are throwing additional dollars at this; and then some day somebody comes to the conclusion, hey, there has been such activity in the past, particularly in those areas, in west California and those areas where you have all of those faults. I think it should be clear that being located in the area of a fault is not in itself dangerous; is that correct?

Mr. ALLEN. I think that is a fair statement. The important effect is what would happen because of an earthquake or the associated faulting that might prejudice the containers and then lead to release of radioactivity.

Basically, tunnels behave very well even under severe shaking. So the ultimate problem is whether or not we would in any way prejudice the containment of the radionuclides.

I might point out that every State in the country, including Florida, has had earthquakes.

Mr. BILIRAKIS. That is why I made the comment that being in that location on top of a fault, or in that location is not necessarily inherently dangerous; it is just what might happen that would make it dangerous.

Mr. ALLEN. Let me make it quite clear that northern Nevada has a higher seismic activity than in other part of the country. There are other areas of the country where seismic hazard—including California, Oregon, Washington—where we have successfully put nuclear plants; and other critical facilities have been licensed by the Nuclear Regulatory Commission.

So, yes, there are other places in the country that have lower seismic activity, but that does not, at least to me, indicate that Nevada, the Nevada site, the proposed site at Yucca Mountain is necessarily unsuitable.

Mr. BILIRAKIS. And your background, sir, is in the area of geology?

Mr. ALLEN. Geology and seismology, yes.

Mr. BILIRAKIS. Well, let me ask just maybe a final question; and I am trying to get it clear in my mind. We are talking about this MRS. Won't it really be a miniature Yucca? Isn't that really what we are talking about?

Mr. BARRETT. No, sir, I believe it is quite different.

Mr. BILIRAKIS. No? Well, aren't we talking about a miniature Yucca—first of all, it would be miniature, right? I mean, it would be a miniature repository as against Yucca Mountain?

Mr. BARRETT. Well, I am not sure. If you look at it from an airplane, the MRS might even be larger than a repository as far as buildings and such. But the MRS, the Federal receiving facility for storage, would strictly be a surface storage operation where fuel would be placed, probably in dry storage until the repository at Yucca Mountain is ready, if Yucca Mountain was determined suitable.

But it would basically be a way station where it would be held in storage.

Mr. BILIRAKIS. All right. So it would be an interim repository.

Mr. BARRETT. It would be an interim—the word "repository" sounds like it is indefinitely, and designed that way. Some people would use it that way; I would not, sir.

Mr. BILIRAKIS. All right. So we use a different word.

But the concerns, what you are running into regarding Yucca Mountain, the legal concerns, the safety concerns, all of those things, won't they also exist regarding the MRS when you ever find a location for it?

Mr. BARRETT. There will be safety concerns that will be raised, yes, sir. However, a fine repository is more complex in that you must prove before the Nuclear Regulatory Commission and the oversight Technical Review Board and others that you have an indefinite 9,000, 10,000-year safety storage to go with that, basically a fuel storage.

You can deal with engineered barriers which you, on the surface, can manage, and society can handle, for the nominal—let's say 100-year time period. That is a much easier case to present—that safety will be afforded for this operation.

Mr. BILIRAKIS. Yes, I guess logically that follows; but also I think logically it follows that the people who live in these areas today are concerned probably more with today, their children, their grandchildren, maybe their great-grandchildren.

I am not sure that we can even see 10,000 years from now, although I know we have to look forward.

But I guess my concern is—and I will finish up with this, I just worry that we are diluting our resources by taking away from Yucca Mountain, which has apparently already been decided upon—I know there are a lot of obstacles there. Where you talk about the expense there and that sort of thing, and you are going to have probably, I guess realistically, the same kind of problems in terms of the licenses, in terms of the approvals, in terms of the acceptance by local residents.

I don't know, if we are talking about Idaho, for instance—and I shouldn't say that—certainly you are going to run into problems. You already have in Idaho, and you haven't done anything there yet. Isn't that true?

I mean, we are talking about only so many resources available, and yet aren't we going to be diluting them? Is it likely to slow down?

Maybe I should ask GAO this; maybe they can answer the question more objectively. But is an MRS likely to slow down the permanent progress towards Yucca Mountain?

Mr. BARRETT. That is a matter of funding. The programs can be run in parallel, and the MRS does not impact Yucca Mountain site suitability and development. If it turns out to be suitable, provided there is sufficient funding, then we have to make trade-offs of a certain amount of money; and then one will start to impact the other. What you will start to find is that Yucca Mountain, using their numbers of 2010 and later for waste emplacement, is a long time off while 25,000 tons of commercial spent fuel exists today, and it is accumulating at nominally 2,000-ton per year.

Mr. BILIRAKIS. And something has to be done with it, sir, and I am supportive of that.

Mr. BARRETT. And those costs, society's costs, have to be paid for by society through the ratepayers or however that gets done. Society has to spend a lot of money to take care of that material safely for a long time.

We basically have 70 sites across this country where this has happened. We have some decommissioned reactors that are shut down where they would like to get rid of the fuel; and it is costing money to society for it to be there.

If you can put it into one place—the difficulty is finding the one place—it is probably better for society. Because it is cheaper and safer and a lot of other reasons, we believe that an MRS-type receiving facility, in concert with an ultimate repository, is the best thing for the Nation. It is not an easy thing to do, sir; but you are absolutely right.

Mr. BILIRAKIS. Well, your job is a tough one and the job that all of you gentlemen and ladies do is tough; there is no question about that. But I would just hate to see the dilution of our resources—limited resources—slowing down the process insofar as Yucca is concerned, and concentrating more on the MRS. I agree with you when I see that some States are already having problems—Minnesota, Wisconsin. So something has to be done there.

All right. Mr. Chairman, I have nothing further. I probably have already used my time. I appreciate your consideration, sir. Thank you.

Mr. LEHMAN. Thank you very much.

I will recognize the gentleman from Washington.

Mr. KREIDLER. Thank you, Mr. Chairman.

Dr. Cantlon, I would like to go back to the issue that I raised earlier in my opening comments—multi-purpose canister systems. I would like your thoughts as to why DOE is going out and designing its own system if there are canisters currently available.

Mr. CANTLON. Well, certainly the DOE can speak for itself, but the board, in looking at the challenge of the waste management system, feels very strongly that the system should be viewed as an interactive system, and that if one rushes in to adopt an array of different containers so that each utility has a different container, you encounter a great deal more risk to the people and to the communities of having different kinds of containers in different parts of the system.

Standardization around a container that has the features that adapt it not only for short-term surface storage, which would be an MRS-type facility, but also would then lend itself well to transportation, and then the ease of putting it into whatever external container the repository requires, is essentially the challenge. And it is not—you know, we have not looked in detail at the particular model that your company is proposing.

DOE, I know, is in conversation with the group. But it is more than simply picking what would be the best container for the near-term study that is the long-term challenge of containers. In rushing to meet the 1998 challenge, we may end up with a container that is—requires a great deal of adaptation to make it totally safe for the long-term positioning of those containers in the jackets that would put it into the repository.

Mr. KREIDLER. Well, I guess I am looking at it primarily from a scientific standpoint right now.

By the way, this issue was raised because I was aware of the fact that this company had canisters in my district. I called them and asked them how come DOE was out there working on these cannisters. I should note that there are probably several private companies that manufacture or have designs out there right now that have been approved.

What I am trying to figure out right now is, from a scientific standpoint, is there something wrong to your knowledge with the existing technology that is out there that would require DOE to go out and reinvent the wheel?

Mr. CANTLON. Let's put the expert on it.

Mr. PRICE. There is a disciplined way of going about approaching the issues in which you come up with the requirements; and by the way, the DOE is 10 years into the program and still hasn't produced its requirements documents. You develop the concept with a variety of alternatives to meet the concepts, and the concept of the cask and its transportation is interrelated with the waste package, interrelated with the mountain, interrelated with interim storage. And you come up with your requirements, the concepts which will meet those requirements.

The trade-offs then are studied and made, and you come up with some kind of design which meets the requirements.

Mr. KREIDLER. Excuse me, but DOE is involved right now with designing its own, it is not developing the parameters of what they need in order to meet the three standards that they are looking for, storage transportation and disposal. They are out there designing one right now, and I am wondering whether the current technology in the private sector is such that they need to do that, or can DOE rely on what is out there in the private market already?

Mr. PRICE. But I would like to stand firm and say that there is a disciplined systems engineering way of going about doing these things, and that is what the board has been encouraging the Department of Energy to do. We have been encouraging them to take the systems engineering evaluation analysis approach to these kinds of things; and in our support of the multi-purpose canister, it has been supported as an alternative among the single-purpose, the dual-purpose existing designs and so forth, to be put into the overall milieu against the requirements that exist with proper alternatives.

And I would like to say, one of our big thrusts has been to try to encourage the Department of Energy and the Office of Civilian Radioactive Waste Management to take a systems engineering approach to the things, and perhaps that has been one of the shortfalls.

While I have the mike, I might be able then to say, I think one of the reasons why they do not come forth—perhaps one of the reasons why they do not come forth with an overall systems grasp of the generation of waste all the way through and interrelate all of these things has to do—and some comment was made earlier about real world problems, and so I am throwing this out on the table—has to do with the fact that they have a director who may be in place as a full-fledged authorized director less than 20 percent of the time.

They have had 7—6 or 7 acting directors, maybe only two actual directors; and in the process, the director takes a little while to come up to speed. Then he begins to understand and know the names of the people in the M&O, know the names of the people, the contractors, and understand all of the national labs, and then he has this systems view that he needs to get into.

About the time that he begins to get an understanding of it, his term is over in some way, and another acting director, and in all due defense of Lake Barrett, that that is the role that they have to play without being able to take aggressive action.

And somehow I think we have to be able to address this management problem, to do this thing in a scientific and in a technical way.

Mr. KREIDLER. Good point. I appreciate that.

Mr. Barrett?

Mr. BARRETT. Regarding the multi-purpose canister, we are following the engineering discipline that Dr. Price outlined. What we are presently doing, we are not designing final multi-purpose canister systems within the Department of Energy. What we are doing is what is known in the engineering profession as a conceptual design to determine what the specifications are for a multi-purpose canister.

There are no multi-purpose canisters in the world. What does exist are storage canisters for at-reactor storage. There are two companies that are developing what is known as dual purpose casks, meaning it is good for storage at reactors and good for transportation.

No one has taken the next big jump—and it is a big jump—to say this canister would also be good for 10,000 years in ultimate disposal.

There are a great number of very difficult technical issues. For example, assuring some criticality for 10,000 years versus an engineered canister that you can go up and look at it through shielding. It is a very different situation.

What we are doing, and the reason there are 150 people over in Virginia that I spoke with this morning, is to put together the conceptual design, which DOE and its contractor is doing, to establish what the specifications are so that private industry can then go out and do what is known as certification designs. The designs can then be submitted to the Nuclear Regulatory Commission and reviewed by the Technical Review Board and all of the utilities, who we hope would use these things to standardize this across the United States. We want a consistent, integrated system along the lines that the Technical Review Board has been urging us to do. And I would like to do more of it, OK, to have that happen.

But we are not going out and designing a government-designed thing rather than having private industry do it.

Mr. KREIDLER. Well, correct me if I'm wrong, but I think we are years away before we will probably be in the position to know what we are really going to design for the disposal of waste.

Mr. BARRETT. No. For disposal, our program goal, and the only thing I am really funding with the scarce funds that I have in the storage area, is this multi-purpose canister. I have to deal with the thermal strategy and all the other issues the board has very ably described, and deal with those issues to have these canisters available and approved by the Nuclear Regulatory Commission for storage at reactors, or for transportation, and to be compatible, to the best of our knowledge, with the ultimate repository system.

This is not a solution to the 1998 problem, but it is our goal in designing the program to mitigate the impacts in 1998 by having these available.

I do not know if it can technically be done. I believe it can be done, but it takes time and money and a lot of energy to do it. And that is why we have people trying to do that, because we believe that it is a good thing for the Nation. And the Secretary has directed us to pursue along this line. I am not sure all of these technical things can be overcome.

Mr. KREIDLER. Mr. Barrett, it seems to me that you are rejecting any of the current technology that is presently out there by saying that we need to go through a particular process to come up with a difficult design to meet the needs for storage and transportation, and then eventually come up with the specifics regarding disposal.

I am concerned that DOE is rejecting current technology that meets those other two standards. It seems to me that if there are designs that can be used for both storage and transportation, and they meet your standards, that they should be the ones that are opted for rather than trying to go through a great deal of effort right now. Extra efforts now will obviously mean that until a system is ready to address the final question on disposal, that a lot of money and a lot of time is going to be lost.

Mr. BARRETT. We believe that if we can develop this multi-purpose canisters building upon the technology that exists for storage and transportation which is being developed today, this would give great advantages to the United States. A standardized system where the Federal Government eventually will start to receive this material, where you don't have to go open up the canisters, handling bare fuel assemblies, causing more exposure to workers and potentially having to deal with the fuel in that manner, it can save potentially billions of dollars to the total life cycle costs of the system.

We believe it is worth investing to do that. We have been urged to do this standardization by the Nuclear Regulatory Commission, we have been urged by the Technical Review Board, and we think it is a good idea and we are proceeding to do it. We are not disregarding or reinventing the wheel; we are building this on the existing technology with those very same companies that you have mentioned.

Mr. KREIDLER. Mr. Wells, do you have any concerns from GAO relative to those activities?

Mr. WEIGEL. Mr. Weigel with GAO. Yes, this sounds very much like what has happened already with the MRS and transportation programs over the last several years.

Under the Nuclear Waste Policy Amendments Act, because of the linkages between the MRS and the repository schedules, it is not within DOE's power to develop on its own—to find a site and develop on its own—an MRS until at least 2004, according to its repository schedule. Yet, for the last several years, DOE has spent millions of dollars, tens of millions of dollars, developing MRS designs and various alternative designs, developing transportation cask designs, all oriented towards having an MRS facility available by 1998, in the expectation that the nuclear waste negotiator would be successful in finding a host willing to accept it on that schedule.

As we said, almost 2 years ago now, there is no evidence that that would occur. So what has happened is, the money that has been spent on the MRS program and the transportation program, to date, in the attempt to reach that really unachievable 1998 date, has not been productively used. A lot of it, I think, could have been used better on the Yucca Mountain Project to advance the site characterization.

What I am hearing here today—we don't know a lot about the multi-purpose canister program, but what I am hearing today is that the schedule for this program again is oriented around the 1998 date. And the question, since the canister has to eventually go into the repository for that final 10,000-year waste emplacement period, then it just—I would hate to see a repeat of what happened with development of transportation casks and MRS designs without taking everything into account.

Mr. KREIDLER. Would you go as far as to say that there may be existing private sector technology.

Mr. WEIGEL. That, I do not know.

Mr. KREIDLER. Do you think that there is reason to suspect that this should be further investigated, before DOE spends more of its resources?

Mr. WEIGEL. The only point I would like to make is that developing a multi-purpose canister by 1998 should not be the issue, the purpose.

The purpose—it may be good to develop a multi-purpose canister. I have no idea what that canister should look like. But it should be developed with a systems approach in mind, and if it takes longer than 1998 to develop it, then it should take longer. Setting a deadline of 1998—or an objective, an objective of 1998 is fine, but the purpose should be to develop the canister, not to meet the 1998 date.

Mr. KREIDLER. Thank you very much. I appreciate that.

Mr. Chairman, if I might just say, that I think there may be room for some further investigation along these lines, given the limited resources that the DOE has, and being realistic about the time lines and what we may be able to hope would come from that particular expenditure of resources by DOE; and given the potential—looking to private resources, that indeed, we may see dollars spent much better, particularly in the short run, over the next few years. And as an intermediary step, if actions like that were taken, rather than postponing coming up with the multi-purpose canister system that is going to be necessary.

Thank you, Mr. Chairman.

Mr. LEHMAN. I thank the gentleman, and certainly we will work together in that regard. I know Mr. Sharp feels the same way.

The gentleman from Idaho.

Mr. CRAPO. Thank you, Mr. Chairman. I would like to—first of all, Mr. Chairman, I have been asked to request unanimous consent that the statement of the Honorable Scott Klug be inserted into the record.

Mr. LEHMAN. Without objection.

Mr. CRAPO. Thank you.

[The prepared statement of Hon. Scott Klug follows:]

PREPARED STATEMENT OF HON. SCOTT KLUG

Mr. Chairman, I want to thank you, not only for holding this most important hearing, but also for yielding me this time to discuss this issue.

The United States nuclear power industry currently is the source of energy for 22 percent of our country. But, in addition to powering homes and businesses, nuclear power has also fueled a great deal of controversy. I believe that while nuclear energy may not happen to be the "be all, end all" of our energy needs, it should be preserved as one the energy options for our country. Nuclear power is a domestically-produced energy source that has many benefits, including the fact that it does not directly contribute to global warming.

However, regardless of where you stand on the use of nuclear energy, the most important issue for the nuclear power industry, as well as the human community, is how we plan to handle and store spent nuclear waste. It has been 20 years since we have had a new nuclear plant built in this country, and if another plant is never built, we still will have to dispose of nuclear waste. Constantly delaying on this matter will not make high-level nuclear waste disappear any faster—and, this may be announcing the obvious.

Last year, during the debate on the House floor on the National Energy Policy Act, I supported nuclear licensing reform, I supported moving forward at the Yucca Mountain, Nevada site, and I continue to believe that standardizing nuclear plant designs will help our efforts to tackle safe disposal of high level nuclear waste.

It is disappointing to me that we needed provisions in last years energy bill, and oversight hearings like this one, to jump-start efforts on this matter. In 1982, Congress mandated the U.S. Department of Energy to site and construct a high-level radioactive waste repository. Five years later, congress passed legislation mandating Yucca Mountain, Nevada as the waste site if the Department of Energy found it to be technically fit. Unfortunately, we are not much closer to opening this site in 1998, as was mandated by law, than we were in 1987. Today, we are looking more towards an opening in the year 2010.

Mr. Chairman, our hearing will be focusing on the Special Report prepared by the Nuclear Waste Technical Review board. This group, established in 1987to review the Department of Energy's civilian radioactive waste program, recently recommended its thoughts to us concerning the high-level waste program. There are parts of that report in which I share agreement, and other parts that I hope our hearing clarifies for me.

Secretary O'Leary has called it the "moral responsibility" of DOE [sic] to take spent nuclear fuel. I share her concern that we get going on the things we need to do. Nuclear utilities have paid hefty user fees into the Nuclear Waste Fund to cover the cost of developing and operating repositories. I am worried that moneys intended to deal with this problem will be used for other budget needs. Last year alone, between utility payments and interest paid on those payments, $919 million had accumulated in the fund. Congress had appropriated only $324 million of that money, leaving the other $595 million in dedicated moneys unspent. The $4 billion surplus resting in the Nuclear Waste Fund was paid in good faith and I believe we need to honor this covenant. I will be watching the House-Senate budget conference to see that we act in the proper manner on this subject.

In the meantime, I believe we must continue to work on making Monitored Retrievable Storage facilities safe, effective, and available. Many utilities planned their waste needs around the Federal Government's ability to make good on its promise to take on the high-level waste in 1998. In my home State of Wisconsin, two of our nuclear utilities use variations of the dry cask storage method. While many have tried to delay use of this method through political activity, dry cask storage has served as a safe, well-administered alternative. I look forward to hearing the panel's views on the universal container system. Many have asserted that these canisters, similar to the dry cask, would standardized storage and transportation as well as save our nuclear waste program millions of dollars. This is something with which we can all be happy.

Mr. Chairman, although I have called on the Federal Government to decisively move forward on this matter, I must acknowledge the shared belief that I have with my constituents about the safety and integrity of this project. Above all, I believe all our efforts and decisions should be rooted in science. Deadlines are irrelevant if we skew the facts for a predetermined decision. Yucca Mountain has been chosen as our site, but if the site characterization proves it to be unfit, we should prudently move on to what needs to be done. The safety and health of our people, our economy, and our domestic energy needs warrants no less.

Again, thank you for yielding me this time and I look forward to listening to the panel.

Mr. LEHMAN. We have the whole Idaho delegation here today.

Mr. CRAPO. That is right. Gentlemen, I am the other Congressman from Idaho. There are two of us.

In fact, the INEL facility that we have been discussing here today is physically located in my district, and I want to get to that. But before I do, I would like to first express to the whole panel my agreement with some of the concerns that have been raised by numerous members here, most recently Mr. Bilirakis, about the delays that we seem to be facing and the frustration with why we cannot move forward more expeditiously.

I would like to address my first question to Mr. Wells.

Mr. Wells, your report seems to document the tension between unfettered scientific investigation and expeditious siting and construction of a repository. How would you weigh one of the problems that we face with the frequent delays in finding a permanent repository for nuclear waste and nuclear spent fuel? We could be looking at a serious impact on the continued operation of the nuclear reactors that are now operating in this country, representing about 22 percent of the electricity in this country.

Have you or the GAO weighed the adverse economic and health consequences that would flow from nuclear power plants having to shut down due to the inability to produce electricity and no place to store the spent fuel which they are generating?

Mr. WELLS. Yes, we have. We have thought about that.

Mr. WEIGEL. I think this points to one of the questions that we raise in the conclusions of our report, that one of the reasons why we believe a thorough review of this program is necessary, is because somehow—I mean, the evidence is that it is going to take longer to develop a repository, even if it is built at Yucca Mountain, which is still not a certainty.

So somehow there has to be a disconnection between the whole issue of storage of spent fuel until a repository is ready, and the repository program itself. But I don't have that answer. I mean, I can't tell you what should be done to make that disconnection.

Mr. CRAPO. With regard to the consequences in this country as a result of a shut down of a significant energy supply, isn't that in and of itself going to pose serious questions about the impact on our health and on the economy of this country?

Mr. WEIGEL. There is no physical reason to shut any of these plants down as a result of delay in the nuclear waste program, so it really comes down to an economic or a political reason, for lack of a better word, at the State level in terms of, do they want to allow the utility—if the utility is planning to build on-site dry storage facilities, do they want to allow them to do that, or do they want to shut the plant down instead?

So that is really what the issue boils down to.

Mr. CRAPO. OK. Thank you.

I see we just got called for a vote, so I am going to move immediately to the Idaho facility and ask just a few quick questions there.

Mr. Barrett, with regard to the INEL facility, I think that one of the concerns—and you have heard the concerns expressed by Congressman LaRocco earlier, but one of the concerns that we face is the continuous question being posed as to whether the Idaho Na-

tional Engineering Laboratory is suitable as a site for permanent storage of spent nuclear fuel, it being located over an aquifer.

To me, that question has been answered many times; but I would like to ask it again here today. Is there any question in your mind as to whether permanent storage of spent nuclear fuel is possible at that site?

Mr. BARRETT. Do you mean permanent, like underground geologic disposal; or do you mean permanent as in an engineered facility that stores fuel on the surface and is controlled by man?

Mr. CRAPO. Well, I guess I am assuming that by permanent, I am talking about the type of facility we are looking at at Yucca Mountain; but if there is another type of above-ground storage that is going to be permanent, I would like to know about that, too.

Mr. BARRETT. I use the word "permanent" to mean underground disposal. Some people refer to above-ground storage where we don't have any definite answer as to where it is going to go as "permanent" because you have no other apparent alternative.

Mr. CRAPO. No, that is not what I am referring to.

Mr. BARRETT. There are two criteria for that and one of those is geologic; and I do not know enough about the geology of the site to tell you if that site would be considered or not. It is not one that we are looking at.

We are following the law, which is to characterize one place, and that is Yucca Mountain; so I do not know whether Idaho would or would not be a possible permanent geological site.

Mr. CRAPO. But it is not being looked at at this point?

Mr. BARRETT. No, sir.

Mr. CRAPO. I guess the next question I have is with regard to the concern that Mr. LaRocco made relating to temporary storage or looking at the INEL as almost a de facto place where storage—where fuel will be located. Mr. LaRocco was referring to the pin being pulled out of the grenade, with the announcement that that was a possibility several months back as the administration changed hands. And it was an understanding, I think, that most of us received, that, no, indeed, that was not being considered.

Do you have any information on that?

Mr. BARRETT. Nothing further than what I have said earlier; that is, the Secretary wishes to have a consultative process to look at the front end of the system; and that would include looking at how the Nation could deal with this institutional problem of finding a place.

Mr. CRAPO. With regard to the development of MRS facilities, that is basically the interim type storage facilities, correct?

Mr. BARRETT. Yes, sir.

Mr. CRAPO. With regard to the development of those facilities, is it correct to assume that with the exception of the fact that you have got to look at storing for 10,000 years as opposed to a shorter period of time, that the same kinds of considerations with regard to permanent storage would be in place?

In other words, you would—I am thinking primarily about the Idaho aquifer and some of those considerations. Is that going to be a factor in those considerations?

Mr. BARRETT. If you are talking about interim storage and an MRS-type of thing, you can deal with that from an engineering

point of view. And that could be located over an aquifer; it could be located with very little geologic restriction.

There are some places you wouldn't want to place facilities, such as a floodplain, but generally you could put that in many places across the United States; and Idaho would be one where, from an engineering, technical point of view, you could put an engineered interim storage facility.

Mr. CRAPO. But to your knowledge, that consideration—that decision with regard to Idaho or other places is not under consideration at this time?

Mr. BARRETT. No. We have no active siting program for that. Only through the negotiator and the volunteer process.

Mr. CRAPO. OK. So the only possibility of that kind of thing happening with regard to current DOE activities is through voluntary activity or the negotiating process, through the negotiator?

Mr. BARRETT. I don't know of anything other than that.

Mr. CRAPO. OK. Thank you.

I have no further questions. Thank you.

Mr. LEHMAN. Thank you very much.

I also note we have a vote on, and I don't want to keep any of the members here any longer than they have already been. We really appreciate your spending almost 3 hours with us. We could have put you on separately, and it might have been easier on you, but we just felt it would be better to have this kind of discussion and give every member here an opportunity to take all the time that we needed.

I just want to make a final comment. GAO has been critical of DOE for giving what they think is relatively low priority to the investigations at Yucca Mountain and, in fact, contending that at the present time, funding level and activity level, the project will take at least 5 to 13 years longer than planned, and obviously costs, a good deal greater.

In addition to that we have a recommendation that there be an independent review being made by the Technical Review Board here. I just want to let you know, Mr. Barrett, that we want to work with you and the Department so that we can get some of these criticisms and problems behind us. I know you have the assurance of Chairman Sharp and every member of this committee in that regard. We don't want to create problems for you.

But as you can tell already from the attendance here this morning and the comments, this is a very contentious, controversial issue. We just want to help do it right.

We really appreciate the board, GAO, and the Department for all they have done.

Mr. Sharp, I will recognize you.

Mr. SHARP. I appreciate the chairman recognizing me.

I just would confirm what he is saying, so that there is no misunderstanding, at least as to what I said or I think, by many other members.

Mr. LEHMAN. Myself as well.

Mr. SHARP. No one is trying to get a moratorium on activity; nobody is trying to bring a halt to what is going on. When we talk about a policy review, we believe that doesn't mean you stop what you are doing. We just think it is an ideal time to take a com-

prehensive, in-depth look to see whether we ought to be accelerating or decelerating something, or whether we ought to be reorganizing; and this is an ideal time to do it. This isn't just a we'll wait-and-see proposition.

But I thank the chairman, and I certainly thank our witnesses.

Mr. LEHMAN. The hearing is adjourned.

[Whereupon, at 12:55 p.m., the subcommittees were adjourned.]

[The following responses to subcommittee questions were received for the record:]

DEPARTMENT OF ENERGY
Washington, DC 20585
September 13, 1993

The Honorable Richard Lehman
Chairman
Subcommittee on Energy and Mineral
Resources
Committee on Natural Resources
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

On July 1, 1993, Lake H. Barrett, Acting Director, Office of Civilian Radioactive Waste Management, testified before your Subcommittee on Energy and Mineral Resources and the House Committee on Energy and Commerce, Subcommittee on Energy and Power regarding High Level Radioactive Waste.

Enclosed are the answers to the questions that you, Representatives Vucanovich, Thomas, Kreidler and Hastert submitted.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Renee Wilhite, on (202) 586-4273.

Sincerely,

William J. Taylor, III
Assistant Secretary
Congressional, Intergovernmental
and International Affairs

Enclosures

Printed with soy ink on recycled paper

QUESTIONS FROM CHAIRMAN LEHMAN

High-Level Waste

Question 1: The hearing record is not clear concerning the current status of the "Mission 2001" document or study. Please describe in detail the current status of the Mission 2001 study.

a) Is the GAO incorrect in its view that the Mission 2001 document is currently the guiding scheduling document for the Yucca Mountain Project?

b) Are DOE and its waste program contractors currently operting on the basis of the schedules and test plans identified or recommended in the Mission 2001 exercise?

c) What is the current planned duration of in situ heater tests during site characterization (prior to NRC license application) at Yucca Mountain?

Answer a): Yes. The Yucca Mountain Site Characterization Project guiding schedule document is the 1991 Energy System Acquisition Advisory Board approved cost and schedule baseline which, like the Mission 2001 Report, also shows the year 2001 as the planned date to submit a license application to the U.S. Nuclear Regulatory Commission. The Mission 2001 Study was undertaken in 1992 because the planned cost profile in the cost and schedule baseline had not been met by appropriations in Fiscal Years 1991, 1992, and 1993. This funding shortfall appeared to Project Management to put the submittal of a license application in 2001 in jeopardy. The highest risk areas are described by the Lawrence Livermore National Laboratory concerns over the duration of the in situ heating tests.

The Mission 2001 Report showed that the license application in 2001 was still viable if future funding levels for Fiscal

Years 1994 and beyond were equal to or exceeded those in the Energy System Acquisition Advisory Board approved cost and schedule baseline. Even if unfunded work in prior years can be "made-up" with higher level funding in future years there is some risk to the 2001 date.

Answer b): The U.S. Department of Energy (DOE) and its waste program contractors are not currently operating on the basis of the schedules and test plans identified or recommended in the Mission 2001 exercise because the budgets required to accomplish those schedules and tests have not been made available. For example, the assumption for the repository program budget for Fiscal Year 1993 in Mission 2001 was $321 million while the actual budget received was $252 million. For Fiscal Year 1994, the assumption in Mission 2001 was $685 million, while the expected funding is $268 million. The testing program that is being conducted is consistent with the program scope laid out in the Site Characterization Plan in 1988, but due to funding limitation is progressing slower than planned.

Answer c): The in situ heater tests to be conducted in the Exploratory Studies Facility are planned for a duration of five to six years prior to Nuclear Regulatory Commission license application.

QUESTIONS FROM CHAIRMAN LEHMAN

Question 2: The Yucca Mountain project officer at Lawrence Livermore National Lab wrote, a year ago:

> It is my firm belief, and that of my technical staff, that a credible license application can not be prepared by 2001 given the constraints prescribed in this recent work plan request.
>
> The recent work plan request exercise reflects a growing tendency of the Project Office and M&O to rely on superimposed milestones rather than genuine technical capabilities. We are deply concerned that this specious information will be used to persuade senior DOE management and, ultimately, Congress that a 2001 licensing date is achievable when, given the constraints in this budget exercise, it is high questionable.

Similarly, the Project officer at USGS wrote last August:

> [T]his strategy does result in less earth-science knowledge about the potential repository site and, therefore, increased risk of failure at licensing.*** For example, some of the questions or concerns expressed by the National Academy of Sciences, Nuclear Waste Technical Review Board and others will not be resolved by the reduced program.

a) How have the concerns expressed by these technical contractors been resolved?

b) Does the Department still plan to proceed with the testing schedules those technical contractors objected to in those letters?

c) If so, what is the justification for the shortened test program? If not, please describe the current testing schedule.

Answer a): The technical contractor's views were based on assumptions about the levels of risk that the DOE should accept when trying to move the repository program forward. No fixed scope of work can be defined that, if accomplished, guarantees DOE will have adequate information to submit an acceptable license application for the Yucca Mountain site to the Nuclear Regulatory Commission. The

issue of whether a 2001 license application date could be met clearly rests on what level of risk the DOE wishes to take at submittal of that application that the Commission will not consider the application to be complete. It is fully recognized that the Commission is likely to ask for additional information.

Answer b): Yes. The in situ heater tests are needed to gather information regarding the physical characteristics of the site, utilizing simulated repository heat loading. The tests require several years to complete. The priority of the Department is to perform underground excavation to allow for an early start of these important experiments to gather enough information to submit a license application with moderate risk. It is the intent of the Department to complete these tests, even though these experiments will continue after license application submittal. If data indicates such a need, an amended license application will be subsequently submitted.

The Nuclear Regulatory Commission repository licensing regulations allow for confirmatory tests, which can span decades and can be underway while a repository is being constructed in stages.

Answer c): As noted in the response to Question 2b), "It is the intent of the Department to complete these tests, even though these experiments will continue after license application submittal..." Consequently, there will be no shortened test program. The current plan for the heater tests is to begin early in 1997 and continue for the planned five to six years duration.

High-Level Waste

Question 3: Your testimony mentions "achieving closure" with the NRC staff on the issue of extreme erosion, and "resolution" of the seismic hazard issue. Since an NRC licensing proceeding for the repository is at least 10 years in the future, in what sense can issues be "closed" or "resolved" now?

Answer: During the prelicensing phase, issues can be "resolved" at the DOE/Nuclear Regulatory Commission staff level. Resolution of an issue does not preclude Nuclear Regulatory Commission staff or Commissioners from revisiting an issue based on additional information received at any time, particularly during the licensing hearing. Issues will not be considered "closed" until a license is issued by the Commission for construction of the geologic repository.

QUESTIONS FROM REPRESENTATIVE VUCANOVICH

High-Level Waste

Question 1: How is DOE carrying out the dual role of fulfilling the responsibilities of the Nuclear Waste Negotiator's Office and the activities associated with the Office of Civilian Radioactive Waste Management?

Answer: President Clinton designated Secretary O'Leary as the acting Nuclear Waste Negotiator pending the nomination and confirmation of a new Negotiator. The activities associated with the Negotiator's office are being carried out by Department of Energy elements not associated with the Office of Civilian Radioactive Waste Management. No Departmental personnel are assigned jointly to both the Office of Civilian Radioactive Waste Management and the Office of the Nuclear Waste Negotiator.

High-Level Waste

Question 2: What is the status of the proposal DOE is considering regarding possible use of a federal facility as the location for an interim nuclear waste site?

Answer: The proposal to use an existing Federal site as an interim storage facility was put forth by the previous administration. This administration is currently reviewing the Civilian Radioactive Waste Management Program with respect to the issues of interim storage and waste acceptance. This review will be conducted through consultation with stakeholders external to the Program.

QUESTIONS FROM REPRESENTATIVE VUCANOVICH

High-Level Waste

Question 3: What criteria would DOE use in determining which Federal facility to consider as a candidate site?

Answer: Any site, Federal or non-Federal, selected for an interim storage facility would be required to meet the criteria established by the Nuclear Regulatory Commission in Title 10 of the Code of Federal Regulations, Part 72, Subpart E. The Department has not established criteria that would be used to select one Federal site over another.

Question 4: Is it true that DOE has directed its contractors to curtail the scientific work that DOE has previously considered necessary, in order to stay on schedule to meet the 2001 license application deadline? If true, how can this be justified?

Answer: The U.S. Department of Energy has not directed its contractors to curtail scientific work in order to meet the 2001 license application deadline. Rather, any work that has been deferred is due to lack of funding or shifting priorities. For example, high priority has recently been placed on the Exploratory Studies Facility, which has caused diversion of funds from other scientific work.

Question 5: In your testimony you indicated that you have received a payment-equal-to-taxes request from Nye County. Could you tell me what the status of the request is and the likelihood that it will be approved?

Answer: We are reviewing Nye County's request for payments-equal-to-taxes and, in keeping with the Secretary's direction that we negotiate on payments-equal-to-taxes, are actively working with the county in an effort to reach agreement on an appropriate payment. The Department has already made a partial payments-equal-to-taxes payment to Nye County in the amount of $1 million.

Question 6: Can you explain what thermal loading is? What you are doing to address the problems associated with it, and how that relates to your current schedule for license application?

Answer: Spent nuclear fuel assemblies will generate heat for a period of years after they are removed from the reactor core. The amount of heat produced by an assembly depends on the type of assembly, the amount of energy obtained from the fuel in a reactor (burnup), and time since the assembly was removed from the reactor core. The term "thermal loading" refers to the thermal characteristics (both near-term and long-term) of the repository, waste packages, and surrounding strata resulting from the heat generated by the fuel assemblies. Thermal loading is typically described in terms of area mass loading (metric tons of uranium per unit of area) or area power density (kilowatts per unit of area). The thermal loading can be controlled by repository design features such as the age of the fuel at time of emplacement, number of fuel assemblies per waste package, the waste package emplacement mode, the distance between waste packages in a drift, and the distance between drifts. The range of thermal loadings being considered ranges from very low thermal loading to very high thermal loading. The objective of a low thermal loading would be to thermally perturb the repository and surrounding strata as little as

possible. The objective of a high thermal strategy is to move any water that may exist in the pores of the rock in the mountain away from the repository, thus reducing the corrosion potential of the waste packages, i.e., a "dry" repository.

A Thermal Loading System study is in progress. This study will address the issues associated with the various thermal loading strategies. The study will utilize predictive models supported by field and laboratory tests and natural analogue studies to evaluate each potential thermal loading strategy in terms of pre- and post-closure performance. Two of the tests currently planned to support the thermal loading decision are the Exploratory Studies Facility in situ test and the large block heater test.

A thermal loading decision must be made in advance of the Department of Energy submitting a license application.

Question 7: Is there a relationship between the thermal loading strategy that you will pursue and the ultimate design of the universal casks?

Answer: There is a relationship between thermal loading and the size and design of the universal canisters or other configuration of waste package that will be emplaced in a repository. For instance, if a low thermal loading strategy is selected to keep the repository rock and surface of the waste packages below the boiling point of water at all times, the number of nuclear spent fuel assemblies that could be placed in each waste package would be significantly less than the number that could be accommodated if a high thermal loading strategy were selected.

Question 8: At the current pace of the program, when do you expect to file a license application with the NRC?

Answer: As stated in the "Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program," dated November 1989, DOE planned to complete site characterization and file for license application in 2001. However, the current pace of the program is constrained by less than optimum resources and may place this date in jeopardy.

Question 9: In your testimony, you indicate that the DOE expects shortly to inform Congress on a proposal to change the current approach of funding the Nuclear Waste Fund, including the possibility of amending the Nuclear Waste Policy Act. What do you mean by this?

Answer: The Department of Energy and the Office of Management and Budget are actively engaged in discussions to coordinate an Administration proposal to the Congress that will ensure adequate and predictable funding for the Civilian Radioactive Waste Management Program for the future. Some options would require amending the Nuclear Waste Policy Act.

High-Level Waste

Question 10: You indicate in your testimony that the Secretary is considering "alternative repository licensing strategies." What do you mean by this and when will you have a decision?

Answer: The Secretary is interested in evaluating alternative strategies for implementing site characterization activities at Yucca Mountain in an effort to assure scientific credibility while potentially reducing project costs and enhancing schedule confidence. In addition, the Secretary is interested in evaluating alternative strategies that address the more efficient licensing, construction and operation of high-level waste facility. One alternative strategy to repository licensing has been proposed by a Task Force that was initiated in the beginning of the year. External groups have also alluded to other strategies that could be implemented. As part of the external consultative process of the Secretary's review of the program, comments will be sought from interested parties on these issues. Any Departmental decisions on alternative strategies for the Yucca Mountain Project will occur after the completion of the Secretary's review of the program later this year.

In this regard, the Secretary believes, however, that the established national policies of a "once-through" fuel cycle for civilian nuclear power plant fuel, the concept of deep geologic disposal as the ultimate disposal method for high-level radioactive waste, and the Congressional direction to characterize the Yucca Mountain site to determine its suitability as a repository are not issues open for reconsideration.

QUESTIONS FROM REPRESENTATIVE VUCANOVICH

High-Level Waste

Question 11: In your testimony you say "The Secretary has instructed the Civilian Radioactive Waste Management Program to develop a more flexible schedule based on interim milestones." What is meant by this statement? Is there any written document from the Secretary regarding this that you can provide the Subcommittees?

Answer: The Secretary issued guidance to the Civilian Radioactive Waste Management Program on April 6, 1993, that addressed several areas of the program. The specific guidance that addresses the above question follows: "The program has fallen into the untenable position of attempting to meet unrealistic schedules without adequate resources. To alleviate this problem, I will no longer allow the program to be unnecessarily schedule driven, with the attendant risk of sacrificing high quality science to meet artificial and unrealistic deadlines. However, I do expect measurable and continued progress toward meeting program goals and continued results in cost reduction and containment." Developing a more flexible schedule with near-term milestones will be the Program's response to that portion of the Secretary's guidance. A copy of the entire April 6, 1993, guidance memorandum entitled "Guidance for the Site Characterization Plan at Yucca Mountain" from the Secretary to the Acting Director of the program is attached.

The Secretary of Energy
Washington, DC 20585

April 6, 1993

MEMORANDUM FOR LAKE H. BARRETT, ACTING DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

SUBJECT: Guidance for the Site Characterization Plan at Yucca Mountain

The successful completion of the mission of the Civilian Radioactive Waste Management program is one of the most critical environmental challenges facing the Nation. Since becoming the Secretary of Energy, I have met with many interested parties, have reviewed numerous written reports and have been reviewing the status of the program. During this early stage of my review I have found that the program needs to refocus its efforts to improve in two broad areas: increased emphasis on the highest quality scientific work and the more effective inclusion of external parties in program development and implementation.

As my review of the program continues, I will determine the classification of program activities into three broad categories: (1) activities within the program that should proceed as presently planned; (2) new activities and policies that will be implemented now; and (3) those activities within the program that require further reconsideration and that will be reviewed formally with substantial external consultation.

My assessment of the scientific viewpoints on the issue of pursuing underground explorations of Yucca Mountain at this time has convinced me that the key to determining site suitability lies in exploration of the underground geology and hydrology through tunnel excavation. Excavation and tunneling activities for the exploratory studies facility at Yucca Mountain will continue as currently planned.

I have also reviewed the tunnel sizing issue for the exploratory studies activity. After carefully considering comments from various perspectives and in keeping with my commitment to the highest standards of worker health and safety conditions for the Department's work force; in recognizing that there will be many uncertainties as the scientific exploration continues; and given my responsibilities under the Nuclear Waste Policy Act and associated regulations to protect the integrity of the site, should it be found suitable for geologic disposal, I have concluded that a 25-foot diameter tunnel is appropriate.

Other program activities may continue while my reviews continue. Examples of such are the development of a design for standardized containers to support spent fuel transportation, storage, and disposal and a proposal for revolving fund legislation for congressional consideration.

To enhance the program's scientific credibility, I want a plan developed to initiate the creation of a senior position for a Chief Scientist to oversee the scientific investigations at Yucca Mountain. The role of the Chief Scientist would be to assure that all work conducted at Yucca Mountain achieves the highest scientific quality and that the work is focused on resolving the issues that are critical to determining the suitability of the site. The Chief Scientist would also be charged with establishing a systematic peer review process for the program, that will include nationally recognized experts in appropriate scientific disciplines.

The program has fallen into the untenable position of attempting to meet unrealistic schedules without adequate resources. To alleviate this problem, I plan to no longer allow the program to be unnecessarily schedule driven, with the attendant risk of sacrificing high quality science to meet artificial and unrealistic deadlines. However, I do expect measurable and continued progress toward meeting program goals and continued results in cost reduction and containment. Thus, to assure consistent resources for the program, and as I indicated above, I want a proposal developed for legislation for the establishment of a revolving fund for the program.

During my review, one of the major criticisms I have heard consistently about the program is its lack of process for ensuring the serious and systematic involvement of the program's stakeholders in shaping program decisions. To improve this area, I want the program to confer with key national stakeholders and to report back to me within 60 days with a plan for broad consultation on specific issues I have identified. As part of that consultation, the program will work with stakeholders to develop, for my approval, a process for their regular involvement in the program.

During this consultation all viewpoints will be brought together by an independent facilitator, who will frame an approach to each issue for my consideration. Special emphasis should be given to the views of elected and appointed public officials having direct constituent responsibilities. The program's activities should also be closely coordinated with separate discussions with Governors and with the consultative activities initiated by the National Association of Regulatory Utility Commissioners.

Areas of the program which likely will require further reconsideration include: consideration of an approach for the 1998 waste acceptance requirement, including utility compensation alternatives; a full range of options for the near-term storage of spent fuel pending ultimate disposal; and alternative repository licensing strategies.

Among the important stakeholders are the States and counties in which site characterization had, or is continuing, to take place. The issue of payments-equal-to-taxes continues to be a contentious issue with these governments, and I would like to see the Department initiate negotiations to identify whether grounds for agreements can be reached.

Devising an acceptable strategy for the long term management of nuclear waste is both a national priority and an opportunity for the United States to set the standard for an international environmental initiative of overwhelming consequence.

Hazel R. O'Leary

QUESTIONS FROM REPRESENTATIVE THOMAS

High-Level Waste

Question 1: On May 25, 1993, Secretary O'Leary sent to OMB proposed legislation that creates a revolving fund for the high-level waste program. When do you expect a response to the proposal?

(a) Does DOE expect to pursue legislation this session of Congress, or will DOE wait until next session?

Answer: The Department of Energy and the Office of Management and Budget are actively engaged in discussions to coordinate an Administration proposal to the Congress that will ensure adequate and predictable funding for the Civilian Radioactive Waste Management Program for the future.

A schedule for submission of this proposal to Congress by the Administration has not been determined and is dependent upon the satisfactory completion of the ongoing discussions between the Department and the Office of Management and Budget.

QUESTIONS FROM REPRESENTATIVE THOMAS

High-Level Waste

Question 2: The revolving fund proposal allows DOE to spend all receipts received by the revolving fund. Some public utility commissions are wary of giving DOE a "blank check." What congressional oversight of DOE spending does your legislation provide?

(a) How does this differ with the present congressional oversight?

Answer: The revolving fund proposal to which you refer was merely a draft proposal for the purpose of initiating discussions with the Office of Management and Budget and, thus, is only one alternative among many possible solutions to the Program's funding problems. It is not the Department's desire or intent to exempt a proposed "revolving fund," the existing Nuclear Waste Fund, or the Civilian Radioactive Waste Management Program from congressional oversight.

While the details of the proposal have not been finalized, it is anticipated that there will be no changes to the existing oversight provided by the respective committees of jurisdiction.

QUESTIONS FROM REPRESENTATIVE THOMAS

High-Level Waste

Question 3: The proposed legislation does not address what will happen to the existing balance in the nuclear waste fund. What is the balance in the nuclear waste fund, and how much interest does the U.S. Treasury pay into this fund annually?

(a) How does DOE propose Congress resolve this issue?

Answer: The balance in the Nuclear Waste Fund as of July 31, 1993, was $4,021 million.

The interest earned annually by the Nuclear Waste Fund is reflected in the following Table:

Fiscal Year	Interest Earnings (Millions)
1983	$0
1984	0
1985	(73)*
1986	73
1987	89
1988	158
1989	196
1990	161
1991	241
1992	261

The disposition of the existing balance in the Nuclear Waste Fund is one of the subjects under discussion with the Office of Management and Budget. No conclusions have, as yet, been reached.

* Premiums paid on investment purchases minus interest earned on investments.

QUESTIONS FROM REPRESENTATIVE THOMAS

High-Level Waste

Question 4: One of the developments in the high-level waste program is the industry's work on a universal container system. This system would standardize the storage, transportation and disposal of spent nuclear fuel, including the use of multi-purpose canisters. Moreover, I understand that the UCS system will save the program millions of dollars.

a. What are the Department's plans for developing the UCS program?

Answer: In December 1992, the Department completed a preliminary evaluation of the use of multi-purpose canisters within the Civilian Radioactive Waste Management System. The preliminary evaluation identified and quantified many of the benefits that the multi-purpose canister system might provide. As a result of that evaluation, the Department initiated conceptual design of a multi-purpose canister system. The conceptual design and supporting studies will be used to evaluate the cost, schedule, and feasibility of implementing the waste management system with multi-purpose canisters. These studies will be completed by the beginning of Fiscal Year 1994 and a decision regarding the further development of the multi-purpose canister system will be made shortly thereafter.

QUESTIONS FROM REPRESENTATIVE THOMAS

High-Level Waste

Question 5: I also understand that a consortium of industry utilities and vendors asked DOE to fund a proposal to develop the UCS system. But, that proposal was denied.

a. Who is responsible for developing the UCS system and what role has the industry been asked to play in developing the system?

Answer: In accordance with the Nuclear Waste Policy Act of 1982, ultimate responsibility for development of the Civilian Radioactive Waste Management System lies with the Department of Energy. With respect to the development of a system that utilizes technologies such as multi-purpose canisters that may be utilized for use at reactors as well as within the Federal Waste Management System, it is important that the Department work closely with the utility industry and vendors to develop the appropriate system. In that regard, the Department anticipates issuing a request for proposals to design, certify, and fabricate a multi-purpose canister system. It is anticipated that utilities or teaming arrangements between vendors, utilities, and fabricators may wish to submit proposals.

QUESTIONS FROM REPRESENTATIVE THOMAS

High-Level Waste

Question 6: I understand the Nevada Nuclear Waste Project Office has received more than $50 million of ratepayer funds during the last decade for scientific oversight of the Department's activities at Yucca Mountain. Who is responsible for auditing how that money is spent?

Answer: The State of Nevada is required by Public Law 102-377, the Energy and Water Appropriations Act of 1993, to provide certification to the DOE that all funds expended from such direct payment monies have been expended for activities as defined in Public Law 97-245, the Nuclear Waste Policy Act, as amended. The State of Nevada annually requests an audit from an independent auditor and provides the audit report to the Office of Civilian Radioactive Waste Management for review. Additionally, the General Accounting Office and Headquarters Department of Energy Inspector General may perform audits at any time.

QUESTIONS FROM REPRESENTATIVE THOMAS

High-Level Waste

Question 7: Recently, Secretary O'Leary indicated that DOE has the responsibility to begin taking spent fuel by 1998. What is DOE doing to ensure it can begin this process by that time?

Answer: The Department is reviewing options for waste acceptance in 1998, including utility compensation alternatives and a full range of options for the near-term storage of spent nuclear fuel pending ultimate disposal. The Department believes that finding a reasonable solution to the nuclear waste disposal issue will require an alliance of wide-ranging and often conflicting constituencies. Accomplishing this will depend on establishment of a collaborative dialogue with stakeholders. Toward this end, the Department held a meeting on August 10, 1993, with a broad range of stakeholders to discuss the process for addressing the issues of 1998 waste acceptance, interim storage and alternative repository licensing strategies.

Another of the Department's recent initiatives involves the development of a design for a standardized canister system for spent fuel transportation, storage, and disposal. In July, the Department conducted the first in a series of multi-purpose canister workshops with stakeholders to discuss with them a concept for such standardized containers. A second workshop is planned for October 1993. The Department continues to support efforts to find a

volunteer host for a monitored retrievable storage facility in order to achieve timely acceptance of spent fuel. In addition, the Department has been working with the Office of Management and Budget to develop proposals for a revolving fund that would assure the requisite funding for the program, while maintaining Congressional and Federal oversight.

QUESTIONS FROM REPRESENTATIVE KREIDLER

High-Level Waste

Question 1: Please provide a description of the DOE's activities regarding development of multi-purpose canister systems.

Answer: In December 1992, the Department completed a preliminary evaluation of the use of multi-purpose canisters within the Civilian Radioactive Waste Management System. The preliminary evaluation identified and quantified many of the benefits that the multi-purpose canister system might provide. As a result of that evaluation, the Department initiated conceptual design of a multi-purpose canister system. The conceptual design and supporting studies will be used to evaluate the cost, schedule, and feasibility of implementing the waste management system with multi-purpose canisters. These studies will be completed by the beginning of fiscal year 1994 and a decision regarding the further development of the multi-purpose canister system will be made shortly thereafter.

Question 2: Does the DOE expect to be able to establish in the near future the parameters for an MPC system that is significantly better than systems that already exist in the private marketplace?

Answer: The objective of the multi-purpose canister system is to have a canister certified by the Nuclear Regulatory Commission that, with appropriate overpacks, can be used for storage, transport, and disposal for a wide variety of spent nuclear fuel. This will require the canister to meet the requirements of 10 CFR 72 for storage, 10 CFR 71 for transport, and 10 CFR 60 for disposal. At the present time, there are no certified technologies that meet these requirements or, moreover, even meet the requirements of both storage and transportation.

QUESTIONS FROM REPRESENTATIVE KREIDLER

High-Level Waste

Question 3: According to a publication prepared for the DOE entitled "A Preliminary Evaluation of Using Multi-Purpose Containers Within the Civilian Radioactive Waste Management System", repository issues relating to the acceptability of a canister will not be known for several years. Given this fact, how confident are you that your canister system will be able to be used for all three stages of the waste cycle, storage, transport, and disposal.

Answer: At the present time, this is an area of uncertainty. However, we are working to minimize the risks of having a canister that would not meet the requirements of 10 CFR Part 60 for disposal in a repository. Some of the concerns will not be known for several years. However, we can identify parameters that can be incorporated into the design that will address many of the repository licensing issues. At the time a license application is submitted to the Nuclear Regulatory Commission for a repository these issues will be more fully understood. If a design change is necessary to address those issues it could be made at that time.

QUESTIONS FROM REPRESENTATIVE KREIDLER

High-Level Waste

Question 4: What effort is being made to evaluate the use of existing canister-based storage systems for immediate use by DOE?

Answer: As part of the preliminary evaluation that was completed in December 1992, existing systems were evaluated to determine whether any of the existing canisters used for storage technologies could meet the requirements for storage, transportation, and disposal. The conclusion was that none of the existing canisters would be able to meet the three requirements. The Department is evaluating the use of existing storage systems to determine how a multi-purpose canister would work with these systems. We have requested information from vendors of existing systems to help in this evaluation. When the Department is in a position to solicit formal proposals, the industry will be able to tailor its existing technologies to meet the requirements established by the Department. Although there are no existing systems that are licensed for storage and transportation, the Department is aware of the work being conducted within the industry to develop such technology. As part of the multi-purpose canister conceptual design and evaluation process, the Department is also evaluating the cost and benefits of using dual purpose (i.e., transportation and storage) canisters compared with multi-purpose canisters.

QUESTIONS FROM REPRESENTATIVE KREIDLER

High-Level Waste

Question 5: I am concerned that we are spending money on problems that have already been solved by the private sector. Is it possible to redirect money spent on the DOE's MPC system towards resolving other radioactive waste disposal issues and DOE priorities in general?

Answer: The multi-purpose canister system being evaluated by the Department represents new technology that does not currently exist. Therefore, we are in the process of developing a design for standardized containers to support spent fuel transportation, storage, and disposal, and we are working closely with the utility industry and vendors in developing such a design. The funds being utilized on the multi-purpose canister system evaluation are appropriated from the Nuclear Waste Fund and, therefore, can only be used for activities authorized by the Nuclear Waste Policy Act, as amended. They cannot be redirected to other "DOE priorities in general."

QUESTIONS FROM REPRESENTATIVE KREIDLER

High-Level Waste

Question 6: Why shouldn't the DOE defer any potential MPC redesign until the repository parameters are available and, in the meantime, use existing storage systems.

Answer: Additional on-site storage for spent fuel is needed by a number of electric utilities now. The number of reactor sites needing additional storage will grow in the coming years. The additional storage provided so far has been furnished by a number of commercial vendors. Many plant sites have chosen different storage concepts and designs. For the most part, these existing storage systems have not considered future transportation or final disposal requirements. As a result, spent fuel in dry storage at reactor sites will have to be removed from its storage container and transferred into a transportation container. Ultimately, the spent fuel would have to be handled again to be put into a waste disposal package. This, in turn, results in higher occupational radiation exposures to workers.

This current approach is not consistent with Nuclear Regulatory Commission regulations that stress the need for compatibility among elements of the waste management and disposal system and the minimization of fuel handling. It is for this reason, among others, that many electric utilities and regulatory and advisory bodies

encouraged the Department to look at developing multi-purpose containers that could be used for on-site storage at reactor sites, subsequent transportation, and disposal.

The Department is pursuing a multi-purpose canister that could be stored and then used directly with an appropriate overpack for transport and another overpack for disposal. We will use the best available information concerning repository parameters to provide the greatest assurance that the multi-purpose canister will be compatible with the final disposal requirements. If successfully developed, this system would reduce occupational radiation exposures, minimize fuel handling operations, and possibly result in overall system cost reductions.

QUESTIONS FROM REPRESENTATIVE HASTERT

High-Level Waste

Question 1: In a May 25 letter to OMB Director Leon Panetta, Secretary O'Leary proposed the establishment of a revolving fund as a successor to the Nuclear Waste Fund. She wrote, "We are now in the position that progress toward effective radioactive waste storage and disposal activities will be constrained by budgetary limitations, despite the surplus collections accumulating in the Nuclear Waste Fund, unless the program is given access to all the Fund's annual revenues. Without action, the balance in the Nuclear Waste Fund will continue to grow and the Federal Government will not be able to deliver the radioactive waste management and disposal services for which the utility ratepayers are being charged and the nuclear utility companies have contracted."

What is the status of the Secretary's proposal to OMB and how does it relate to the provision to take the Nuclear Waste Fund off-budget that was proposed by Senator Johnston as part of the Budget reconciliation and subsequently withdrawn?

Answer: The Department of Energy and the Office of Management and Budget are actively engaged in discussions to coordinate an Administration proposal to the Congress that will ensure adequate and predictable funding for the Civilian Radioactive Waste Management Program for the future. While both the Administration and Chairman Johnston seek to achieve this goal, the Administration's approach to a resolution may differ with respect to impacts on the deficit and on discretionary spending limitations.

QUESTIONS FROM REPRESENTATIVE HASTERT

High-Level Waste

Question 2: Recently, much attention has been focused on the Department of Energy's responsibility for taking title to spent nuclear fuel in 1998, as outlined in standard contracts entered into between the Department and nuclear utilities. Why is this target date so important and why is the high-level waste storage issue such an acute problem?

Answer: The 1998 target date was identified originally in Section 302 of the Nuclear Waste Policy Act of 1982 and subsequently incorporated in the standard contracts entered into between the Department of Energy and the nuclear utilities. Many nuclear utilities have informed us that they undertook long-range planning for the acceptance of their spent fuel by the Department and for the need for possible onsite storage based on the Department initiating spent fuel acceptance in 1998.

By the end of 1998, it is projected that approximately 38,200 metric tons of spent nuclear fuel will be in storage at reactor sites across the country. Until the Federal Government begins to accept the spent nuclear fuel from utilities, available storage capacity at each reactor site will continue to decrease and other alternatives such as dry storage will be needed. It is projected that by 1998, 1,650 metric tons of uranium from 28 reactors will be in dry storage at 19 different reactor sites in 17 States and, if the Federal Government does not begin accepting the spent fuel by 2010, 11,500 metric tons of uranium from 82 reactors will be in dry storage at 54 different reactor sites in 30 States.

QUESTIONS FROM REPRESENTATIVE HASTERT

High-Level Waste

Question 3: As you may be aware, this Committee has been very interested over the past several years in the Department of Energy's statutorily required studies of Yucca Mountain, Nevada to determine its suitability as a repository for high-level radioactive waste. We have been gratified recently to see several steps taken at Yucca Mountain to move forward, including beginning construction of an exploratory studies facility and the recent purchase of a state-of-the-art tunnel boring machine. At the same time, Secretary O'Leary has reportedly agreed to a review of the program. While I appreciate and support a review of the program, it is critical that the progress that the Department is currently making continue.

What is your understanding of the scope of the proposed review? Will it include a review of the policy of deep-geologic disposal upon which there is worldwide scientific consensus and which is enshrined in the Nuclear Waste Policy Act of 1982?

Answer: Secretary O'Leary has directed that a multi-phase approach be implemented for review of the Civilian Radioactive Waste Management Program. This approach is based on the established national policies of a "once-through" fuel cycle for civilian nuclear powerplant fuel and ultimate deep geologic deposition as the disposal method, and the congressional instruction to characterize the Yucca Mountain site to determine its suitability as a repository. These established national policies are not being reconsidered. The elements of the review are: 1) an independent financial and management review of the Yucca Mountain Site Characterization Project; and 2) general consultation with stakeholders for the process to review acceptance and near-term storage issues, and for review of alternative repository program strategies. The process for this second element of the review will be initiated at an August 10, 1993, meeting in Las Vegas, Nevada.

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
1100 Wilson Boulevard, Suite 910
Arlington, VA 22209

August 26, 1993

The Honorable Philip R. Sharp
Chairman
Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Richard Lehman
Chairman
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairmen Sharp and Lehman:

I join Drs. Allen and Price and the other members of the Nuclear Waste Technical Review Board (the Board) in thanking you for providing us an opportunity at the joint hearing on July 1 to present the findings and recommendations contained in our *Special Report*. We also appreciate very much your gracious comments regarding the contribution of the Board to the civilian radioactive waste program.

Enclosed are the Board's answers to the follow-up questions forwarded by Chairman Lehman, and Representatives Hastert and Vucanovich. The questions are both thoughtful and thought provoking. We hope that the Board's responses will prove helpful. Should you require additional information or clarification, please contact me.

The Board looks forward to continuing to work with the Subcommittees to make improvements to and speed progress in this important program.

Sincerely yours,

John E Cantlon

John E. Cantlon
Chairman

Enclosure

Telephone: 703-235-4473 Fax: 703-235-4495

POST-HEARING QUESTIONS FOR THE NWTRB

Questions from Chairman Lehman

Question #1

You state that the management & operations contractor for the program is not being used as effectively as it could be.

a) How could the M&O contractor be used more effectively, in your view?

b) To what extent, if any, do you think the M&O contractor contributes to the excessive emphasis on program infrastructure which you cite?

Board response to question #1

a) In the Board's view, the principal functions of the management and operating (M&O) contractor should be (1) developing a technically supportable basis for prioritizing program activities; (2) integrating the program's many and diverse activities related to scientific research and development, engineering, and construction; and (3) helping the Department of Energy (DOE) ensure that the program as a whole will achieve its goals in the most cost-effective and timely manner possible. Currently, however, it is not clear that the M&O has been given the authority to carry out these functions effectively. Furthermore, there seems to be substantial duplication of effort between the M&O and other DOE contractors. During the start-up phase for the M&O, some duplication was unavoidable. Now, however, the DOE needs to be more aggressive in assigning clear responsibilities and in eliminating redundancies.

b) It is unclear to what extent the M&O contributes to the program's high infrastructure costs. However, redundancies in the program and continuing problems with setting priorities will naturally affect program costs. We believe that this question and the other issues raised above should be addressed as part of the independent review of the management and organizational structure of the Office of Civilian Radioactive Waste Management (OCRWM) called for in the Board's *Special Report.*

Question #2

What is the appropriate degree of technical conservatism in a program of this kind? Is it appropriate for the program to embrace a higher degree of conservatism than is considered technically necessary in order to help address the public acceptance problems of the program?

Board response to question #2

To determine the appropriate degree of conservatism in a program of this kind, one must consider several factors. Among these are (1) purely technical issues, (2) the consequences of failure, and (3) the level of uncertainty the public is willing to accept. In general, the overall level of conservatism need not be very different from that which the nation has found acceptable for other critical, and often controversial facilities. Critical facilities are those facilities that society needs but whose failure could lead to serious consequences.

The DOE faces the challenge of siting and building a first-of-a-kind geologic repository that can safely isolate radioactive waste for thousands of years. The best approach, as required in the Nuclear Waste Policy Act of 1982, is to develop a repository system that relies on multiple barriers. Such barriers could include a long-lived waste package, favorable geology, and a favorable hydrologic regime, all of which can act independently and together to isolate the waste. The pivotal question facing those involved in repository development should not be the elimination of *all* scientific uncertainty; there will always be uncertainties in such a venture. Rather, the DOE should strive to increase the robustness of the repository system, or its capacity to protect the public and the environment, in the presence of these uncertainties.

Public acceptance, however, may be linked only tenuously to the ability of the technical community to ensure safety and demonstrate conservatism. Beyond some as of yet undetermined point, increasing conservatism will have little or no effect on public acceptance.

Question #3

In your Special Report, you noted that other factors beyond DOE's control could also contribute significantly to further delays in program progress.

a) Could you provide us with some insights to the kind of technical or institutional problems that could occur?

b) Are the kinds of delays you would expect in terms of years or decades?

Board response to question #3

According to the DOE,[1] to meet its 2010 deadline for beginning repository operation, it must assume the *absence* of the following:

- political or legal obstruction;
- difficulty in clearly resolving site suitability issues;
- difficulty in resolving licensing issues;
- continuing evolution of regulatory requirements;
- insufficient program funding levels.

However, any number of factors substantially, if not entirely, beyond the DOE's control could invalidate this already very optimistic set of assumptions. For example:

- *Legal challenges could be raised by the State of Nevada or other intervenors.* The controversial nature of the repository may continue to generate opposition by the State of Nevada or other opponents of the repository. Legal challenges to the development of the repository cannot be ruled out.

- *There could be difficulties or delays in resolving site-suitability and licensing issues.* Insufficient time has been allowed in the schedule to acquire and analyze the data necessary to resolve scientific uncertainties associated with geologic features that will likely be encountered once underground exploration and testing is initiated. Furthermore, to accommodate the 2010 date for repository operation, the DOE assumes that the Nuclear Regulatory Commission (NRC) will accept its data and analyses and issue a license to construct a repository within a three-year period. Given the first-of-a-kind nature of this facility, this time frame may be optimistic.

- *Changes in radiation-safety standards may affect licensing requirements.* In 1992, Congress passed legislation establishing a three-year process for promulgating a radiation-safety standard and for revising the NRC's criteria and technical requirements for waste disposal at Yucca Mountain. It now seems likely that three years may not be adequate to complete this process. In addition, changes in the Environmental Protection Agency (EPA) standard and the NRC requirements could affect the waste package design and the time required to conduct some scientific tests.

- *Annual appropriation levels have been less than the program says it needs to meet current program deadlines.* The DOE has indicated that to meet its schedule for site evaluation it will need $700 million per year, just for site-characterization activities, to apply for a license to construct the repository

[1] John Bartlett, DOE, January 7, 1991, Board meeting, transcript pages 21-24 and associated viewgraphs.

by 2001. However, annual budgets for the program have been considerably below this amount. This situation is not strictly outside the DOE's control since it has never requested anything approaching this amount for the program. However, it is unclear whether Congress would approve such substantial increases in program funding.

b) It is difficult to predict how long it could take to resolve any one or all of these issues, should they arise. However, it is safe to say that any one of these uncertainties, especially a legal challenge, has the potential of delaying the program for periods of time ranging from a few months to several years or more. In view of such uncertainties, the Board has suggested that *real* program progress can be measured more meaningfully by setting and achieving realistic intermediate goals, such as getting underground, completing critical testing, and determining site suitability.

Question #4

Your Special Report states that the waste package is a key component of the waste management system, and several earlier reports urged DOE to place greater emphasis on this component of the waste system. Contrary to your recommendations, DOE has reduced funding for R&D in this area for the last 3 years.

a) Please discuss what effect this strategy could have on overall safe disposal of nuclear waste.

b) In your view, what degree of reliance would be appropriate to assign to a robust, long-lived waste package when planning the overall repository design?

c) Is the current NRC standard requiring a 300 to 1,000-year period of substantially complete containment of waste in the waste packages adequate?

Board response to question #4

a) The DOE has recently indicated interest in considering a much more robust waste package than is included in the 1988 baseline plan. However, the DOE's pattern of significantly underfunding necessary waste package research is shortsighted. To validate the selection of container materials for the waste package, short- and long-term tests of the materials proposed to be used in the waste package will be required. Citing budget constraints, the DOE has underfunded this area, which has resulted in delays in initiating these tests. Under the current schedule, there may be insufficient time to complete long-term testing. This could result in the preemptive rejection of potentially superior, or more cost-effective, materials, which require longer test periods, or in the DOE's inability to demonstrate credibly the long-term performance of these materials. The former

could result in greater cost and/or reduced repository safety performance, the latter in licensing problems.

b) The Board believes that the use of engineered barriers *in combination* with a well-characterized and suitable site is the most effective way to increase our confidence in predictions of repository performance over thousands of years. One of the most important components of the engineered barrier system is the waste package. The Board sees no technical reasons why a waste package with a lifetime of several thousand years, and perhaps more, cannot be developed by the U.S. program. Indeed, some programs in other countries the Board has visited provide for a waste package lifetime that is considerably longer than this.

The Board does *not* believe that the waste package with a lifetime of 300-1,000 years in DOE's baseline design meets the criteria for a robust, long-lived waste package. We hope that the DOE's recent efforts related to a multipurpose container will include the development of a robust, long-lived waste package.

c) The Board believes that the current NRC repository criteria that include a radionuclide containment requirement of 300 - 1,000 years should be viewed as a minimum standard and that the program should strive to exceed this requirement. One way to do this is to design a robust, long-lived waste package that by itself could be shown to have a reasonable assurance of containing radioactive waste for thousands of years.

Questions from Representative Vucanovich

Question #1

In the Report you say that "Safely storing spent fuel does not appear to present any serious technical problems...The Board has long advocated the development of alternative container concepts." Does this mean the Board would support on-site storage as an acceptable alternative to an interim nuclear waste facility until a high-level waste repository is built?

Board response to question #1

We see no technical basis for disagreeing with the NRC's determination that spent fuel can be stored safely at reactor sites or at a centralized interim storage facility for at least 100 years. That said, the Board has advocated the development of alternatives to the DOE's baseline container concept and overall high-level waste management system because of the potential to reduce handling of the waste and increase the level of safety in the waste management system. Our position should not be regarded as implicit support for one storage alternative over another. As stated in the *Special Report*, given the current law, even if a centralized interim storage facility is successfully sited and constructed, much spent fuel will likely remain stored at many reactor sites for extended periods. Thus, some on-site storage will almost certainly have to be part of any waste management plan.

Question #2

In your testimony, you indicate that "attempting to meet these unrealistic deadlines (1998 and 2001)...could cause licensing problems, increase overall program costs and ultimately delay the program."

Could you please explain what the licensing problems might be, and particularly what the extent of delay in the program would result?"

Question #3

What do you mean in your testimony that "DOE's repository development schedule may not allow sufficient time to complete these (heater) and other essential scientific tests." What are the heater tests and what type of delay might result in the lack of flexibility in the DOE schedule?"

Board response to questions #2 & #3

Licensing problems could result from a failure to collect scientific data of sufficient duration, quality, and/or quantity to adequately support a license application. Some site-investigation studies need to be carried out over several years or more if they are to produce the information needed to demonstrate repository safety. For example, in-situ heater tests that are needed to choose and scientifically justify the appropriate thermal-loading strategy for the repository could take up to a decade or more to complete. The thermal-loading strategy, which describes how to achieve a given range of temperatures within a repository and in the surrounding rock over a chosen period of time, will affect the size and design of the repository, the ageing of the spent fuel, and the design of the waste package. The Board is concerned that attempting to meet the deadlines in the current schedule could result in shortening the duration of these heater tests or the corrosion tests necessary to demonstrate the performance of materials used in the waste package. This could reduce the scientific quality of test results and cause the NRC to require the DOE to initiate additional testing before a repository license could be obtained.

Question #4

Given your criticisms of the DOE program, what type of independent review do you envision of the DOE program and who do you suggest conduct such a review?

Board response to question #4

The Board has recommended an independent review of OCRWM's management and organizational structure. Such a review should not be conducted or sponsored by the DOE. However, we are unaware of any currently existing entity that would be ideal for this job. Obviously, it would be important to include on such a review panel experts with experience in the management of underground projects of commensurate complexity. The Board strongly believes that *any* review of the program should be conducted concurrently with ongoing site-characterization activities to preserve continuity and facilitate program progress.

Question #5

In the Report, you say "unrealistic deadlines also are forcing the DOE to undertake activities simultaneously that might better be conducted sequentially." What's the impact of this statement on the Board's confidence in the DOE's scientific activities at Yucca Mountain?

Board response to question #5

The Board's concern in this area is that conducting some activities simultaneously could lead to costly mistakes, could create inefficiencies, and could cause further program delays. The Board believes it is very important that the DOE not make decisions or commit to strategies or designs that may rule out options that might later be shown to be preferable. For example, to be able to accept spent fuel at a centralized interim storage facility, the DOE had decided to begin procurement of transportation casks before completing research on alternative container concepts such as the multipurpose container. Earlier this year, the DOE modified its approach, emphasizing the development of a more flexible multipurpose container that could be used to transport, store, and, perhaps, dispose of spent fuel. The Board is encouraged by this change. However, the development of a container concept is now being conducted simultaneously with thermal and materials testing that will take several years, perhaps up to a decade, to complete. Consequently, it is important that the DOE maintain the flexibility to modify its multipurpose container designs based on the outcome of these tests or to develop an multipurpose container that can accommodate a range of thermal-loading alternatives.

Question from Representative Hastert

Question #1

It has been suggested that the Department of Energy should postpone work on the Yucca Mountain site characterization pending a comprehensive review of the high-level waste program. Wouldn't this simply further delay the program in Nevada?

Board response to question #1

The Board has explicitly stated that any review of the program "can and should be accomplished without slowing the progress of important site-characterization activities at Yucca Mountain."[2] The Board does not support postponement of site characterization pending the outcome of a comprehensive review. Postponing this important work, or any significant part of it, such as underground exploration and testing, could increase overall costs, delay the determination of site suitability, and cause substantial additional delays in addressing the problem of disposing of radioactive waste. Such a delay also could affect efforts across the nation to expand on-site storage of spent fuel at reactors. The Board believes that *any* review of the program can and should be conducted concurrently with ongoing site-characterization activities.

GAO Responses to Post-hearing Questions

Questions from Representative Vucanovich

1. In your report you raise some serious questions about the extent to which DOE has pressured its contractors to reduce the time that they need to conduct necessary tests to determine if the site is suitable in order for the 2001 date to be met. Will you expand on these concerns and please provide a specific example of what I consider to be a very serious problem?

GAO response

Both the Lawrence Livermore National Laboratory and the U.S. Geological Survey have expressed their concerns to DOE's Yucca Mountain Project Office that actual and potential reductions in the scope of planned site characterization tests may adversely affect DOE's ability to obtain an adequate scientific understanding of the Yucca Mountain site.

The Survey is particularly concerned that cuts in planned site investigations to achieve cost savings will also reduce confidence in earth-science knowledge of the site and, therefore, pose potential delays or decreased probability of success in a future repository licensing proceeding. The Survey's position, for example, is that the more modest earth sciences program under consideration does not allow for dealing with unanticipated geologic or hydrologic findings, such as recent preliminary results from studies of the Ghost Dance Fault. According to the Survey, these results have shown the need for expanded--rather than reduced--resources and time to resolve the unanticipated findings.

Livermore is especially concerned about reductions in the time permitted to conduct a planned "engineered barrier system field test" which, simply stated, is a test of the effects of heat on the repository. According to Livermore, scientists would be most comfortable with a 12-year test period but agreed that a test period of about 6 years can be technically supported. As a result of the Mission 2001 project, however, the planned 6-year test was shortened to 3 years so that the schedule for completing site characterization and filing a license application with the Nuclear Regulatory Commission by October 2001 could by maintained. Also, materials testing elements originally planned have now been eliminated. Livermore does not expect this shorter period to provide the necessary data. The laboratory believes that a future licensing proceeding would probably be delayed to allow for the acquisition of data from a second test of longer duration. In this regard, the laboratory's position is that it will not defend a license application based on the limited information obtainable from the new 3-year test period unless (1) the

laboratory is allowed to follow the initial test with a second test lasting about 5 years and (2) the information obtained from the second tests confirms the validity of the initial 3-year test.

2. You indicate that DOE is not adhering to its "Mission 2001" document with respect to its baseline projections for site characterization. Is the Mission 2001 document still in place as the guiding document for the Yucca Mountain project?

GAO response

DOE's Yucca Mountain Project Office and its project contractors have been implementing the results of the Mission 2001 study. Thus, at that level within DOE, the Mission 2001 study now represents the guiding document for planning the characterization of Yucca Mountain on a schedule that would lead to a license application by October 2001. For example, the duration of the engineered barrier field test, discussed in response to the earlier question, is now planned for 3 years, rather than 6 years, because the 2001 milestone could not be met with a test period of longer than 3 years.

However, as the Acting Director of DOE's Office of Civilian Radioactive Waste Management pointed out at the July 1, 1993, hearing, the changes brought about by the Mission 2001 exercise have not been formally incorporated into the official technical, schedule, and cost baseline for the Yucca Mountain site characterization project. Moreover, DOE has not incorporated into this baseline the $563 million difference between actual funding for the project in fiscal years 1991 through 1993 ($566 million) and the amount ($1.159 billion) that the original project baseline shows would be needed in those years to complete all planned site characterization activities on schedule. In other words, the official baseline does not yet recognize (1) that over $500 million of site characterization work planned for those three fiscal years was not funded and, therefore, was initially deferred to later years and (2) the subsequent adjustments that DOE made to its site characterization plans, such as cutting the engineered barrier field test duration from 6 to 3 years, to adhere to its October 2001 license application milestone date.

3. When do you expect your recommendations regarding an outside review to be available? Could you give us some examples of the type of entity you envision?

GAO response

We expect to address the subject of outside review of the civilian nuclear waste disposal program in our next legislatively-mandated report on the program expected to be

issued later this year. There are several forms that a review of the disposal program could take. In our view, the key factor to be considered in establishing such a review is the independence of the reviewing organization from the Department of Energy and stakeholder entities to ensure that the scope of the review is sufficiently broad, the conduct of the review is objective, and the review results are credible.

Although questions about the way DOE has organized and managed the disposal program would be important aspects of an independent review, the review should, in our view, be structured around the recognition that development of a repository for disposal of highly radioactive waste--whether at Yucca Mountain or elsewhere--is likely to take much longer than DOE's current schedule--a schedule that is already 12 years longer than anticipated in the Nuclear Waste Policy Act of 1982. This condition has significant policy implications related to storage of utilities' spent fuel, the preferred management approach to investigating and potentially developing the Yucca Mountain site, and disposal program financing over the long term. Because of these policy implications, we favor a review of the disposal program that is independent of DOE and program stakeholders, is managed at a very high level, and that gives both DOE and program stakeholders ample opportunity to provide their views on the disposal program to whatever entity actually conducted the review. There are a number of possible review approaches that could be taken and that we are assessing, including

-- hearings by appropriate congressional committees or by a specially-constituted committee of the Congress;

-- a special commission established through legislation, such as the Monitored Retrievable Storage Review Commission created by the Nuclear Waste Policy Amendments Act of 1987 to report on the need for a monitored retrievable storage facility as part of the nation's nuclear waste management system;

-- a presidential commission, such as the President's Commission on the Accident at Three Mile Island; or

-- an existing body, such as the National Academy on Public Administration, with expertise in policy analysis and organization and management issues.

4. On another subject, I understand that you are close to completing your audit of the Office of the Nuclear Waste Negotiator. When do you expect that to be completed and when can you provide my staff with a copy of the report?

GAO response

We expect to issue the subject report to the Chairman of the Committee on Natural Resources about September 1, 1993. The report will be publicly available within 30 days of its issuance.

Question from Representative Hastert

1. Recently, Secretary O'Leary endorsed an independent review of the Department's management of the Yucca Mountain site characterization process. Since then, some have indicated that while this review is taking place, there should be a moratorium on any further characterization work.

Given the number of reviews that have already taken place, and the fact that the entire characterization process is seriously behind schedule, shouldn't the Department be permitted to continue its scientific work at the site concurrently with the independent review?

GAO response

GAO believes that an independent review of the civilian nuclear waste disposal program should be conducted but does not suggest that the program, including characterization of the Yucca Mountain site, be stopped while this review occurs. As we stated in our testimony, it is our view that concerns about the disposal program can be addressed without slowing the momentum of site characterization.



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