S. HRG. 112–970

RECOMMENDATIONS FROM THE BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE FOR A CONSENT-BASED APPROACH TO SITING NUCLEAR WASTE STORAGE AND MANAGEMENT FACILITIES

HEARING

BEFORE THE

SUBCOMMITTEE ON CLEAN AIR
AND NUCLEAR SAFETY

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

JUNE 7, 2012

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C O N T E N T S

RECOMMENDATIONS FROM THE BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE FOR A CONSENT-BASED APPROACH TO SITING NUCLEAR WASTE STORAGE AND MANAGEMENT FACILITIES

THURSDAY, JUNE 7, 2012

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY,
Washington, DC.

The Committee met, pursuant to notice, at 10 a.m. in room 406 Dirksen Senate Building, Hon. Thomas R. Carper (Chairman of the Subcommittee) presiding.

Present: Senators Carper, Barrasso, Udall, Merkley, and Alexander.

OPENING STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM THE STATE OF DELAWARE

Senator CARPER. Good morning; welcome one and all, General Scowcroft, Professor Peterson, ladies and gentlemen.

We appreciate the efforts of all our witnesses to be here today. I want to pass on my very best to Congressman Hamilton, who is one of my heroes and mentors from my time in the House. I appreciate it, and hope he is doing well.

Today's hearing is really one of several that we hope to hold on the work of the Blue Ribbon Commission on America's Nuclear Future as our Committee starts to deliberate on how we move forward on what I think what we all believe is the very important issue of nuclear waste disposal in this country and really in the world. Specifically today we will be focusing on the consent-based siting recommendations made by the Commission. Senators will have 5 minutes for their opening statements, and then we will recognize our first panel of witnesses, two members of the Blue Ribbon Commission itself.

General Scowcroft and Dr. Peterson will have 5 minutes each to offer their statements to our Committee. If you go a little bit over that, that is OK. But not too far over that. Following the first panel's statements, we will have one round of questions. And somewhere during this, we will probably start some votes. I think we have one vote today at 10:30. So we will deal with that, and then start right back up. Maybe if we are lucky we will be able to continue in session. I would like to try that.

Then our second panel of witnesses will come forward, and their testimony will be followed again by another round of questions. That is sort of the game plan. We will see how it works out.

Across this country, we have 104 currently operating nuclear power reactors who are providing this nation with clean, reliable power. They provide roughly 20 percent of the electricity to the people of this country. Unlike fossil-fueled power plants, these nuclear power plants do not emit sulfur dioxide, do not emit nitrogen oxide, do not emit mercury, do not emit carbon dioxide, all of which harm our health and our environment. Currently our nuclear reactors are storing spent nuclear fuel onsite in a safe and reliable manner.

I have been told that the technology we have to store spent nuclear fuel, called dry cask storage, can be safe for another 50 to as many as 100 years, perhaps even longer. However, our nuclear reactors were not designed to keep the spent fuel onsite forever. And as our reactors age and are decommissioned, we must find an alternate resting place for our nuclear spent fuel.

Unfortunately, our country has been on a path to finding a place for nuclear spent fuel for decades. It was over 30 years ago when Congress realized the importance of finding a permanent solution for disposal of our spent fuel and high level waste. In response, Congress passed the Nuclear Waste Policy Act of 1982, moving this country forward toward deep mine geologic nuclear waste repositories.

After years of study and debate, we find ourselves 30 years later at what is really a dead end. We have no functioning nuclear waste repository and none in the foreseeable future. I applaud President Obama for realizing that we need to forge a new pathway to dealing with our nuclear waste by forming this Blue Ribbon Commission which is represented here today.

I want to thank General Scowcroft, and I want to thank Congressman Lee Hamilton, Commissioner Peterson, and the other commissioners for what is very good work on this effort. I believe the Commission did a thorough job, reaching out literally to thousands of Americans and folks all over the world in searching for the best way to move forward on this front. The Blue Ribbon Commission recommendations provide us with an excellent road map to enable us to not just find a new path, but to go the right direction.

Before we start running full speed ahead, we need to make sure that we fully learn from our past mistakes and not repeat those missteps. If not, our country may well find ourselves 30 years from now in another dead end situation, the kind that we face today.

I believe that one of the biggest mistakes that we made is that we were unable to get consent from all parties on the location of disposal. Somehow we have learned in communities, really, States across the country to compete with one another for the siting of prisons in their States as opposed to other States, but haven't learned how to get communities to compete for our disposal sites for spent fuel.

Some of my colleagues have heard me discuss in the past in Delaware that siting prisons is not an easy thing to do in fairly dense populations. But we have found there are a number of other States around the country who, as part of their economic develop-

ment plan, would be a host to build prisons and host prisoners from other States. If we can get States to do that, we ought to be able to get figure out who would like to do what they are doing over in France, in providing good paying jobs in high tech facilities for spent fuel.

That is why I believe, out of all the Commission's recommendations, the recommendation on consent-based siting is the most important, and that is why we are holding our hearing today on this important issue.

As a former two-term Governor—and I know Senator Alexander is a former two-term Governor and knows this as well, and so do our other colleagues—but I know that any consent-based approach must include a meaningful partnership between Federal, local, and State leaders. We also have to have open communication with the people who live and work in and around those communities. Only with open communication will we be able to re-establish the public trust and confidence that is needed to solve our nuclear waste disposal issues once and for all.

In closing, I am looking forward to today's discussion. I am especially interested in hearing what we have learned from our mistakes and what we can do different as we examine how consent-based siting might work here in the USA.

With that, let me turn to my partner in crime, Senator Barrasso.

OPENING STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM THE STATE OF WYOMING

Senator BARRASSO. Thank you very much, Mr. Chairman.

I would like to join you in welcoming all the witnesses who have agreed today to be here to testify, including the two Blue Ribbon Commissioners. Most especially I want to welcome Lieutenant General Brent Scowcroft, the co-chair of the Blue Ribbon Commission. Thank you for your service to our country and for agreeing to testify today. Thank you both.

Mr. Chairman, the issue of the storage of nuclear waste is vital to maintaining and expanding affordable nuclear power in the United States. All of us here know that Congress took action 30 years ago to begin addressing the problem of the build up of nuclear waste stored at nuclear plants throughout the United States. The Nuclear Waste Policy Act passed by Congress laid out a process that looked at three possible long-term storage sites. Yucca Mountain was deemed the best by the Department of Energy after a thorough technical analysis.

Congress has voted a number of times to retain Yucca Mountain as the national site, and $15 billion has been spent on the project. Nineteen billion dollars is the estimated taxpayer liability to be paid out of the judgment funds to utilities because the DOE has not yet removed the nuclear waste as promised. Thirty billion dollars is the total amount of IOUs in the Nuclear Waste Trust Fund that ratepayers have been paying into that must eventually be paid back by the taxpayers because Congress spent the money on other programs.

Unknown is the cost of creating another Federal agency to manage nuclear waste, as recommended by the Commission.

The Yucca Mountain project goes back three decades, and it seems that we are nowhere near today yet a long-term solution. The question we have to ask is, how do we know that if we adopt the recommendations laid out in the Commission's report that we won't be back here again three decades from now, having spent billions more without a long-term storage solution. Can this plan be a bridge that will result in long-term solution, or will this kind of be a bridge back to square one?

So that is what I hope to find out in what I hope will be a series of hearings on this important subject. The barriers to establishing a long-term storage facility for nuclear waste are the same barriers that interim storage facilities will face. So whether it is the cost of shipping the waste and building the storage facilities, whether it is the siting of the facilities, whether it is the transportation routes for the shipment of the waste or the environmental impact of shipping and storing the waste, or the bureaucratic red tape of permitting the project across multiple governmental entities, none of these issues have yet gone away.

Even while advocating a new consent-based approach to siting the waste, which we will explore today, the Commission itself admits in the report that 'The crux of the challenge derives from a Federal, State, tribal, and local rights dilemma that is far from unique to the nuclear waste issue and no simple formula exists for solving it."

So the Commission is attempting to solve this problem and offer solutions to the siting and storage of waste. They have cited examples in New Mexico, Finland, France, Spain, and Sweden where there have been possible templates for us to follow.

So I look forward to exploring these examples and see if we have found something new here that can work. But we must not lose sight of the ultimate goal here, which is, where is the long-term solution, and are we getting there any time soon. We must not forget that nuclear power is a viable part of our energy mix. It is affordable, runs 24 hours a day, 7 days a week. It is an essential part of an all of the above strategy.

We cannot secure our country's energy future without providing for its continued success. That means developing our natural resources such as mining for domestic American uranium, found in abundance, Mr. Chairman, in my home State of Wyoming. It also means expediting the siting and construction of new nuclear power plants across the country and providing for a long-term storage facility for spent fuel.

So I pledge to continue to work with my colleagues, with you, others on the Committee and in the Senate to achieve these things. Again, thank you very much for this hearing this morning, and I look forward to the testimony.

Thank you, Mr. Chairman.

Senator CARPER. Thanks a lot for your statement.

I think Senator Merkley might be up next, then Senator Alexander.

Senator MERKLEY. I will simply say that I appreciate your report very much, that this is an incredibly important challenge, and I look forward to your testimony.

Thank you.

Senator CARPER. Short but sweet, thank you.
Senator Alexander.

OPENING STATEMENT OF HON. LAMAR ALEXANDER, U.S. SENATOR FROM THE STATE OF TENNESSEE

Senator ALEXANDER. Thanks, Mr. Chairman.

Senator CARPER. I know this is an issue of real interest to you, and I am delighted that you are part of this.

Senator ALEXANDER. Thank you. Thank you for having the hearing, and to you and Senator Barrasso, and after we vote I will be back so I can hear what all the witnesses have to say and hopefully ask some questions.

General Scowcroft, Professor Peterson, thank you both for your hard work on all of this. My view on nuclear power is pretty well known. To think about using windmills when we have nuclear reactors would be like General Scowcroft going to war in sailboats when we had a nuclear navy available. But I won't get into all that today.

As the Chairman said, and as Senator Barrasso said, we have had a stalemate here for about 25 years, as you have said in your report. And we in Congress have caused some of that. And we need to break that stalemate. Your report told us something we know or should have known; it is the obvious that no policy or process involving nuclear waste can be successful unless it is consent-based along the way.

So we have tried to break that stalemate. And by we, I say Senator Bingaman, Senator Feinstein, who are the ranking members on Energy and the Energy Appropriations Committee, and Senator Murkowski and I, who are the ranking Republican members, we have decided that we are going to work together, Mr. Chairman, with you and others to try to break the stalemate, address the issue and begin to implement the best ideas from this report.

Two things have happened this year which are moving us in that direction. First, we were able to include, with the approval of the Authorization Committee leaders, a provision in this year's Energy and Water Appropriations bill that creates a pilot program for the Department of Energy to begin to find consolidation sites for used nuclear fuel. That would be a consent-based process, and it would be a place where you would put nuclear fuel before it goes into a long-term repository.

We thank you for the endorsement by the co-chairs of your Commission of this idea. Dr. Peterson has also commended the idea; that is a big help. Whether one is for or against Yucca Mountain, we need to move ahead. We still need consolidation sites. We have some places around the country of the 65 sites where we have used nuclear fuel where there are no plants any more. Those would be obvious places where we ought to move that used nuclear fuel to consolidation sites.

And it is our responsibility, as Senator Barrasso said. Under the law, it is our job to get the waste and to take care of it. We are not doing that, and the Government is liable for that. So that is another reason to break the stalemate.

Still another reason to break the stalemate is, even if Yucca Mountain were open today, we would still need a second repository

very quickly. Because the stuff we have would pretty well fill up Yucca Mountain if it were open.

So we need to move ahead. We need to break the stalemate. I am very appreciative of Senators Carper and Barrasso focusing on this. I want to commend Senators Bingaman and Feinstein and Murkowski for their leadership. We know that fuel safely stored can be stored there for a long time, maybe 100 years. But that is not where it is supposed to be stored. And we need to solve that problem.

The second thing that is happening is that Senator Bingaman and Senator Murkowski are developing a comprehensive proposal to try to implement the recommendations that your Commission has made. Senator Feinstein and I hope to be co-sponsors of that. We have been meeting on it regularly. We hope that that bill can be introduced within the next 2 or 3 weeks. Senator Bingaman hopes to have a hearing on it soon.

In other words, we want to get moving. So this is an area in Washington where we have had a stalemate for 25 years and where Senators on both sides are taking advantage of an excellent report by the Commission. Whether or not you favor Yucca Mountain, we need to move ahead with consolidation sites, with finding a second repository. And we can argue about Yucca Mountain along the way.

Thank you for being here.

Thank you, Mr. Chairman.

Senator CARPER. Thank you, Senator Alexander, and for the expertise and passion you bring to this subject.

Senator Udall, good morning.

OPENING STATEMENT OF HON. TOM UDALL,
U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator UDALL. Good morning, Senator Carper. It is good to be here with Senator Barrasso.

Senator CARPER. It is great to have you.

Senator UDALL. Thank you for holding this hearing.

First I would like to thank our Blue Ribbon Commissioners for coming, and would also like to especially welcome two panelists of our next panel. Geoff Fettus formerly worked with me in the New Mexico Attorney General's office during the WIPP siting process. His expertise is now very much broader, and he is a very knowledgeable expert with a great spirit of public service. Geoff, welcome.

Dr. Andrew Orrell, of the Sandia National Lab, is one of our nation's best experts on the science and policy of the nuclear fuel cycle. Thank you for making the long trip here from Albuquerque to be with us. Dr. Orrell has worked on WIPP, Yucca Mountain, and the science behind numerous international and potential nuclear waste solutions.

Sandia, Dr. Orrell and his colleagues, and Los Alamos National Labs are very valuable assets for the entire country on the nuclear issue.

As we consider nuclear issues, I encourage all of my colleagues to reach out to both Sandia and Los Alamos for objective, reliable information. Second, I want to emphasize, this is an extremely im-

portant hearing. The Senate Appropriations Committee has already approved legislation on the interim nuclear waste storage. It is my understanding that that provision is within the jurisdiction of this Subcommittee and this Committee, like many of the Blue Ribbon Commission recommendations. We are trying to start over with clean slate, so I think we should proceed with the regular order whenever possible.

I know the Senate Energy Committee also has a strong interest, and I believe we should work cooperatively with them. Nuclear waste policy has a poor history in Congress, as evidenced by Congress cutting short the site selection process and mandating Yucca Mountain over State objection. What goes around comes around.

As New Mexico's attorney general, I had a similar experience, having to litigate against the Department of Energy over the Waste Isolation Pilot Project. We were not fighting over the facility itself but DOE's go-it-alone process and Congress' failure to provide appropriate authorization. Eventually we were able to obtain State regulatory authority, independent EPA oversight, and hundreds of millions in State assistance. The facility was also firmly limited to defense only transuranic waste. High level waste is specifically prohibited. These standards were eventually enacted in the WIPP Land Withdrawal Act. As a result, the State accepted WIPP, and it has been operated safely ever since. I know both of these Commissioners have visited WIPP and are very familiar with it.

Both the Yucca Mountain case and the WIPP case shed light on what consent-based siting should mean. Our panel here today is very qualified to help us further understand these issues, and I look forward to the Committee's work.

Once again let me say, Senator Carper, I very much appreciate your interest in this issue and asserting jurisdiction of this Committee over this issue. I know that this is a big issue, and I know that the Subcommittee and our Committee, the EPW Committee, have jurisdiction, and we should assert that and push forward with this issue.

Thank you.

Senator CARPER. You are in an assertive mood today, aren't you?

[Laughter.]

Senator CARPER. This is good.

To our Commissioners, General Scowcroft, you are a hero to many of us, Republicans and Democrats alike, having served our nation under several Presidents, I think Gerald Ford, if I am not mistaken, and Richard Nixon, and George Herbert Walker Bush. We are grateful for all the years you have served and continue to serve.

Dr. Per Peterson—has your first name ever been mispronounced? Every day?

Mr. PETERSON. I confess, I don't pronounce it correctly, because I do not have a Swedish accent.

[Laughter.]

Mr. PETERSON. It does happen every now and then.

Senator CARPER. All right. Well, I come from the colony of New Sweden, where the first Swedes came to America, Wilmington, Delaware, they planted a flag almost 300—I want to say 375 years

ago, and said this was the colony of New Sweden. It is now Wilmington, Delaware. So a special welcome.

You are currently, as I understand, a professor of nuclear engineering at UC Berkeley, part of this Commission. General Scowcroft said you are the brains of the operation. That is a high compliment. I know he has plenty of brains himself, and so does Congressman Hamilton.

The full content of your written statement will be included in the record. I will ask you to go ahead and proceed. We will probably start the voting around 10:35, one vote. I want us to make sure we all get to hear your testimony. We may take a short break and come right back and ask questions.

General Scowcroft, please proceed.

STATEMENT OF BRENT SCOWCROFT, LIEUTENANT GENERAL, U.S. AIR FORCE (RETIRED), AND PRESIDENT, THE SCOWCROFT GROUP

Mr. SCOWCROFT. Thank you, Mr. Chairman.

Senator Carper, Ranking Member Barrasso, distinguished members of the Subcommittee, it is a pleasure to appear before you today to discuss the final recommendations of the Blue Ribbon Commission on America's nuclear future.

Before we begin, I would like to pass along co-chairman Lee Hamilton's deep regrets for not being able to be with you today. But I am very pleased that fellow Commissioner Per Peterson was able to join me.

I would like to note that Congressman Hamilton and I were delighted to work with such a talented and dedicated group of fellow commissioners. We are thankful for the expertise and insights they brought to our endeavors. We had a wide difference of perspective on the issues, but the professionalism of the commissioners led to our final report being unanimous, a fact which we believe speaks to the strength of our recommendations.

As you are aware, the Blue Ribbon Commission was formed by the Secretary of Energy at the direction of the President. Our charge was to conduct a comprehensive review of the policies for managing the back end of the nuclear fuel cycle and to recommend a new strategy. We came away from our review frustrated by decades of unmet commitments to the American people, yet confident we can turn this record around.

Mr. Chairman, as we are all too well aware, America's nuclear waste management program is at an impasse. The Administration's decision to halt work on a repository at Yucca Mountain is but the latest indicator of a policy that has been troubled for decades and has now all but completely broken down. The approach laid out under the 1987 amendments to the Nuclear Waste Policy Act has simply not worked to produce a timely solution for dealing with the nation's most hazardous radioactive material. The United States has traveled nearly 25 years down the current path, only to come to a point where continuing to rely on the same approach seems destined to bring further controversy, litigation, and protracted delay.

What we found is that our nation's failure to come to grips with the nuclear waste issue has already proved damaging and costly.

It will be even more damaging and more costly the longer it continues, damaging to prospects for maintaining a potentially important energy supply option for the future, damaging to State-Federal relations and public confidence in the Federal Government's competence, and damaging to America's standing in the world as a source of nuclear expertise and as a leader on global issues of nuclear safety, non-proliferation, and security.

The national interest demands that our nuclear waste program be fixed. Complacency with a failed nuclear waste management system is not an option. With a 65,000 metric ton inventory of spent nuclear fuel spread across the country and growing at over 2,000 metric tons a year, the status quo cannot be accepted. The need for a new strategy is urgent.

Mr. Chairman, the strategy we recommend in our final report has eight key elements. We are certain they are all necessary to establish a truly integrated national nuclear waste management system, to create the institutional leadership and the wherewithal to get the job done, and to ensure that the United States remains at the forefront of technology developments and international responses to evolving nuclear safety, non-proliferation, and security concerns.

We will now discuss those in detail. I will cover the first four and Commissioner Peterson the last.

Our first recommendation is a new consent-based approach to siting future nuclear waste management facilities. Experience in the United States and in other nations suggests that any attempt to force a top-down federally mandated solution over the objections of a State or community, far from being more efficient, will take longer, cost more, and have lower odds of ultimate success.

By contrast, the approach we recommend is expressly adaptive, staged, and consent-based. Based on activities in the United States and abroad, including most notably the siting of a disposal facility for transuranic radioactive waste, the Waste Isolation Pilot Plant, or WIPP, in New Mexico, and recent positive outcomes in Spain, Finland, and Sweden, we believe this type of approach can provide the flexibility and sustain the public trust and confidence needed to see controversial facilities through to completion.

I might just add that I had the opportunity to speak with the Prime Minister of Finland last evening, and he announced that he was very pleased with the progress that they are making. He thinks that it will be very successful.

Senator CARPER. Did he also mention the first Finns came from America through Wilmington, Delaware?

[Laughter.]

Mr. SCOWCROFT. No, we didn't get to that.

Senator CARPER. Just checking.

Mr. SCOWCROFT. Our second recommendation is for a new organization dedicated solely to implementing the waste management program and empowered with the authority and resources to succeed. The overall record of DOE and of the Federal Government as a whole has not inspired confidence or trust in our nation's nuclear waste management program.

For this and other reasons, the Commission concludes that new institutional leadership is needed. Specifically, we believe a single

purpose, congressionally chartered Federal corporation is best suited to provide the stability, focus, and credibility needed to get the waste program back on track.

For the new organization to succeed, a substantial degree of implementing authority and assured access to funds must be paired with rigorous financial, technical, and regulatory oversight by Congress and the appropriate Government agencies.

Our third recommendation is that access to the funds nuclear utility ratepayers are providing for the purpose of nuclear waste management. Nuclear facilities are assessed a fee on every kilowatt-hour of nuclear generated electricity in exchange for the Federal Government's contractual commitment to begin accepting commercial spent fuel beginning by January 31st, 1998. Fee revenue go to the Government's nuclear waste fund, which was established for the sole purpose of covering the cost of disposing of civilian nuclear waste and ensuring that the waste program would not have to compete with other funding priorities.

The fund does not work as intended. A series of executive branch and congressional actions has made annual fee revenues of approximately $750 million a year, and the unspent $27 billion balance in the fund effectively inaccessible to the waste program. Instead, the waste program is subject to exactly the budget constraints and uncertainties that the fund was created to avoid. This situation must be remedied immediately to allow the program to succeed.

The Commission sent a letter to the President on December 11th of 2011, discussing this particular recommendation in detail. And we will submit it as a part of this hearing's recommendation.

Our fourth recommendation is prompt efforts to develop one or more geologic disposal facilities. The conclusion that disposal is needed that the deep geologic disposal is a scientifically preferred approach has been reached by every expert panel that has looked at the issue and by every other country that is pursuing a nuclear waste program.

Moreover, all spent fuel reprocessing or recycle options either already available or under active development at the time still generate waste streams that require permanent disposal solutions. We simply note that regardless of what happens with Yucca Mountain, the U.S. inventory of spent fuel exceeds the amount that can be legally in place at that site until a second repository is in operation. The statutory limit for Yucca Mountain is 70,000 metric tons. And DOE has set aside 10 percent of that limit for defense-spent nuclear fuel on high level waste, leaving only 63,000 metric tons for civilian waste.

So under current law, the United States will need to find a new disposal site even if Yucca Mountain goes forward. We believe the approach set forth here provides the best strategy for assuring continued progress regardless of the fate of Yucca Mountain.

[The prepared statement of Mr. Scowcroft follows:]

STATEMENT OF
GENERAL BRENT SCOWCROFT, CO-CHAIRMAN
AND
DR. PER PETERSON, COMMISSIONER
BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE
BEFORE THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY
U.S. SENATE
SECOND SESSION, 112TH CONGRESS
JUNE 7, 2012

Introduction

Chairman Carper, Ranking Member Barrasso, distinguished members of the Subcommittee, it is a pleasure to appear before you today to discuss the final recommendations of the Blue Ribbon Commission on America's Nuclear Future.

Before we begin, I would like to pass along Co-Chairman Hamilton's sincerest regrets for not being here with us today. I would like to note that Congressman Hamilton and I were delighted to work with such a talented and dedicated group of fellow Commissioners. We are thankful for the expertise and insights they brought to our endeavors. Their professionalism led to our final report having unanimous approval; a fact, which we believe, speaks to the strength of our recommendations.

As you aware, the Blue Ribbon Commission was formed by the Secretary of Energy at the direction of the President. Our charge was to conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle and to recommend a new strategy. We came away from our review frustrated by decades of unmet commitments to the American people, yet confident that we can turn this record around.

Framing the Issue

Mr. Chairman, as we are all too well aware, America's nuclear waste management program is at an impasse. The Administration's decision to halt work on a repository at Yucca Mountain is but the latest indicator of a policy that has been troubled for decades and has now all but completely broken down. The approach laid out under the 1987 Amendments to the Nuclear Waste Policy Act has simply not worked to produce a timely solution for dealing with the nation's most hazardous radioactive materials. The United States has traveled nearly 25 years

down the current path only to come to a point where continuing to rely on the same approach seems destined to bring further controversy, litigation, and protracted delay.

The national interest demands that our nuclear waste program be fixed. Complacency with a failed nuclear waste management system is not an option. With a 65,000 metric ton inventory of spent nuclear fuel spread across the country and growing at over 2000 metric tons per year, the status quo is not acceptable. The need for a new strategy is urgent.

Key Elements of the Blue Ribbon Commission's Recommendations

Mr. Chairman, the strategy we recommend in our final report has eight key elements. We are certain they are all necessary to establish a truly integrated national nuclear waste management system, to create the institutional leadership and wherewithal to get the job done, and to ensure that the United States remains at the forefront of technology developments and international responses to evolving nuclear safety, non-proliferation, and security concerns. We will now discuss those in more detail.

1. **A new, consent-based approach to siting future nuclear waste management facilities.**

   Experience in the United States and in other nations suggests that any attempt to force a top-down, federally mandated solution over the objections of a state or community—far from being more efficient—will take longer, cost more, and have lower odds of ultimate success. By contrast, the approach we recommend is explicitly adaptive, staged, and consent-based. Based on activities in the United States and abroad—including most notably the siting of a disposal facility for transuranic radioactive waste, the Waste Isolation Pilot Plant (WIPP) in New Mexico, and recent positive outcomes in Spain, Finland and Sweden—we believe this type of approach can provide the flexibility and sustain the public trust and confidence needed to see controversial facilities through to completion.

2. **A new organization dedicated solely to implementing the waste management program and empowered with the authority and resources to succeed.**

   The overall record of DOE and of the federal government as a whole has not inspired confidence or trust in our nation's nuclear waste management program. For this and other reasons, the Commission concludes that new institutional leadership is needed. Specifically, we believe a single-purpose, Congressionally-chartered federal corporation is best suited to provide the stability, focus, and credibility needed to get the waste program back on track. For the new organization to succeed, a substantial degree of implementing authority and assured access to funds must be paired with rigorous

financial, technical, and regulatory oversight by Congress and the appropriate government agencies. The Commission concluded that a good gauge of consent is the willingness of affected units of government – host states, tribes, and local communities – to enter into legally binding agreements with the new organization. Thus the capability to negotiate such agreements is a key element of authority that should be provided to the new organization.

3. **Access to the funds nuclear utility ratepayers are providing for the purpose of nuclear waste management.**

   Nuclear utilities are assessed a fee on every kilowatt-hour of nuclear-generated electricity in exchange for the federal government's contractual commitment to begin accepting commercial spent fuel beginning by January 31, 1998. Fee revenues go to the government's Nuclear Waste Fund, which was established for the sole purpose of covering the cost of disposing of civilian nuclear waste and ensuring that the waste program would not have to compete with other funding priorities. The Fund does not work as intended. A series of Executive Branch and Congressional actions has made annual fee revenues - approximately $750 million per year - and the unspent $27 billion balance in the Fund effectively inaccessible to the waste program. Instead, the waste program is subject to exactly the budget constraints and uncertainties that the Fund was created to avoid. This situation must be remedied immediately to allow the program to succeed. The Commission sent a letter to the President, dated December 11, 2011, discussing this particular recommendation in detail, and we will submit it as part of this hearing's record.

4. **Prompt efforts to develop one or more geologic disposal facilities.**

   The conclusion that disposal is needed and that deep geologic disposal is the scientifically preferred approach has been reached by every expert panel that has looked at the issue and by every other country that is pursuing a nuclear waste management program. Moreover, all spent fuel reprocessing or recycle options either already available or under active development at this time still generate waste streams that require a permanent disposal solution.

   We simply note that regardless what happens with Yucca Mountain, the U.S. inventory of spent nuclear fuel exceeds the amount that can be legally emplaced at this site until a second repository is in operation. So under current law, the United States will need to find a new disposal site even if Yucca Mountain goes forward. We believe the approach

set forth here provides the best strategy for assuring continued progress, regardless of the fate of Yucca Mountain.

As a key element of consent-based siting, the Commission believes that before any new disposal site is selected, a new, site-independent safety standard should be developed. So the Commission has recommended that the Environmental Protection Agency and Nuclear Regulatory Commission begin working together to define an appropriate process for developing a generic disposal facility safety standard and associated implementing regulations.

5. **Prompt efforts to develop one or more consolidated storage facilities.**

Developing consolidated storage capacity would allow the federal government to begin the orderly transfer of spent fuel from reactor sites to safe and secure centralized facilities independent of the schedule for operating a permanent repository. The arguments in favor of consolidated storage are strongest for "stranded" spent fuel from shutdown plant sites; of which there are ten across the country. Stranded fuel should be first in line for transfer to a consolidated facility so that these plant sites can be completely decommissioned and put to other beneficial uses. The availability of consolidated storage will also provide valuable flexibility in the nuclear waste management system that could achieve meaningful cost savings, can provide back-up storage in the event that spent fuel needs to be moved quickly from a reactor site, and would provide an excellent platform for ongoing R&D to better understand how the storage systems currently in use at both commercial and DOE sites perform over time. We support the efforts of Senators Feinstein and Alexander with their proposed legislation regarding a pilot storage program for high level nuclear waste and spent nuclear fuel as it incorporates several key recommendations of the Blue Ribbon Commission and is a positive step toward the goal of creating an integrated nuclear waste management program in the United States. Our letter of support dated April 23, 2012, will be submitted for the record.

6. **Prompt efforts to prepare for the eventual large-scale transport of spent nuclear fuel and high-level waste to consolidated storage and disposal facilities when such facilities become available.**

The current system of standards and regulations governing the transport of spent fuel and other nuclear materials appears to have functioned well, and the safety record for

past shipments of these types of materials is excellent. That being said, greater transport demands for nuclear materials are likely to raise new public concerns.

The Commission believes that state, tribal and local officials should be extensively involved in transportation planning and should be given the resources necessary to discharge their roles and obligations in this arena. Historically, some programs have treated transportation planning as an afterthought. No successful programs have done so.

7. **Support for advances in nuclear energy technology and for workforce development.**

   Advances in nuclear energy technology have the potential to deliver an array of benefits across a wide range of energy policy goals. The Commission believes these benefits—in light of the environmental and energy security challenges the United States and the world will confront this century—justify sustained public- and private-sector support for RD&D on both existing light-water reactor technology and advanced reactor and fuel cycle technologies.

8. **Active U.S. leadership in international efforts to address safety, non-proliferation, and security concerns.**

   As more nations consider pursuing nuclear energy or expanding their nuclear programs, U.S. leadership is urgently needed on issues of safety, non-proliferation, and security and counter-terrorism. From the U.S. perspective, two points are particularly important: First, with so many players in the international nuclear technology and policy arena, the United States will increasingly have to lead by engagement and by example. Second, the United States cannot exercise effective leadership on issues related to the back end of the nuclear fuel cycle so long as its own program is in disarray; effective domestic policies are needed to support America's international agenda.

Tying It Together

In conclusion, the problem of nuclear waste may be unique in the sense that there is wide agreement about the outlines of the solution. Simply put, we know what we have to do, we know we have to do it, and we even know how to do it.

We believe the conditions for progress are arguably more promising than they have been in some time. But we will only know if we start, which is what we urge the Administration and Congress to do, without further delay.

Thank you for having us here today, and we look forward to your questions.

BLUE RIBBON COMMISSION
ON AMERICA'S NUCLEAR FUTURE

April 23, 2012

Senator Dianne Feinstein, Chairman
Senate Committee on Appropriations
Subcommittee on Energy
and Water Development
184 Dirksen Senate Office Building
Washington, DC 20510

Senator Lamar Alexander, Ranking Member
Senate Committee on Appropriations
Subcommittee on Energy
and Water Development
184 Dirksen Senate Office Building
Washington, DC 20510

Dear Senators Feinstein and Alexander:

Thank you for your leadership and dedication to solving one of our nation's most complex problems. Your proposed legislation regarding a pilot storage program for high level nuclear waste and spent nuclear fuel incorporates several key recommendations of the Blue Ribbon Commission on America's Nuclear Future and is a positive step toward the goal of creating an integrated nuclear waste management program in the United States.

As you know, our Commission recommended a consent-based approach to siting new nuclear waste management facilities, including facilities for consolidated interim storage of spent nuclear fuel. We are pleased to see that your proposed legislation incorporates these recommendations. Looking forward, we are hopeful that the process you call for in your legislation can be carried out by a new nuclear waste management organization that is independent from the Department of Energy, has assured access to the nuclear waste fee and fund, and can provide the stability, focus, continuity and credibility that are essential to get the nation's nuclear waste program back on track.

A serious lack of trust exists today in the federal government's ability to meet its nuclear waste cleanup obligations. The longer our country fails to solve the nuclear waste problem, the greater the trust deficit becomes – with the U.S. government continuing to fail in its legal and moral obligation to take spent nuclear fuel and defense high level waste while the future of nuclear power as an option for electrical generation in this country is seriously jeopardized. We believe your efforts, along with those of Senators Bingaman and Murkowski with whom you have been working closely on this matter, can begin to restore trust in our country's ability to tackle difficult problems in an effective, bi-partisan manner.

With best regards,

Lee H. Hamilton
Co-Chairman

Brent Scowcroft
Co-Chairman

BLUE RIBBON COMMISSION
ON AMERICA'S NUCLEAR FUTURE

December 12, 2011

President Barack Obama
The White House
1600 Pennsylvania Avenue, NW
Washington, DC 20500

Dear Mr. President:

At your direction, the Secretary of Energy established the Blue Ribbon Commission on America's Nuclear Future to review policies for managing the back end of the nuclear fuel cycle and recommend a new strategy. We are pleased to be serving as Co-Chairmen of the Commission, and we are writing to you to highlight an important action we strongly believe should be reflected in your Fiscal Year 2013 baseline budget projections.

In our draft report to the Secretary, issued in July of this year, the Commission recommends several actions that should be taken to get the nuclear waste management program back on track. High on our list of recommendations are actions that can and should be taken soon to provide assured access to utility waste disposal fees for their intended purpose. Unless action is taken in the near-term to fix the way these fees are treated in the federal budget, the nuclear waste strategy we recommend cannot succeed.

Funds for the disposal of spent nuclear fuel from commercial power reactors are collected regularly through the assessment of a nuclear waste fee on nuclear-generated electricity as a *quid pro quo* payment in exchange for the federal government's contractual commitment to begin accepting commercial spent fuel for disposal beginning by January 31, 1998. These fee payments, which total approximately $750 million per year, go to the government's Nuclear Waste Fund, which was established for the sole purpose of covering the cost of disposing of civilian nuclear waste and ensuring that the waste program would not have to compete with other funding priorities.

As we have learned through our investigation, the Nuclear Waste Fund does not work as intended. A series of Executive Branch and Congressional actions has made annual fee revenues and the unspent $26 billion balance in the Fund effectively inaccessible to the nuclear waste management program. Instead, the waste program must compete for federal funding each year and is therefore subject to exactly the budget constraints and uncertainties that the Fund was created to avoid. This situation must be remedied to allow the program to succeed.

In the meantime, with the federal government having failed to meet its contractual obligation to begin receiving spent fuel beginning in 1998, nuclear utilities have successfully sued the government for failure to perform and are receiving damage payments from the federal Judgment Fund. The government estimates its liability will grow to $16 billion by 2020 and will increase by several hundred million dollars per year thereafter until it begins accepting spent fuel for disposal.

We have recommended that your Administration offer to amend the standard nuclear waste contract with nuclear utilities, which you are authorized to do under current law, so that utilities remit only the portion of the annual nuclear waste fee that is appropriated for waste management each year. The rest of the funding would be placed in a trust account, held by a qualified third-party institution, to be available when needed. At the same time, we have recommended that the Office of Management and Budget work with the Congressional budget committees and the Congressional Budget Office to change the budgetary treatment of annual fee receipts so that these receipts can directly offset appropriations for the waste program.

These actions are vital to enabling key subsequent actions the Commission recommends. Therefore, we respectfully request that you act promptly to implement these changes in your Fiscal Year 2013 budget proposal. We have heard repeatedly from those following our work that they expect our recommendations to lead to prompt action on the nuclear waste issue; we firmly believe that implementing our funding recommendations is an essential first step.

We recognize that our recommendations, if adopted, would mean the nuclear waste fee receipts could no longer be counted against the federal budget deficit and that the result will be a negative impact of approximately $750 million on annual budget calculations. We appreciate that any budgetary actions that increase the size of the deficit are especially difficult to take in the present fiscal climate. However, it is clear that the federal government is contractually bound to use these funds to provide for ultimate disposal of spent nuclear fuel. In our view, a failure to correct the funding problem does the federal budget no favors in a context where taxpayers remain liable for mounting damages, compensated through the Judgment Fund, for the federal government's continued inability to deliver on its waste management obligations.

In preparing our draft proposal we consulted with former Office of Management and Budget and Congressional budget staff, and our proposal enjoys the support of both the National Association of Regulatory Utility Commissioners, representing the ratepayers, and the Nuclear Energy Institute, representing the nuclear utilities. We should note that the federal government's failure to deliver on its statutory obligations with respect to commercial spent fuel disposal has prompted these organizations to pursue legal action against the government aimed at suspending entirely the collection of fees until such time as a new waste management plan for the country has been finalized.

We believe our recommended actions are essential to the future success of the nuclear waste management program and we urge you to reflect our recommendations in your Fiscal Year 2013 budget proposal.

With best regards,

Lee H. Hamilton
Co-Chairman

Brent Scowcroft
Co-Chairman

cc: Secretary Steven Chu

U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

General Brent Scowcroft Response to Questions from Senator Barbara Boxer Subcommittee on Clean Air and Nuclear Safety hearing entitled, "Recommendations from the Blue Ribbon Commission on America's Nuclear Future for a Consent-Based Approach to Siting Nuclear Waste Storage and Management Facilities." - Thursday, June 7, 2012

1. Two of the Blue Ribbon Commission's (Commission) key recommendations are to develop safe short-term nuclear waste storage facilities and to develop one or more long-term geologic disposal facilities to safely and permanently store such waste.

a. Why did the Commission recommend the simultaneously development of short-term storage and long-term disposal facilities? Does simultaneously developing these options provide additional protection to the interests of communities?

To allay the concerns of states and communities that a consolidated storage facility might become a *de facto* disposal site, a program to establish consolidated storage must be accompanied by a credible parallel disposal program that is effective, focused, and making discernible progress in the eyes of key stakeholders and the public. A robust repository program will be as important to the success of a consolidated storage program as the consolidated storage program will be to the success of a disposal program. In addition, agreements with host states, tribes and localities for consolidated storage facilities will have to recognize that fuel may remain in storage at those sites for longer than expected, and the parties involved in negotiating those agreements will need to factor in assurances, penalties, or whatever else is needed to make the facility acceptable to the host state and other units of government.

b. What are the risks to moving forward with the development of short-term facilities before beginning a new process to identify and develop one or more long-term disposal facilities?

Unfortunately, the federal government lacks credibility in meeting its contractual obligations to take spent nuclear fuel and high-level waste from communities. As a result, without having a credible, parallel program for long-term waste disposal, communities will be even more leery of the federal government's sustained commitment to finding a permanent solution. However, because the technical requirements for a short-term facility would be less demanding than for a repository, finding a suitable location with an accepting host community may be less difficult, particularly if it is accompanied by attractive incentives. The Commission has heard testimony indicating that potential host communities, states and tribes would be willing to participate in an open process that engages affected constituencies from the outset and gives them actual bargaining power. Nevertheless, the potential difficulty of siting consolidated storage and the need for a thoughtful approach to this task must not be underestimated.

c. What types of benefits to communities did the Commission say should be considered when states and localities agree to the placement of storage or disposal facilities?

It will be important to demonstrate that the decision to host a facility can deliver real benefits (economic and otherwise) to the affected state, tribe(s), and local community(ies). Affected states, tribes, and communities will reasonably expect incentives for helping to address the important national issue of nuclear waste management. To be most effective, such incentives must be provided in ways that are generous, creative, and attentive to their symbolic content.

Besides financial incentives, benefits could include local preferences in hiring and in the purchase of goods and services by the waste management facility, infrastructure investments (such as new roads or rail lines), as well as the opportunity to host co-located research and demonstration facilities or other activities that would generate new employment opportunities and make a positive contribution to the local and regional economy. Priority selection for future waste processing operations or other nuclear related programs might be helpful to gaining local or state support, but would certainly depend on the community. For example, Spain's effort to find a volunteer host for a storage facility for spent fuel and a small amount of HLW did include a technological research laboratory to deal with waste processing, waste forms, disposal of HLW as well as spent fuel, etc. as an integral part of the facility.

In addition to locating waste management-related activities in the affected state and community, these states and communities could also be given preference in the siting of other federal projects (provided they are otherwise suitable to host those projects). Section 174 of the NWPA, titled "Other Benefits—Considerations in Siting Facilities," already specifies that the Secretary of Energy "in siting Federal research projects, shall give special consideration to proposals from states where a repository is located." This approach can provide additional benefits to host communities and states without requiring new appropriations or increasing the cost of already planned programs or projects. The Commission recommends that this provision be expanded to include states that host any waste management facilities sited by the new waste management organization and to clarify that the special consideration applies to research, development, and demonstration facilities (not research contracts) that receive federal funding, including any federal matching funds.

It is important to note that experiences in Sweden, Finland, and elsewhere indicate that it may not be possible or even advisable to specify incentives and compensation up front; rather, in keeping with an adaptive approach, these determinations are best left to the discretion of the implementing organization and potential host governments—including communities surrounding the host community. These stakeholders will be in the best position to determine what incentives are both appropriate and in their best interests.

2. The Commission report stated that the Environmental Protection Agency's (EPA) has a role to develop a safety standard to protect public health from nuclear waste and the Nuclear Regulatory Commission (NRC) has a role in using that safety standard when licensing nuclear waste storage and disposal facilities.
a. Do the EPA and the NRC have sufficient authority to move forward with creating and using safety standards to ensure the public will be protected from the dangers of nuclear waste held at storage and disposal facilities?

The Commission believes that actions to coordinate the development of new disposal regulations can be undertaken by the Executive Branch without additional action by Congress. However, the Commission recommends that the administration and Congress ensure that NRC and EPA have sufficient resources to complete this process in a thorough and timely way.

b. Given the Commission's recommendation to move forward with creating and using such a safety standard early in the process, how soon should the EPA begin to develop a safety standard?

The Commission believes there is no reason to wait to start the process of developing generic regulations for future geologic disposal facilities. The cost of delays in being able to move ahead with finding new sites would certainly be far higher than the cost of a process to establish the necessary standards as soon as possible.

c. Are there any potential problems in creating a safety standard before the Congress establishes a new, consent-based approach, which includes input from communities, local officials, and other stakeholders, for siting nuclear waste management facilities?

There is no need for Congress to wait for a generic safety standard to be developed before establishing a consent-based siting process.

3. The Commission's recommends preserving the EPA's role in creating a safety standard for nuclear waste management facilities and the NRC's role in licensing and regulating such facilities, while ensuring cooperation and coordination between these agencies.

a. What are the current strengths of the EPA and the NRC in protecting the public from the dangers of nuclear waste and how can cooperation enhance public safety?

The presence of independent, competent regulators such as the EPA and the NRC is essential in securing and enhancing public safety. Close cooperation and coordination among these regulators can, for instance, reduce disagreements over regulatory philosophy which in the past has confused the public and undermined confidence in the regulatory system.

b. What specific steps should be taken to ensure or strengthen ongoing cooperation and coordination between the EPA and the NRC?

Instead of defining specific actions for the agencies to take, the Commission felt it was more important to focus on the outcomes of what increased coordination between the two regulators could accomplish in the development of new disposal regulations – such as: 1) a clear definition of the regulatory issues to be resolved, 2) a comprehensive identification of alternative approaches to resolving these issues, 3) a thorough and fair analysis of the alternatives, 4) a clear explanation of the regulatory choices that are made, and 5) a shared understanding between the two agencies and with other stakeholders about the compliance demonstration methods and standard of proof that are to be used in implementing the standards.

4. The NRC's role in protecting the public from the dangers of nuclear waste includes determining whether spent fuel can safely be stored at nuclear power plants until future storage and disposal facilities are available.

a. What did the Commission find regarding the NRC's ability to ensure that nuclear power plants can safety hold waste until storage and disposal facilities can be developed?

The Commission recommended vigorous, ongoing efforts by industry and by the appropriate regulatory authorities to ensure that all near-term forms of storage meet high standards of safety and security for the multi-decade-long time periods that they are likely to be in use. Based on the evidence and safety record to date, the Commission sees no unmanageable safety or security risks with current storage arrangements. That said, active research, monitoring, and continued responsiveness to new information and lessons learned—including lessons learned from a more complete understanding of events at Fukushima—are clearly needed to sustain this confidence. Any realistic assessment of the time it can be expected to take to site, construct, license and begin operating consolidated storage and disposal facilities underscores the need for continued vigilance and attention to safety and security concerns at existing storage sites.

The NRC has begun researching the potential environmental impacts of storage over even longer timeframes—more than one hundred or even several hundred years. It is important to emphasize, however, that even if the NRC finds that storage can be safely implemented over these very extended timeframes, this would not mean that deferring disposal for additional decades to (in the worst case) centuries would be justified or would make sense—in either cost or risk management terms.

b. Does the NRC need to take any further steps to address potential deficiencies in the ability of nuclear power plants to safety hold nuclear waste, since short- and long-term storage and disposal facilities have not yet been completed?

In June 2010, the NRC launched a comprehensive review of regulations related to extended storage and transport including, specifically, the adequacy of existing mechanisms for ensuring safe and secure storage and transportation for extended periods beyond 120 years. This review is expected to be complete in 2017. The NRC and other agencies, such as the IAEA, are currently conducting in-depth investigations of the crisis that occurred at Japan's Fukushima Daiichi nuclear power station following the March 2011 earthquake and tsunami, and are developing an appropriate regulatory response to the events; in addition, the Commission is recommending a separate NAS study of Fukushima.

As a result of these efforts, new storage-related regulatory requirements may be deemed necessary and appropriate and if so, should be implemented as expeditiously as possible.

U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

General Brent Scowcroft Response to Questions from Senator Tom Carper Subcommittee on Clean Air and Nuclear Safety hearing entitled, "Recommendations from the Blue Ribbon Commission on America's Nuclear Future for a Consent-Based Approach to Siting Nuclear Waste Storage and Management Facilities." - Thursday, June 7, 2012

1. We have heard proposals in the past for an entirely private-sector waste management organization, with the federal government taking title to nuclear waste only after a repository was filled and sealed. What do you think the implications would be for transferring waste management responsibilities to the private sector?

The Blue Ribbon Commission believes that a federal corporation chartered by Congress offers the most promising model for the management of the nation's nuclear waste program. However, the Commission notes that other organizational structures are possible and that the manner in which the organization behaves and delivers on commitments is more important than what specific organizational form it takes. Striking the right balance of independence and accountability is the key challenge, whether a new waste management organization is structured as a federal corporation or takes some other form. In any case, Congress must provide clear policy direction, exercise ongoing oversight, and establish the necessary funding mechanisms but should leave control of operational decisions and resource commitments for implementing the policy direction to the new organization – regardless of its structure. Those decisions and commitments, and indeed the performance of the organization as a whole, would, of course, be subject to policy, safety, security, technical, and financial review by appropriate government agencies and Congress.

Senator CARPER. Dr. Peterson.

Thank you, General Scowcroft.

Please continue. The votes started at 10:30; we are about 5 minutes into the vote. I would like for you to be able to complete your testimony; then we will take a short recess.

STATEMENT OF PER F. PETERSON, PROFESSOR, CHAIR, DEPARTMENT OF NUCLEAR ENGINEERING, UNIVERSITY OF CALIFORNIA, BERKELEY

Mr. PETERSON. So continuing with the disposal as a key element of consent-based siting of disposal facilities, the Commission believes that before any new disposal site is selected, a new, site-independent safety standard should be developed. So the Commission has recommended that the Environmental Protection Agency and the Nuclear Regulatory Commission, which this Committee has jurisdiction over, should begin working together to define an appropriate process for developing a generic disposal facility safety standard and associated implementing regulations.

The fifth recommendation relates to prompt efforts to develop one or more consolidated storage facilities. Developing consolidated storage capacity would allow the Federal Government to begin the orderly transfer of spent fuel from reactor sites to safe and secure centralized facilities independent of a schedule for operating a permanent repository. The arguments in favor of consolidated storage are strongest for stranded spent fuel at shut down plant sites, of which there are 10 across the country. Stranded fuel should be first in line for transfer to consolidated facilities, so these plant sites can be completely decommissioned and put to other beneficial uses.

The availability of consolidated storage will also provide valuable flexibility in the nuclear waste management system that could achieve meaningful cost savings, can provide backup storage in the event that spent fuel needs to be moved quickly from a reactor site, and would provide an excellent platform for ongoing R&D to better understand how storage systems currently in use at both commercial and DOE sites perform over time.

We support the efforts of Senators Feinstein and Alexander with their proposed legislation regarding a pilot storage program for high level nuclear waste and spent nuclear fuel as it incorporates several key recommendations of the Blue Ribbon Commission and is a positive step toward the goal of creating integrated waste management program in the United States. Our letter of support dated April 23rd, 2012, will be submitted for the record.

Sixth is prompt efforts to prepare for the eventual large scale transport of spent fuel and high level waste to consolidated storage and disposal facilities, when such facilities become available. The current system of standards and regulations governing the transport of spent fuel and other nuclear materials appears to have functioned well. The safety record of past shipments of these types of materials is excellent, particularly with respect to the WIPP transportation system.

That being said, greater transfer demands for nuclear materials are likely to raise new public concerns. The Commission believes that State, tribal, and local officials should be extensively involved in the transportation planning and should be given the resources

necessary to discharge their roles and obligations in this area. Historically, some programs have treated transportation planning as an after-thought. No successful programs have done so.

Seventh is support for advances in nuclear energy technology and work force development. Advances in nuclear energy technology have the potential to deliver an array of benefits across a wide range of energy policy goals. The Commission believes these benefits, in light of environmental and energy security challenges the United States and the world will confront in this century, justify sustained public and private sector support for RD&D on both existing light water reactor technologies and advanced water and fuel cycle technologies.

The eighth recommendation relates to the key topic of active U.S. leadership in international efforts to address safety, non-proliferation, and security concerns. As more nations consider pursuing nuclear energy or expanding their nuclear programs, U.S. leadership is urgently needed on issues of safety, non-proliferation, security, and counter-terrorism.

From the U.S. perspective, two points are particularly important. First, with so many players in the international nuclear technology and policy arena, the United States will increasingly have to lead by engagement and by example. Second, the United States cannot exercise effective leadership on issues related to the back end of the nuclear fuel cycle so long as our own program is in complete disarray. Effective domestic policies are needed to support America's international agenda.

In conclusion, the problem of nuclear waste may be unique in the sense that there is a wide agreement about the outlines of a solution. Simply put, we know what we have to do, we know we have to do it, and we even know how to do it. We believe the conditions for progress are arguably more promising than they have been in some time, but we will only know if we start, which is what we urge the Administration and Congress to do without further delay.

Thank you for having us here today, and we look forward to your questions.

[The responses of Mr. Peterson to questions for the record follow:]

Per F. Peterson
Answers to EPW Follow-Up Questions

Questions from Senator Barbara Boxer:

1. **Two of the Blue Ribbon Commission's key recommendations are to develop safe short-term nuclear waste storage facilities and to develop one or more long-term geologic disposal facilities to safely and permanently store such waste.**

   a. **Why did the Commission recommend the simultaneously development of short-term storage and long-term disposal facilities? Does simultaneously developing these options provide additional protection to the interests of communities?**

   The Commission identified a number of arguments that support early development of consolidated storage, which are listed in Section 5.2 of the BRC final report. The Commission recommended that the use of consolidated storage be prioritized to remove spent fuel from shut-down reactor sites. Beyond the benefits of allowing these shut-down reactor sites to be placed to more beneficial use, in my judgment the most important benefit of starting early with spent fuel transfers from shut-down reactors is that it will provide learning experience with spent fuel transportation at small scale, prior to eventually initiating the large scale transfers that will be required.

   Currently, the U.S. has a highly effective transportation system devoted to moving defense transuranic wastes to the Waste Isolation Pilot Plant. Under current planning, this system will likely be dismantled well before spent fuel transfer to a disposal facility will be possible (even if the Yucca Mountain Project were restarted, the completion of licensing and construction will take at least one or two more decades). The capability to transfer experience and lessons from the WIPP waste transportation system to the new system for civil spent fuel can only exist if the civil system begins at least limited operation soon.

   In developing consolidated storage, the interests of the communities and states that choose to host such facilities must also be protected. The legally binding agreements recommended by the Commission provide a key ingredient, because these agreements should be expected (and even required) to define capacity limitations on consolidated storage facilities, linkages between changes in capacity limits and progress toward development of disposal capacity, as well as federal obligations to remove spent fuel from interim storage by defined dates or pay penalties for delays.

From a technical and policy perspective, I sincerely hope that we see some local communities and states coming forward with proposals to co-locate consolidated storage facilities with demonstration projects for deep borehole disposal. Beyond the potential of deep boreholes to provide extremely effective, essentially permanent isolation of waste (waste is emplaced over 2 kilometers deep into crystalline basement rock at least 1-billion years old), borehole disposal does not require the construction and operation of expensive underground facilities, so operational costs are low. Such proposals should clearly be given much higher weight than proposals for stand-alone consolidated storage facilities.

b. What are the risks of moving forward with the development of short-term facilities before beginning a new process to identify and develop one or more long-term disposal facilities?

I would anticipate that agreements to host consolidated storage will include deadlines for removal of spent fuel and financial penalties for delays. Thus the most visible impact if delays occur in developing disposal would be the damage payments to the communities hosting interim storage facilities. Still, because consolidated storage provides a tool to reduce the current federal legal liability and damage payments, the near-term reduction in damage awards helps balance the risk of potential future damages if disposal is delayed.

The risk that the development of disposal could be delayed depends, in part, upon whether Congress decides to retain Yucca Mountain (a question the Commission did not address), since in principal Yucca Mountain might be developed as a repository more rapidly than a new site.

In my personal judgment, our nation will be better served if we move forward to develop different geologic disposal capability than Yucca Mountain, including pursuing a serious effort for a licensed demonstration of deep borehole disposal technology. Even if Congress were to decide to retain Yucca Mountain, I do not believe that it would be in our interest to proceed to construct a repository there, or to pass the permanent land withdrawal act that would be required to start construction, unless a serious, good-faith national effort to develop better geologic disposal has clearly failed.

c. What types of benefits to communities did the Commission say should be considered when states and localities agree to the placement of storage or disposal facilities?

As discussed in Section 6.7 of the final report, the Commission emphasized that benefits must be flexible and generous. The Commission also

recommended that instead of being specified in advance, that the specific benefits be one of the elements of negotiation between the federal government and local, state, and tribal governments. Moreover, the Commission emphasized that communities and states must also receive compensation for all impacts generated by storage and disposal facilities, as well as associated waste transportation.

2. **The Commission report stated that the Environmental Protection Agency (EPA) has a role to develop a safety standard to protect public health from nuclear waste and the Nuclear Regulatory Commission (NRC) has a role in using that safety standard when licensing nuclear waste storage and disposal facilities.**

   a. **Do the EPA and NRC have sufficient authority to move forward with creating and using safety standards to ensure the public will be protected from the dangers of nuclear waste held at storage and disposal facilities?**

      In my judgment, the EPA and NRC have the full capability needed to develop the new safety standard and associated implementing regulations that the Commission recommended. However, to initiate this work it is my understanding that these agencies will need specific direction from Congress.

   b. **Given the Commission's recommendation to move forward with creating and using such a safety standard early in the process, how soon should the EPA begin to develop a safety standard?**

      The EPA's effort to develop a safety standard should start as soon as possible, in parallel with the effort needed to develop and pass the legislation that is needed to create the new nuclear waste management entity recommended by the BRC.

   c. **Are there and potential problems with creating a safety standard before Congress establishes a new, consent-based approach, which includes input from communities, local officials, and other stakeholders, for siting nuclear waste management facilities?**

      There should not be any problems with proceeding immediately to develop the safety standard, in parallel with establishing the new entity needed to implement consent-based siting of new storage and disposal facilities. The standard establishes technical requirements for geologic disposal facilities, to assure adequate near- and long-term protection of public health and the environment. The requirements of this standard should be independent from

the process used to identify and select sites, that is, the requirements should be site-independent.

3. **The Commission's recommends preserving the EPA's role in creating a safety standard for nuclear waste management facilities and NRC's role in licensing and regulating such facilities, while ensuring cooperation and coordination between these agencies.**

   a. **What are the current strengths of the EPA and NRC in protecting the public from the dangers of nuclear waste and how can cooperation enhance public safety?**

      The EPA has extensive experience in assessing and establishing regulations to protect public health and the environment from the disposal of hazardous chemicals from a wide variety of sources. In my judgment, this gives the EPA a unique ability to establish a standard for long-term protection of public health and the environment from the geologic disposal of high level wastes and spent fuel.

      Likewise, the NRC has extensive experience in regulating the safety of nuclear facility construction and operation, and the safety of transport and storage of nuclear materials.

      The current arrangement, which the Commission recommended be retained, leverages those areas where EPA and NRC bring the greatest strength.

   b. **What specific steps should be taken to ensure or strengthen ongoing cooperation and coordination between the EPA and NRC?**

      The most important element of cooperation and coordination should involve extensive communication between the Administrator of the EPA, the Chairman of the NRC, and their senior staff. By appointing a new NRC chairman who has deep experience in the technology and regulation of nuclear waste disposal, Congress has already taken one of the best possible steps to assure effective cooperation and coordination between EPA and NRC.

4. **The NRC's role in protecting the pubic from the dangers of nuclear waste includes determining whether spent fuel can be safety stored at nuclear power plants until future storage and disposal facilities are available.**

   a. **What did the Commission find regarding the NRC's ability to ensure that nuclear power plants can safely hold waste until storage and disposal facilities can be developed?**

Based upon its review of the evidence to date, the Commission found no unmanageable safety or security risks with current methods of spent fuel storage at existing U.S. reactor sites. However, the Commission also noted that continued vigilance and careful attention to the lessons learned from the Fukushima accident will be necessary to ensure that this remains the case. For this reason, the Commission recommended that the National Research Council be commissioned to perform a study on lessons learned from the Fukushima accident and their implications for the safety and security of spent fuel storage in the United States. Congress has subsequently commissioned this study, which started in March of this year.

b. Does the NRC need to take any further steps to address potential deficiencies in the ability of nuclear power plants to safely hold nuclear waste, since short- and long-term storage and disposal facilities have not yet been completed?

The NRC Near Term Task Force on Fukushima identified a number of recommendations relevant to the safety of spent fuel storage that should be implemented. Likewise, the National Academies study that is now underway can be expected to develop additional recommendations, which should also be implemented.

Question from Senator Carper:

1. **Currently, there is significant research and development into technologies that will allow us to have safer, waste reducing, cost competitive nuclear reactors. In the public meetings and conversations that the Commission had across the country, did any of the individuals or communities express interest in hosting a research facility into advanced reactor technology that would reduce the amount of nuclear waste that would need to be disposed together with an interim storage or deep geologic disposal facility?**

   The Commission, and in particular its Reactor and Fuel Cycle Technology subcommittee that I co-chaired, received a large number of recommendations for research and development of new reactor and fuel cycle technologies, from a wide spectrum of members of the public and stakeholders. These recommendations spanned a range of technical options, from fast-spectrum reactors to thorium fueled molten salt reactors to derivatives based upon existing light water reactor technology.

   While the Commission did not examine potential sites for storage and disposal facilities nor request solicitation of interest by communities, the numbers of individuals and organizations that did express interest in advanced reactor and fuel cycle technologies does suggest that the siting of research facilities could end up being an important factor in generating local community and state support. The Commission did recommend that Congress retain the current Nuclear Waste Policy Act provision that provides special consideration in the siting of DOE facilities for RD&D:

   > "In addition to locating waste management-related activities in the affected state and community, these states and communities could also be given preference in the siting of other federal projects (provided they are otherwise suitable to host those projects). Section 174 of the NWPA, titled "Other Benefits—Considerations in Siting Facilities," already specifies that the Secretary of Energy "in siting Federal research projects, shall give special consideration to proposals from states where a repository is located." This approach can provide additional benefits to host communities and states without requiring new appropriations or increasing the cost of already planned programs or projects." (pg. 59)

Senator CARPER. I want to thank you both for that joint testimony. We are going to recess here for a brief time; we should be back in about 10 minutes, and we will start right back, and we will go right into questions.

[Recess.]

Senator CARPER. You were all having a lot of fun while we were gone. I hate to bring that to a close.

[Laughter.]

Senator CARPER. We are finishing up the vote, and our colleagues are making their way back over here in the next couple of minutes.

Let me ask the first question. This is really a question for both of you. Feel free to take turns answering it or whatever you are comfortable with. But it is my understanding that previous mechanisms for finding voluntary sites for nuclear waste facilities have been successful in this country. One of those is in New Mexico; I think it is called the Waste Isolation Pilot Plant.

However, there is a different type of facility than the one we are talking about here, for high level waste, as I understand it. But I believe the New Mexico facility does take mid-level defense waste. And in fact, it is my understanding that the State and the community there agreed to a facility with the understanding that it would not accept high level waste in the future.

Can you help provide any takeaways from the New Mexico experience on what we can replicate in a consent-based approach for high level repositories, or any cautions on what cannot be replicated? What can be exported from that experience in New Mexico and what cannot?

Mr. PETERSON. Thank you, Senator Carper. We found a number of very important lessons in examining the success of the development of the WIPP facility. I can list just a couple. One was that the Federal Government in the end was willing to negotiate legally binding agreements with the State government that clearly defined a set of regulatory authorities that the State held, and in essence gave State leadership hands on a steering wheel, or at least ability to put their foot on a brake. I think that was a key element of creating confidence that the facility could be operated safely, and that they could assure citizens that indeed it would be operated safely.

Senator CARPER. So instead of a my way or the highway, Federal Government calling the shots, you have the State in the car?

Mr. PETERSON. Yes.

Senator CARPER. And in one of the front seats of the car.

Mr. PETERSON. That is correct.

Senator CARPER. With the ability to put a foot on the brake. Almost like in driver's ed when I was in high school, you would have the student driver on the one side and then the instructor on the other side, both with a steering wheel and the pedals and everything.

Mr. PETERSON. And in the next panel, Geoff Fettus and others are likely to comment on the value of this. It does mean that whatever new entity is created by amendment to the Nuclear Waste Policy Act that it will be very important that it have the authority to negotiate and enter into these sorts of agreements on behalf of the Federal Government.

Another key thing that was done was that the Federal Government funded an independent scientific and technical evaluation group called the Environmental Evaluation Group in New Mexico. I think the State government made a tremendous decision by locating that scientific review panel within their university system, so that it was given in essence the type of independence that one associates with an academic institution, and therefore had tremendous credibility.

It also didn't hurt to have two very capable national laboratories in the same State as well. But to have independent source of scientific advice, separate from the Federal Government, I think was another key ingredient.

Another key element was that this repository was sited and developed and licensed to a safety standard that was established in advance of the siting of the repository, not during or after the selection of the repository. This relates to the Commission's recommendation that a new site-independent safety standard be developed by EPA and the NRC.

I think a final element that was critical in my judgment was the fact that this program had assured funding. And in the sense that the senior Senator from the State of New Mexico served on both the appropriating and authorizing committees, and that gave some assurance that adequate funding would be available to operate the facility safely after it had been built. We can't really rely on that good luck happening again, because the statistical probability, as you might guess, is rather low.

So this is a key reason why the Commission has recommended that we need to change, at a minimum, the way that we classify the fee receipts in such a way that when they are appropriated, they don't have to compete against other discretionary spending priorities. The situation in terms of spending those moneys looks more like how we fund the Nuclear Regulatory Commission, where the fees offset appropriations, and Congress is not faced with the dilemma of needing to cut other programs in order to fund something that is being paid for by the fees.

This is really critical, because I think that a local community really wants to have confidence that the facility will receive adequate funding.

The final element was that the Office of Civilian Radioactive Waste Management, in its 30-year history, never had a single director who served for more than 2 years. In other words, there was a lack of continuity of leadership that, if you think about a consent-based process, to have the leader of an organization going to a local community and then knowing that that person is not likely to be around, say, within 18 months, also would be a really serious problem. So this is another reason why we think that some type of new organization does need to be created to take on these responsibilities, so it can have the continuity of leadership that can give confidence to local communities that the Federal Government ultimately will live up to its obligations.

Senator CARPER. Those are very helpful answers. Thank you very much.

Let me yield to Senator Udall, a junior Senator for now, but not for long. You will soon be the senior Senator from New Mexico. I say that sadly, because we love Jeff Bingaman.

Senator UDALL. We sure do, we sure do. And Senator Carper, we are going to miss him very much, and miss that ability as Professor has pointed out, how he was serving on several committees that were really key.

Senator CARPER. I also know, I say this to our witnesses, I also know that the interests of New Mexico will be in very good hands.

Senator UDALL. Well, you are very kind. We are going to work hard on that.

And let me say to Dr. Peterson, I think you pulled out some of the very good lessons on the Waste Isolation Pilot Project. I wanted to explore a little bit more of those with both of you here in terms of questioning.

Should a State as a whole have the right to accept or reject a nuclear waste site in its borders, and how should that authority work?

Mr. SCOWCROFT. That is a very hard question for us to answer.

Senator UDALL. That is why I asked it.

[Laughter.]

Senator UDALL. You were given a lot of time to think about that.

Mr. SCOWCROFT. Well, we looked a lot at the differences between New Mexico and WIPP and Yucca Mountain. I think you put your finger on the principal difference. In New Mexico, there is a general acquiescence that this is good for the State, good for the country. So that is completely lacking in Nevada, where local communities are by and large very supportive, the State communities are very opposed. I think that Per has described a number of the details.

But WIPP is what gives me the optimistic confidence that we can move ahead. Because I think the attitude that we found down there, that I found down there, and I am not an expert like Per is, was immensely reassuring that this consent adaptive approach, if really taken seriously by both sides, can work.

Senator UDALL. General Scowcroft, you still didn't answer this. The question was very pointed here. Should a State as a whole have the right to accept or reject a nuclear waste site in its borders, and how should that authority work? You are comparing Nevada and New Mexico. As you know, and I think the history you are talking about, what happened in Nevada was the High Level Nuclear Waste Policy Act, which had a very scientific process, broad selection of sites, was shortened by Congress, and Congress basically said, it is going to Nevada and forced it down Nevada's throat. I think at the time the Governor and local officials, there was a lot of objection.

In New Mexico, it was different. The Governor and local officials and I believe the leadership in the Congress all had a very accepting attitude. So they came together and talked about, well, what should this agreement be. And as one of the parts of the agreement, as I mentioned in my opening statement, was the idea that no high level waste was going to come to New Mexico, that this was going to be a transuranic waste site.

So that is why I asked this question to you. It is one I know, I think you have tried to finesse in your report. And I am trying to get to the real heart here. Should a State as a whole have the right to accept or reject a nuclear waste site in its borders, and how should that authority work?

I realize that it is a tough question. But that is why we hired you to do this.

Mr. SCOWCROFT. Well, and I am speaking now more as an individual, because we didn't resolve that in detail, I will be honest with you.

Senator UDALL. Yes, but please, as an individual, your best. You sat through all of this; you have seen the experiences. Tell us what you think.

Mr. SCOWCROFT. I think to be successful we need to have State and local communities together. If they are not together, it is not going to work. So I think part of the whole consent process is working with the communities as a whole, State, local, tribal, whatever they are, to make it work.

Senator UDALL. Dr. Peterson, your thoughts on that question.

Mr. PETERSON. I think that in our report we essentially recognized that this is the major issue. So the final report does address it more specifically in the sense that it points out that in the end, the ability to opt out and what the conditions would be and how long should it be unconditional is best left to be a matter of negotiation between the Federal Government and the State. Because for example, if you are going to enter into a mortgage to purchase a house, there is a point and time where you make these decisions.

But in this case, by having the ability to opt out be one of the most important and key elements of negotiation, you can preserve an unconditional opt-out initially. Of course, if any safety issue arises associated with the site, there should be an immediate ability to put a brake onto the whole thing until things are fixed.

The timing and ability to opt out is something that in the phase of the operative approach probably needs to be worked out as a part of the negotiation between the State and Federal Governments.

Senator UDALL. Yes. And I think Senator Carper, he has pointed out an issue here that is very important when we look at final legislation. Many of the issues that arise along the way, what happened in the Waste Isolation Pilot Project was local people and State people were very worried about the safety issues and they were worried about highways, they were worried about emergency preparedness. And many dollars, hundreds of millions of dollars, were put toward that, to alleviate the fears, to improve the roads, to get emergency preparedness in place, No. 1.

And then the issues that you both talked about came together around, should we have the site, how we should have it. And the State was very worried about the science. The State was saying, well, we know the big Federal Government has a lot of science, we know about the national laboratories. But as a State, we want to have some oversight. So as part of the negotiation, as you both pointed out and you put in your report, the Environmental Evaluation Group was created. These were independent scientists, and they walked every step with the Federal scientists along the way,

challenged them at times. I think Dr. Orrell will talk a lot about this when he hits the testimony here.

So there were some important lessons that I think were learned. I have gone on way too long, but I really, and I only asked one question, and you see how hard it is to get to the bottom of that crucial question.

[Laughter.]

Senator UDALL. I hope Senator Alexander will focus on in this, too. It is important to protect Tennessee, I know, from the unilateral action of getting a nuclear site.

Senator CARPER. It may have only been one question, but it was a pretty good one.

Senator Alexander, before you begin, let me just ask something. I have kind of been thinking out loud here about the role that Senator Domenici played in all this, as an authorizer and as appropriator. I think Pete, who was a colleague for many years, may have seen, in fact, in the words of Albert Einstein, in adversity lies opportunity, potential for adversity. But also the potential for real economic opportunity for the people of New Mexico, if they figure it out and play their cards right. I think, arguably, they have done that pretty well.

Senator Alexander.

Senator ALEXANDER. Thanks, Mr. Chairman.

As I said in my opening remarks, whether you are for Yucca Mountain or against Yucca Mountain, we need to break the stalemate. That is the point of the Commission report, right?

Mr. PETERSON. Yes.

Senator ALEXANDER. You said 25 years is long enough just to be sitting there, and we need to get on with it. And if I am not correct, you said even if that, as far as a repository, even if Yucca Mountain were open, we would soon need a second repository; is that correct?

Mr. SCOWCROFT. That is correct.

Senator ALEXANDER. So we have that work to do.

And you didn't define what you meant by consent-based. Was that deliberate? You didn't say the State legislature has to pass a law and the local city council has to pass it. You didn't say that.

Mr. SCOWCROFT. No, we didn't, because we said consent-based also is adaptive. It depends on the circumstances, and it may be different in different areas.

Senator ALEXANDER. Did you envision that there would be incentives to local governments to do that?

Mr. SCOWCROFT. Yes, we did, and I think Per has talked about some of those. The research laboratory, all kinds of things that can make such a facility attractive to the community.

Senator ALEXANDER. Basically whatever it took to create an attractive environment so that people want to compete for this. Is that correct?

Mr. SCOWCROFT. Part of the consent basis.

Senator ALEXANDER. In my experience, and I don't want to prejudge this, and this may not even be a part of Senator Bingaman's bill, but for a long-term repository, I would think that the Federal Government would want the Governor and the State legislature to pass a law approving it. Then if I were the Governor, I would want

the Congress to pass a law approving it, because I wouldn't want the next President or the next Governor to undo it.

So my guess is that this will work, what we mean by consent-based will work itself out. Because communities who compete for the research laboratory or whatever this opportunity turns out to be will try to put together the most attractive package they can. And then from whoever the Federal administrator is will look at it and say, well, New Mexico has A, a history, B, their Governor or legislature said yes, or city council said yes, or Tennessee said yes. And that would be a part of an attractive proposal to the Federal Government, would it not, to know that you had that kind of backing in law, rather than just some statement by a Governor who might not be there next year.

Mr. SCOWCROFT. Absolutely. And that is essential. And in our Federal system, it is much more complicated than in other countries where we have looked, like Sweden and Finland and so on, where they don't have a Federal system. They have actually had communities bidding against each other.

Senator ALEXANDER. Well, I would hope that would happen here.

Mr. SCOWCROFT. But it is more complicated here because of the nature of our structure.

Senator ALEXANDER. Yes, but still, I think Senator Carper—and I have mentioned this myself, I had the same experience with prisons when I became Governor. We couldn't locate one, and I announced that we only had one, and we would have a competition. Pretty soon we had three proposals. So we can make it attractive, and should.

I think your consent-based recommendation just clears the air, it doesn't resolve Yucca Mountain for now. But again, whether or not—whether one is for Yucca Mountain, as I am, or whether one is against it, as Senator Reid is, it doesn't really matter in terms of whether we need a second repository or consolidated site.

Now, let me ask about these consolidated sites. The Nuclear Waste Policy Act allows consolidated storage only after a permanent repository has been licensed. Now, in the legislation that Senator Feinstein and I have in the Appropriations Committee, we separate these consolidated sites. We don't call them interim sites, because there might always be something there on its way to a permanent site.

But can you discuss why you in your recommendation separated the consolidation site from the search for the permanent repository and whether or not you think it is a wise idea for us to move ahead as the appropriations language says with identifying one or more pilot consolidation sites? Although in the end, if any site were chosen, it would have to be approved by an act of Congress.

Mr. PETERSON. That is an excellent question. I think we found that the benefits of developing consolidated storage are so large in terms of taxpayer liability, of being able to collect material into a smaller number of locations and return unused sites to more productive uses. And to gain experience with transportation at smaller scale, so that we can build that capability. So it makes sense to move forward on consolidated storage in parallel with, not after the development of a geologic repository.

This does take amendment to the Nuclear Waste Policy Act, and it is just one of several areas where we made recommendations. You had also mentioned the importance of incentives. We reviewed the current structure of incentives in the Nuclear Waste Policy Act and found that they probably would not work as well as they should. So the report provides recommendations for ways to improve the incentive basis for that.

Senator ALEXANDER. But did I state it correctly, your recommendation and support for the idea of moving ahead with identifying consolidation sites does not decide the question of Yucca Mountain one way or the other? Whether we are for Yucca Mountain, am I accurate to say whether we are for it or against, we still need to move ahead with consolidation sites, and we still need to move ahead as soon as the legislation is passed to begin to identify a second repository?

Mr. PETERSON. Absolutely. Clearly the question of what needs to be done with Yucca Mountain is quite controversial. I think if our Commission had been required to answer that question, we would have had a difficult time reaching a consensus. But what we found is that the things that we recommended that we do move forward on, developing a new repository, developing consolidated storage, creating a new entity, these are things we need to do, as the Commission said, regardless of whether we were to retain, discard, or place into deep freeze or whatever it ends up being, what happens to Yucca, these are other things that really are important for us to move forward on as promptly as we can.

Senator ALEXANDER. Mr. Chairman, may I ask one more quick question?

Senator CARPER. Let us discuss this.

[Laughter.]

Senator CARPER. Go ahead.

Senator ALEXANDER. Thank you, Mr. Chairman.

Did you weigh—sometimes the simplest solution is the best solution. And the simplest solution for used nuclear fuel is to leave it where it is. I mean, you have security, you don't have to transport it, which is hard to do and sometimes risky. And so a consolidation site takes time, takes a lot of money, requires transportation, which could be risky.

So did you weigh those two things and still come down on the side of the need for consolidation sites?

Mr. SCOWCROFT. Yes, we certainly did. We looked at all the different possibilities. And we concluded that even though it means more sites you have to locate, that on balance it was well worth it. And the transportation is certainly a problem. It has worked well regarding the WIPP thing, and we think that with certain precautions which we suggest in our recommendation to have the State and local authorities aware of possible crises, that transportation is not that big a problem.

Senator ALEXANDER. Thanks, Mr. Chairman, Senator Barrasso, for your courtesy.

Senator CARPER. You are welcome. Great questions.

Senator Barrasso.

Senator BARRASSO. Thank you very much, Mr. Chairman.

To both of you, in the testimony you discussed examples of where a consent-based approach has worked. You visited about the disposal facilities, siting for New Mexico. My question is, are there positive outcomes, Spain, Finland, Sweden? Could you tell us a little bit more about what the key common elements are that made those projects successful?

Mr. SCOWCROFT. I would say the key common elements are that the prospects were made to look positive in the eyes of the local communities. And they were an asset to the communities. That is why there has actually been, in some cases, active bidding to hold the site.

So I think that is the key to it, to make it not a penalty that is being forced on you, but an opportunity for the community. And that will differ for different communities, what they find attractive. But it seems to be working very well in all the other countries that we visited. As I say, none of them have the particular complications we do in our Federal system. But given that, we are optimistic.

Senator BARRASSO. Talk about some of the particular complications in the Federal system. In the written testimony you mentioned in terms of the EPA working with the Nuclear Regulatory Commission. I think you said they should begin working together to define an appropriate process for developing a generic disposal facility safety standard, and then associated implementing regulations.

Was there a similar process in terms of developing that safety standard when it came to Yucca Mountain? Was that there? Because it seemed that the process took a long, long time.

Mr. PETERSON. For Yucca Mountain, there were difficulties in demonstrating compliance with the existing safety standards. So Congress did direct the National Academies to study the question and issue a report upon which a new safety standard could be issued. This occurred after the site had been selected.

So in my professional judgment, I think the standard that was developed is reasonably protective. But to do this after you have picked a site and then to change the safety standard that it is required to meet through legislation I think does damage the confidence in the entire process. And this is one of the reasons why considerable amount of activity can start immediately in terms of facilitating the ability of local communities to study and to understand what the implications would be of hosting facilities. But before site selection occurs, it really would be best to have a clearly defined and clearly site-independent safety standard available that the sites would be required to meet.

Senator BARRASSO. When I think about Yucca Mountain, we need affordable domestic energy. And we need it now. I believe Yucca Mountain could be a key bridge to allowing nuclear energy to be a very viable part of America's energy mix. So when I look at this—you talk about providing incentives for communities to accept nuclear waste. Under your plan, would Nevada qualify for incentives, and is there any way now to incentivize communities in Nevada to move forward with Yucca Mountain?

Mr. SCOWCROFT. We see no reason that Yucca Mountain could not go forward if it meets the criteria. So we do not rule out Yucca Mountain at all. No.

Senator BARRASSO. Great, thank you.

Thank you, Mr. Chairman.

Senator CARPER. To my colleagues, I would just say, for years, whenever I see Yucca Mountain referred to in the press or in the media, by the media, it is always characterized as a nuclear waste dump. Always characterized that way. In my State, my guess is the same is true in Wyoming or Tennessee or New Mexico or any other State, nobody wants to have a dump in their neighborhood or in their community. As we figure out, going through this kind of consensus building that is being recommended by the Commission, not as important to make clear that a repository collection site, whatever we want to call it, not be a dump, but to be able to point to other similar facilities around the world where these actions have gone forward, and they are anything but a dump.

And there are not only construction jobs for those facilities in other countries, there are very good jobs for people who work there and operate these facilities. And they spin off tax revenues for the local governments and do so in an environmentally sound way. We have to be smart enough, as they have, I believe, in some of these other countries, to meet the transportation concerns that have been alluded to here today.

But we have to be smarter the second time through than we were the first time through. I am hopeful that the work the Commission has done will enable us to be a whole lot smarter. Or as my father used to say, just take your smart pills, Tom. We are going to take our smart pills, and you are going to give us a full prescription of those.

Laura Haines, who sits behind me, over my left shoulder, gave me a note. I just want to refer to it briefly here. The question goes back to jurisdictions. And I show this to Senator Barrasso. It is very short, so I just want to mention this before you all are excused.

I believe that some folks are confused about the Subcommittee's jurisdiction. We want to be clear and state very briefly what we think it is. This is a quote: "A non-military environmental regulation and control of nuclear energy." That is non-military Environmental regulation and control of nuclear energy. That is verbatim.

Our friends in the Energy Committee, whom we love, have jurisdiction over the—and this is a verbatim quote: "A non-military development of nuclear energy." That is the non-military development of nuclear energy. And since we are talking about the control of nuclear waste spent fuel, we believe this clearly lies in this Subcommittee's jurisdiction. In fact, several nuclear waste bills have already been reported to our Subcommittee, to our Committee over recent years.

I am sure, given the affection we have for our friends in the Energy Committee, that we will work well and closely with them and other relevant committees on this very important issue.

That having been said, I just want to thank you and ask you to convey to your colleagues on the Commission our profound thanks for all the work, all the time and effort that has gone into this ef-

fort and to say we look forward to having good dialogue with you going forward, as we end up in a much smarter place this time than we did over the last 30 years.

With that having been said, you are excused. Our very best to your colleague, Lee Hamilton. Give him our highest regards, and thank you so much.

Mr. SCOWCROFT. Thank you very much, Mr. Chairman, Mr. Ranking Member. It has been a privilege to be with you.

Senator CARPER. The privilege is ours. Thank you both.

As our second panel takes their seats, I just want to briefly introduce them, welcome them. Thank you all for joining us today.

You heard from your warm up act. They were pretty good. We now look forward to hearing from each of you.

On this panel, we welcome Geoffrey Fettus, Senior Project Attorney for the National Resources Defense Council, which announced earlier this year that in evaluating the beaches throughout the country, the NRDC, as I recall, announced that there a lot of one-star beaches, they announced that there are a lot of two-star beaches. You don't want to be a one-star beach, but we have a lot of one-star beaches, we have a lot of two-star beaches, not as many three-star beaches, even fewer four-star beaches. But there turned out to be four five-star beaches in America. And two of them are actually in a State represented by one of the two members of this Committee, sitting here.

[Laughter.]

Senator CARPER. And the last time I checked, there were no beaches in New Mexico.

[Laughter.]

Senator UDALL. Did you know, Chairman Carper, that we had an ancient ocean a million years ago in New Mexico?

[Laughter.]

Senator CARPER. That was then.

[Laughter.]

Senator CARPER. This is now. So if you are looking for a five-star beach to come to, Senator Udall, Senator Barrasso, feel free to visit us in Rehoboth or Dewey Beach, Delaware.

All right, that is neither here nor there. We are especially happy to welcome you, given the great work that the NRDC did on that.

David Wright, President of the National Association of Regulatory Utility Commissioners and Vice Chairman, Public Service Commission of South Carolina. Nice to see you. Welcome.

Mr. Eric Howes, Director of Government and Public Affairs, Main Yankee. And Daniel S. Metlay, Senior Professional Staff, U.S. Nuclear Waste Technical Review Board.

Dr. Metlay, great to see you. And is it Mister or Doctor; which do you like to be called? All right, Mister it is. All right, we will alternate, then.

Dr. Andrew Orrell, Director of Nuclear Energy and Fuel Cycle Programs, Sandia National Laboratories.

Again, we will ask you to hold your statements to about 5 minutes. If you go way beyond that, we will have to rein you in. But we are glad that you are here, and we appreciate your participation and your preparation.

Mr. Fettus.

STATEMENT OF GEOFFREY FETTUS, SENIOR PROJECT ATTORNEY, NATURAL RESOURCES DEFENSE COUNCIL

Mr. FETTUS. Good morning. I thank the Chairman and the Ranking Member for inviting NRDC to share its views on the potential legislative outcomes of the President's Blue Ribbon Commission.

I have submitted written testimony to be included in the record, and I will focus briefly on two points now. Point one, in new legislation, we urge Congress to require standards for site screening and development criteria be in final form before any interim storage or disposal sites are considered. And I was very pleased to hear Dr. Peterson reiterate that call; we share it.

The same is true for generic radiation and environmental protection standards. The BRC was correct when it wrote that regulatory requirements to license a geologic repository should be generic, that is, applicable to all sites in the first instance.

But with respect, we are very pleased that they were explicit today that such standards must be in final form before the process begins. Why do we feel so strongly about this? Short circuiting the site selection process and gerrymandering environmental standards led directly to the loss of support from Nevada, substantially diminished congressional backing, except to ensure that the proposed site remained the sole option, and wholesale erosion of public support for the Yucca Mountain Project.

Further, we expect any such generic standards will be subject to adverse pressure applied by, for example, the Office of Management and Budget, other involved agencies, and perhaps even industry. Altering regulatory standards in order to allow a site to be licensed, which is what happened repeatedly with Yucca Mountain, ensures the nation won't make progress on lasting solutions.

Which takes us to point 2. The BRC's emphasis on a consent-based approach was a step in the right direction. I am pleased to hear so many members of the panel amplify that today. The Commission studied hat worked and what didn't work over the past 20 years, and it looked overseas. It came to the conclusion that trying to foist an unending stream of nuclear waste on an unwilling State and an unwilling congressional delegation was a losing proposition.

The BRC stated, "It is essential to affirm a meaningful role for States, tribes, and local governments that is at once positive and substantively meaningful." Frankly, such an observation was long overdue. We concur with that observation but note that BRC was too tentative in its recommendation. Rather than attempt to build a better version of the same kind of mouse trap, such a change can be accomplished by amending the Atomic Energy Act to remove its express exemption of radioactive material from environmental laws. Exemptions of radioactivity from our laws make it, in effect, a privileged pollutant.

These exemptions are at the foundation of State and Federal agency distrust of both commercial and Government-run nuclear facilities. If EPA and the States had full legal authority and could treat radionuclides as they do other pollutants, clear clean up standards could be promulgated, and we could be much further along in remediating the toxic legacy of the cold war, as just one example.

Furthermore, we could avoid some of the ongoing disputes over operations at commercial nuclear facilities. Even the BRC recognized this, as it noted New Mexico's efforts to regulate aspects of the WIPP facility in Senator Udall's State, under its hazardous waste laws, is mentioned as a critical positive development. Speaking briefly outside of my text, I can assure you that obtaining that regulatory authority was, in short order, a contentious fight. But once that regulatory authority was obtained by the State, that was the critical step.

Any regulatory change of this magnitude would have to be harmonized with NRC licensing jurisdiction over nuclear facilities and EPA's existing jurisdiction over radiation protection standards. But such a process is certainly within the capacity of those Federal agencies.

Some States would assume environmental jurisdiction over radioactive material; others might not. But in any event, improved clarity in the regulatory structure and a meaningful State oversight role would allow for the first time consent-based and transparent decisions to take place.

Let me close point 2 by noting that if Congress were to follow a more timid path and legislate a narrow allowance for a particular State, such as a contract that would provide the State with some measure of regulatory control, that would be inadequate and would not provide the State the necessary certainty. New Mexico and its Senator might be able to inform this more. With the demise of the proposed Yucca Mountain project, we understand that some have already suggested that aspects of the WIPP Land Withdrawal Act might be subject to alteration.

Well, as Senator Udall explained before, there were express promises made to New Mexico. And if those promises are even remotely in jeopardy, it is not clear to NRDC why any State would trust such a contract or future promise.

We addressed interim storage and other matters, and I am happy to take questions on those as well. But I will close on the overarching premise that we hope guides both congressional inquiry and legislative drafting. That is, years or decades from now, just as you warned, Chairman Carper, others will face our current predicament unless Congress creates a transparent, equitable process with strong public health and environmental standards that can't be manipulated in order to license a site that may not be suitable.

As I stated to several members of the BRC in an extensive public colloquy last fall in Denver, I can't guarantee that NRDC's recommendations will result in a solution. But I can point to strong evidence that following a course similar to the last two decades results in failure.

Thank you again for this opportunity to testify, and I am happy to take your questions.

[The prepared statement of Mr. Fettus follows:]

Statement of

Geoffrey H. Fettus
Senior Project Attorney
Natural Resources Defense Council, Inc.

on the

Recommendations from the Blue Ribbon Commission on America's Nuclear Future for a Consent-Based Approach to Siting Nuclear Waste Storage and Management Facilities

Before the
Committee on Environment and Public Works
Subcommittee on Clean Air and Nuclear Safety
United States Senate
Washington, D.C.

June 7, 2012

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Introduction

Mr. Chairman and members of the Committee, thank you for providing the Natural Resources Defense Council, Inc. (NRDC) this opportunity to present our views on the final report of President Obama's "*Blue Ribbon Commission on America's Nuclear Future - Report to the Secretary of Energy, January 31, 2012*" (hereafter "*BRC Report*" or "*Final Report*").

NRDC is a national, non-profit organization of scientists, lawyers, and environmental specialists, dedicated to protecting public health and the environment. Founded in 1970, NRDC serves more than one million members, supporters and environmental activists with offices in New York, Washington, Los Angeles, San Francisco, Chicago and Beijing. We have worked on nuclear waste issues for the entirety of our existence and we will continue to do so.

While we were initially dismayed with the lack of balance in the composition of the BRC, we think the Commission delivered a useful, although limited, report that identified several components of what could become a successful strategy for the ultimate safe disposal of commercial and defense spent nuclear fuel and high-level radioactive waste. NRDC submitted both oral and written comments to the Commission and its subcommittees during the months the Commission conducted its work. We append our final comments on the BRC's *Final Draft Report* as a resource and an amplification of our presentation today. *See* Attachment 1, *NRDC Comments On "Blue Ribbon Commission On America's Nuclear Future - Draft Report To The Secretary Of Energy, July 29, 2011,*" November 1, 2011.

Next, I thank the Committee and the Chairman for holding this hearing. While the general approach of the BRC has merit, there is need for serious inquiry on several subjects prior to formulation of substantive, consensus legislation on this matter. This Committee needs no reminding that failure to achieve consensus legislation, especially with a history as fraught as that of nuclear waste, invites the likelihood of more political and legal gridlock down the road.

Today I offer five recommendations from NRDC for ensuring the success of any legislative outcomes to the BRC process – (1) incorporate concepts of intergenerational justice and consent into the legislation; (2) create a coherent legal framework before commencing any geologic repository or interim storage site development process; (3) arrive at a consent-based approach for nuclear waste storage via a fundamental change in law; (4) address interim storage; and (5) reject closed fuel cycle and reprocessing options from the charter of any new federal corporation created to implement the interim storage and ultimate disposal missions. We could cover these and other matters in greater depth, but I seek to focus NRDC's recommendations on these five key topics.

Importantly, our view on each subject area is premised on a single overarching caution: in order to avoid repeating the mistakes of the last three decades, Congress must create a transparent, equitable process incorporating strong public health and environmental standards insulated from gerrymandering or other distortions in order to license a site (or sites) that may not be suitable. What follows are NRDC's recommended prerequisites for establishing such a protective and robust process.

Summary Overview – Intergenerational Justice and Consent
There are two concepts the BRC appropriately highlighted but, unfortunately, failed to develop into clear guidance for Congress.

First, the BRC *Final Report* puts an emphasis on the concept of "intergenerational justice" as an ethical framework for a nuclear waste disposal program. NRDC agrees and views this concept as the principal basis for seeking geologic disposal of the nuclear waste. This generation's ethical obligation to future generations regarding nuclear waste disposal implicates critical issues of security: including financial security, environmental protection, and public health. However, the Report failed to illuminate the history of U.S. policy under the Nuclear Waste Policy Act, 42 U.S.C. 10101 *et seq.*, (NWPA) and the Report's summary of our national experience with the proposed repository at Yucca Mountain fails to tell the story of how the Environmental Protection Agency (EPA), the Department of Energy (DOE), the Nuclear Regulatory Commission (NRC), the Justice Department, and the U.S. House and Senate together corrupted the process for developing and implementing licensing criteria for the Yucca Mountain repository. If Congress does not engage this history with clear eyes, there is little hope that a future repository will be sited and developed without undue risks to succeeding generations. The supporting record for any new legislation should detail this history in frank terms and the precise legislative direction should ensure the concept of "intergenerational justice" is at the forefront.

Second, much is made throughout the *Final Report* of a "consent-based, adaptive, and phased approach" for developing geologic disposal options. We agree with the general thrust of such a conceptual framework for developing repositories, but any such "consent-based" process will enjoy a far higher probability of success in concert with a simple, but profound, change in the law. As the *Final Report* acknowledges but fails to meaningfully discuss, current federal law, including aspects of the Atomic Energy Act (AEA), has the effect of preempting almost all forms of state regulation over a high level waste facility and, indeed, over regulation of radionuclides in general.

This Committee should recommend that Congress commence hearings to remove once and for all the AEA's exemptions for radionuclides from our water and hazardous waste laws. These anachronistic exemptions from environmental law are at the heart of state and public distrust of both government and commercial nuclear facilities. As I noted at the outset, the BRC has made suggestions in its report that could build a better nuclear waste management system, but we submit that decades from now the Nation will return to the same predicament (no matter how improved the architecture of said system) unless States are provided with meaningful regulatory authority under existing environmental laws. We expand on this topic in our third recommendation.

Create a Coherent Framework Before Commencing the Nuclear Waste Siting Process
The BRC recognized that the 1987 amendments to the NWPA were "highly prescriptive" and "widely viewed as being driven too heavily by political considerations." Those observations are insufficiently critical assessments of what happened. We recommend that Congress be clear about what happened to avoid repeating the mistakes of the past. Put bluntly, first DOE and then Congress corrupted the site selection process leading to Yucca Mountain as the only option. The original strategy contemplated DOE first choosing the best out of four or five geologic media, selecting a best candidate site in each media alternative, next narrowing the choices to the best three alternatives, and finally picking a preferred site for the first of two repositories. Such a

process, if it had been allowed to fairly play out, is precisely the adaptive, phased, and science-based process to which the BRC referred.

But instead, what happened was that DOE first selected sites that it had pre-determined. Then in May of 1986 DOE announced that it was abandoning a search for a second repository, and narrowed the candidate sites from nine to three, leaving in the mix the Hanford Reservation in Washington (in basalt medium), Deaf Smith Co., Texas (in bedded salt medium) and Yucca Mountain in Nevada (in unsaturated volcanic tuff medium). Next, all equity in the site selection process was abandoned in 1987, when Congress, confronted with cost of characterizing three sites, amended the NWPA of 1982 to direct DOE to abandon the two-repository strategy and to develop only the Yucca Mountain site. Not by coincidence, at the time Yucca Mountain was DOE's preferred site. The abandonment of the NWPA site selection process jettisoned a science-based approach, led directly to the loss of support from the State of Nevada, diminished Congressional support (except to ensure that the proposed Yucca site remained the sole site), and eviscerated public support for the Yucca Mountain project.

To avoid a similar fate, we urge Congress be explicit and state clearly in legislation that not only the standards for site screening and development criteria be in final form before any sites are considered, but generic radiation and environmental protection standards for any such site be established as well. See *Disposal Subcommittee Report*, at 74. The Subcommittee was right to state that the standard and supporting regulatory requirements to license a geologic repository should be generic – *i.e.*, applicable to all sites. Care must be taken to insulate any site standard, development or regulatory framework from adverse pressures applied by the Office of Management and Budget, the Department of Justice, DOE and the NRC. Indeed, it is our assessment that past administrations' failures to protect EPA from just such pressures is why the development of the EPA standard setting process was so problematic. Thus, we concur with the BRC that the existing generic standards are not adequate (*Final Report* at 91) and, we recommend, need to be strengthened. We look forward to future Congressional inquiry on just how those standards might be improved.

On a final note, some could argue that putting final form on siting criteria or radiation protection standards might unduly or unnecessarily restrict the number or type of sites under consideration. We have confidence that enough flexibility could be introduced into any generic standards to avoid a premature limitation of potentially appropriate sites from a science-based approach. But the alternative of *not* requiring the siting criteria or generic environmental standards to be in final form prior to developing potential storage and disposal sites ensures that the same gaming of the system will recur as unfortunately played out over the last two decades. And Congress is mindful of how that effort failed.

Arrive At a Consent-Based Approach Via a Fundamental Change In Law

On the consent-based approach to siting, the BRC *Final Report* tentatively approached a bright line that it should have boldly walked across. We suggest Congress, with its firm understanding of federalism, take the stronger course. Specifically, we refer to the role of the local, state and tribal governments in the BRC's prescription for a successful repository and waste storage program. We fully support the concepts embodied in the five qualities suggested by the BRC for developing a successful approach:

> (1) Consent-based—in the sense that affected communities have an opportunity to decide whether to accept facility siting decisions and retain significant local control;
> (2) Transparent—in the sense that all stakeholders have an opportunity to understand key decisions and engage the process in a meaningful way;
> (3) Phased—in the sense that key decisions are revisited and modified as necessary along the way rather than being pre-determined;
> (4) Adaptive—in the sense that process itself is flexible and produces decisions that are responsive to new information and new technical, social, or political developments; and
> (5) Standards – and science-based—in the sense that the public can have confidence that all facilities meet rigorous, objective, and consistently-applied standards of safety and environmental protection.

These aspirations are both laudable and necessary in light of the history of spent fuel and high-level radioactive waste disposal programs. As Congress is aware, much of the difficulty of finding workable disposal solutions for nuclear waste can be traced to inherent tensions that exist in federal, state and tribal regulatory relationships. We could have extensive inquiry into the origins of those inherent tensions, but none could deny the existence of such disputes. And without fundamental changes in the law to address that federal, state and tribal tension, we will never approach closure and consent on transparent, phased, and adaptive decisions for nuclear waste siting. Indeed, we suggest that decades from now there will have been little change and disputes that will continue unchecked unless Congress avails itself of the opportunity to finally suggest a decades-overdue change in the law that the BRC itself acknowledges in the Report text.

The *Final Report* states in pertinent part:

> We recognize that defining a meaningful and appropriate role for states, tribes, and local governments under current law is far from straightforward, given that the Atomic Energy Act of 1954 provides for exclusive federal jurisdiction over many radioactive waste management issues. Nevertheless, we believe it will be essential to affirm a role for states, tribes, and local governments that is at once positive, proactive, and substantively meaningful and thereby reduces rather than increases the potential for conflict, confusion, and delay.

Final Report at 56 (citation omitted).

A meaningful and appropriate role for States in nuclear waste siting can and must be done straightforwardly. How can this be achieved? Such a change can be accomplished by amending the Atomic Energy Act (AEA) to remove its express exemptions of radioactive material from environmental laws. The exemptions of radioactivity make it, in effect, a privileged pollutant. Exemptions from the Clean Water Act and the Resource Conservation and Recovery Act (RCRA) are at the foundation of State and, we submit, even fellow federal agency distrust of both commercial and government-run nuclear complexes.

As this Committee is aware, most federal environmental laws expressly exclude "source, special nuclear and byproduct material" from the scope of health, safety and environmental regulation by EPA or the states, leaving the field to the DOE and the NRC. In the absence of clear language in those statutes authorizing EPA, or states where appropriate, to regulate the environmental and public health impacts of radioactive waste, DOE retains broad authority over its vast mess of radioactive waste, with EPA and state regulators only able to push for stringent cleanups on the margins of the process. Indeed, the BRC Report's discussion of the WIPP facility and the State of New Mexico's efforts to regulate aspects of the facility under RCRA is mentioned as a critical positive element in the development of the currently active site. *Final Report* at 21. The NRC also retains far reaching safety and environmental regulatory authority over commercial nuclear facilities, with agreement states able to assume NRC authority, but only on the federal agency's terms.

As we noted in our July 2011 comments to the BRC, states are welcome to consult with the NRC and the DOE, but the agencies can, and will, assert preemptive authority where they see fit. This has happened time and again at both commercial and DOE nuclear facilities. Continuing the outdated regulatory scheme is at the heart of the distrust that has poisoned federal and state relationships involved in managing and disposing of high-level radioactive waste (HLW) and spent nuclear fuel.

If EPA and the States had full legal authority and could treat radionuclides as they do other pollutants under environmental law, clear cleanup standards could be promulgated, and we could be much farther along in remediating the toxic legacy of the Cold War. Further, we could likely avoid some of the ongoing legal and regulatory disputes over operations at commercial nuclear facilities. Any regulatory change of this magnitude would have to be harmonized with appropriate NRC licensing jurisdiction over facilities and waste and harmonized with EPA's existing jurisdiction with respect to radiation standards: but such a process is certainly within the capacity of the current federal agencies and engaged stakeholders. Some states would assume jurisdiction over radioactive material, others might not. But in any event, substantially improved clarity in the regulatory structure and a meaningful state oversight role would allow, for the first time in this country, consent-based and transparent decisions to take place on the matter of developing geologic repositories.

Address Interim Storage

"First, we recommend that the United States establish a program that leads to the timely development of one or more consolidated storage facilities." *Final Report* at 32.

With respect to interim storage of spent nuclear fuel, we take issue with the number of facilities and with the manner in which spent fuel should be managed pending disposal as insufficiently fact-based.

First, NRDC disagrees that multiple sites for consolidated interim storage are required. We see no need or justification for more than one government consolidated interim storage facility in the United States. Nor do we necessarily see need for expanding interim storage beyond sites that are currently storing commercial spent fuel. As indicated in Table 1 (p. 32) of the *BRC's Report*, current total stranded spent fuel (SF) could be accommodated in approximately 250 casks. Even

twice this amount could be accommodated in a single hardened building the size of the Ahaus facility in Germany. A single site the size of the chemical processing area at La Hague in France could accommodate more than 100,000 tonnes (t) of spent fuel stored in dry casks storage, assuming 0.5 t SF/m2. The development of multiple facilities would be an unnecessary expense considering the numerous other high-priority issues that exist relating to the safe handling of the already present waste.

With respect to spent fuel management, we concur with the BRC's admonition that there must be vigorous efforts by industry and by the appropriate regulatory authorities to ensure that all near-term forms of storage meet high standards of safety and security for the decades-long time periods that interim storage sites are likely to be in use. While NRDC agrees with the overall concept advanced by the Commission, the BRC cited no evidence for why continued reliance on densely-packed wet storage should be accepted as adequate in light of the health, safety and security risks that interim wet storage poses. Instead, the BRC was negligent in not recommending that Congress statutorily direct movement of spent fuel from wet pools to dry casks as soon as practical, *i.e.*, as soon as spent fuel has cooled sufficiently to permit safe dry cask storage, generally about five years. With less fuel in the pool, an accident scenario in which cooling is lost would be less problematic through the extended time allotted by the slower boiling rate in the lesser-filled pools and the radiation source term would be reduced. The now standardized practice of hardened dry-cask storage poses clear benefits in terms of the mitigation of an accident or act of terrorism, either of which could lead to the release of quantities of radiation exceeding a reactor core melt.

Moreover, as we and many others in the environmental and public health community noted to the BRC, current practice at U.S. reactor sites allows the spent fuel pools to be filled to near capacity, with most pools containing five times as much fuel as the reactor itself. We disagree with the Commission's politicized conclusion that it sees "no unmanageable safety or security issue associated with current methods of storage (dry or wet) at existing sites in the United States." *Final Report* at 32. This counter-factual conclusion is not borne out by the post-9/11 National Academy study of spent fuel storage, or by the recent post-Fukushima nuclear safety reviews at U.S. reactors that reveal significant deficiencies in back-up spent fuel cooling and instrumentation capability under the conditions of a station black-out. Particularly with respect to the 23 boiling water reactors (BWRs) in the United States, supplying emergency make-up water to a boiling pool inside the secondary containment can itself threaten, via excess heat and condensation, the performance of other critical reactor safety systems, and the elevated pools themselves are vulnerable to structural damage and debris from hydrogen explosions in a severe accident scenario, as occurred during the Fukushima accident.

In short, unprotected or lightly sheltered spent fuel pools outside containment are vulnerable to disabling of their cooling systems in a severe natural event – such as a tornado, earthquake, fire, or flood – and to direct destruction via a terrorist attack. On September 11, 2001, Flight 11 passed directly over the Indian Point nuclear reactors and spent fuel pools, containing tons of discharged fuel in wet storage. None of the above enumerated threats could be considered "well-managed" under current NRC regulations or current independent licensee efforts. Congress should confront this matter directly in any forthcoming legislation and require unpacking of the pools and into hardened onsite storage.

Reject Closed Fuel Cycles and Reprocessing

The analysis of advanced fuel cycle technologies contained in the BRC *Final Report* was inadequate and the broad sweeping conclusions are not supported by a more rigorous comparison of current once-through versus advanced closed fuel cycles. As we demonstrated time and again to the Commission in our comments (*see* Attachment 1, *NRDC November 1, 2011 comments at 7-14*), one can determine the relative attractiveness and economic outlook of various reactor and fuel cycle concepts and the likelihood that various options will be implemented in the United States. Consequently, rather than promoting a large research and development (R&D) program covering a wide range of alternative fuel cycles, Congress should look at the reality of the federal budget over the next decade and narrow the options and focus on those that are most promising. Given that there is no current or prospective closed fuel cycle that can economically compete with the current open cycle, Congress should prioritize R&D funding to support technologies that can mitigate climate change in the near-term at the least cost. This excludes government funded R&D on closed plutonium fuel cycles.

Conclusion

The BRC made several recommendations that could help build a better nuclear waste management system, but decades from now others will face our current predicament unless Congress creates a transparent, equitable process with strong public health and environmental standards that cannot be manipulated in order to license a site (or sites) that may not be suitable. To do that, as it writes our path forward, Congress must ensure we not repeat the mistakes of the past. Key to avoiding those mistakes is providing states with meaningful regulatory authority and creating a transparent, equitable process that incorporates strong public health and environmental standards at the outset.

Thank you again for this opportunity and I am happy to answer any questions.

Natural Resources Defense Council - Nuclear Program
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November 1, 2011

ATTACHMENT 1

Via Electronic Mail

Mr. Timothy A. Frazier, *Designated Federal Officer*
President's Blue Ribbon Commission on America's Nuclear Future
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

NRDC COMMENTS ON "BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE - DRAFT REPORT TO THE SECRETARY OF ENERGY, JULY 29, 2011"

The Natural Resources Defense Council ("NRDC") submits these comments on the "Blue Ribbon Commission on America's Nuclear Future - Draft Report to the Secretary of Energy, July 29, 2011" (hereafter "Draft Report"). NRDC has submitted previous comments to subcommittees of the Blue Ribbon Commission ("BRC") and testified several times during the months the BRC has conducted its work. As those comments are already in the record of this proceeding, we will not reattach them here. To the extent those comments are still relevant and touch on measures not addressed in our final comments, we incorporate those earlier comments by reference.

SUMMARY OF COMMENTS AND INTRODUCTION

In the opening pages of the Draft Report, the authors discuss the "lack of trust in the federal government's ability to meet its waste cleanup and management obligations." With regard to this obligation, the Draft Report should begin by noting that nuclear power is the only energy technology where the government has assumed responsibility for the management and disposition of the waste. For the sake of the reader, the Draft Report should indicate why this has transpired and whether the BRC believes this is still desirable, and if so, why? Should the government similarly assume responsibility for the disposition of wastes from other energy technologies, e.g., from burning coal?

The Report also mentions the concept of "intergenerational justice" as an ethical responsibility during development of a successful waste management program. NRDC views this concept as the principal basis for seeking geologic disposal of the nuclear waste. This generation's ethical obligation to future generations regarding nuclear waste disposal implicates critical issues of security, including financial security, environmental protection, and public health. The Draft Report's Section 3.4.2 summary of the

history of U.S. policy under the NWPA, and its Section 3.4.3 summary of the experience with Yucca Mountain, fail to tell the story of how EPA, DOE, NRC, Justice and the Senate corrupted the process for developing and implementing licensing criteria for the Yucca Mountain repository. If the BRC does not understand this history, there is little hope that the next repository will be sited and developed without undue risks to future generations.[1]

Much is made in the opening pages and throughout the report of a "consent-based, adaptive, and phased approach" for developing geologic disposal options. *See* discussion at vi of Draft Report. While we agree with the general thrust of such a conceptual framework for developing repositories, we reiterate the comments we made in July of this year that any such "consent-based" process will enjoy a far higher probability of success in concert with a simple, but profound change in the law. As the Report acknowledges but fails to meaningfully discuss, current federal law, including aspects of the Atomic Energy Act, has the effect of preempting almost all forms of state regulation over a high level waste facility and, indeed, over radionuclides in general. This Commission should recommend that Congress commence hearings to once and for all remove the Atomic Energy's exemptions for radionuclides from our water and hazardous waste laws. We will discuss this matter in some more depth later, but suffice to say that these anachronistic exemptions from environmental law are at the heart of state and public distrust of both government and commercial nuclear facilities. The BRC has made several suggestions in this draft report that could build a better nuclear waste management system, but we submit that decades from now we will return to the same predicament (no matter how improved the architecture of said system) unless the States are provided with meaningful regulatory authority under existing environmental laws.

NRC WASTE CONFIDENCE PROCEEDING

The BRC acknowledges the import of the NRC's Waste Confidence proceeding and notes that NRDC has sued the NRC over its most recent Waste Confidence Decision (WCD) in the U.S. Court of Appeals for the D.C. Circuit. *See*, pp. 27, 28 of Draft Report. That litigation is underway and the pleadings speak for themselves.

[1] "How Safe is Yucca Mountain?" Cochran, Thomas B. Symposium - Uncertainty in Long Term Planning - Nuclear Waste Management, a Case Study. (Vanderbilty University, http://docs.nrdc.org/nuclear/files/nuc_08010701A.pdf, 2008)

However, in order to inform the BRC and complete the record in this proceeding, some of our objections to the NRC's WCD are as follows. We have argued to the DC Circuit that the WCD is a generic licensing decision that permits the generation of spent nuclear fuel (SNF) by nuclear reactors based on a finding of "confidence" that safe disposal of the SNF will be possible at some time in the future. But for the WCD, the NRC would not issue reactor licenses, as the agency itself has stated. As a licensing decision, the WCD violates the National Environmental Policy Act (NEPA) because the NRC has failed to prepare an Environmental Impact Statement (EIS) that examines the risks of radioactive releases from an SNF repository, the costs of containing SNF, or the disposal-related environmental impacts of a potentially indefinite delay in the siting of a repository.

We contend that the NRC violates NEPA by failing to analyze the effects of societal and political opposition to repositories on the environmental impacts of SNF disposal. Under NEPA, it is insufficient for the NRC merely to state that repositories will be available "when necessary," without evaluating how long it may take and the impacts that may occur if storage goes on beyond a time period that is reasonable for relying on institutional controls, such that storage becomes de facto disposal. And finally, we have argued that the WCD establishes a schedule for reviewing its findings that is so unreasonably attenuated that it violates the law. Given the fundamentally predictive nature of the WCD, the open-ended schedule for subsequent reviews violates NEPA's requirement that agencies must continue to examine the environmental impacts of their decisions, even after the decisions are initially approved.

INTERIM & DRY-CASK STORAGE

> *First, we recommend that **the United States proceed promptly to develop one or more consolidated interim storage facilities**... [p. 36]*

The NRDC disagrees that multiple sites would be required. We see no need or justification for more than one government consolidated interim storage facility in the United States. As indicated in Table 1 of the Draft Report, the current total stranded spent fuel (SF) could be accommodated in approximately 300 casks. Even twice this amount could be accommodated in a single hardened building the size of the Ahaus facility in Germany. A single site the size of the chemical processing area at La Hague in France could accommodate more than 100,000 tonnes (t) of SF stored in dry casks storage, assuming 0.5 t SF/m^2. The development of multiple facilities would be an unnecessary expense considering the numerous other high-priority issues that exist relating to the safe handling of the already present waste.

Current practice at U.S. reactor sites involves allowing the spent fuel pools to be filled to near capacity, with most pools containing five times as much fuel as the reactor itself. We dissent from the Commission's politicized conclusion that it sees "no unmanageable safety or security issue associated with current methods of storage (dry or wet) at existing sites in the United States." This counter-factual conclusion is not borne out by the post-9/11 National Academy study of spent fuel storage,[2] or by the

[2] *Safety and Security of Commercial Spent Nuclear Fuel Storage*. Board of Radioactive Waste Management, National Research Council of the National Academies (2006)

recent post-Fukushima nuclear safety reviews at U.S. reactors that reveal very significant deficiencies in back-up spent fuel cooling and instrumentation capability under the conditions of a station black-out. For BWRs, supplying emergency make-up water to a boiling pool inside the secondary containment can itself threaten, via excess heat and condensation, the performance of other critical reactor safety systems, and the elevated pools themselves are vulnerable to structural damage and debris from hydrogen explosions in a severe accident scenario, as occurred during the Fukushima accident. Unprotected or lightly sheltered spent fuel pools outside containment are vulnerable to disabling of their cooling systems in a severe natural event -- such as a tornado, earthquake, fire, or flood -- and to direct destruction via a terrorist attack with hijacked aircraft or high explosives. None of the above enumerated threats can be considered "well-managed" under current NRC regulations or current independent licensee efforts. The Committee should significantly revise or withdraw this flawed statement.

> *Second, we urge **vigorous, ongoing efforts by industry and by the appropriate regulatory authorities to ensure that all near-term forms of storage meet high standards of safety and security for the multi-decade-long time periods that they are likely to be in use.** [p. 36]*

While NRDC agrees with the overall concept proposed in this statement, the language is weak and tends toward comforting platitudes, as the Report cites no evidence for why continued over-reliance on densely-packed wet storage should be accepted as adequate. Instead, the Report should call for movement of spent fuel from wet pools to dry casks as soon as practical, i.e., as soon as the SF has cooled sufficiently to permit safe dry cask storage, generally about five years. With less fuel in the pool, an accident scenario in which cooling is lost would be less problematic through the extended time allotted by the slower boiling rate in the lesser-filled pools. The practice of hardened dry-cask storage also poses clear benefits in terms of the mitigation of an accident, terrorism-related or otherwise, that could lead to the release of radiation. With less fuel present in the pool, the release source term is obviously also smaller. Additionally, the Report should recommend other measures to increase the safety of wet pool storage, which has been one focus of the NRC Near-Term Task Force following the Fukushima disaster.

A CONSENT-BASED APPROACH & A FUNDAMENTAL CHANGE IN LAW

As we noted in our July comments on the Draft Disposal Subcommittee Report to the Full Commission, the full BRC tip toes up to a line that it should boldly walk across. Specifically, we refer to the role of the local, state and tribal governments in the BRC's prescription for a successful repository program. We fully support the concepts embodied in the five qualities suggested by the BRC for developing a successful approach:

(1) Consent-based—in the sense that affected communities have an opportunity to decide whether to accept facility siting decisions and retain significant local control.

> (2) Transparent—in the sense that all stakeholders have an opportunity to understand key decisions and engage the process in a meaningful way.
> (3) Phased—in the sense that key decisions are revisited and modified as necessary along the way rather than being pre-determined.
> (4) Adaptive—in the sense that process itself is flexible and produces decisions that are responsive to new information and new technical, social, or political developments.
> (5) Standards- and science-based—in the sense that the public can have confidence that all facilities meet rigorous, objective, and consistently-applied standards of safety and environmental protection. [p. 56]

These aspirations are both laudable *and* necessary in light of the history of spent fuel and high-level radioactive waste disposal programs. As the BRC is aware, much of the difficulty of finding workable disposal solutions for nuclear waste can be traced to inherent tensions that exist in federal, state and tribal regulatory relationships. Several parties could waste time arguing about the origins of those inherent tensions, but none could deny the existence of such disputes. And without fundamental changes in the law to address that federal, state and tribal tension, we will never approach closure on transparent, phased, and adaptive decisions. Indeed, we suggest that decades from now little will have changed and the disputes will continue unchecked unless the BRC avails itself of the opportunity to finally suggest a decades-overdue change in the law that the BRC itself acknowledges and articulates in the text. The Draft Report states in pertinent part:

> We also recognize that defining a meaningful and appropriate role for states, tribes, and local governments is far from straightforward, given that the Atomic Energy Act of 1954 grants the federal government exclusive authority to regulate the possession and use of all radioactive materials, including wastes. Nevertheless, we believe it will be essential to affirm a role for states, tribes, and local governments that is at once positive, proactive, and substantively meaningful without increasing the potential for further conflict, confusion, and delay. [p. 68]

A meaningful and appropriate role for States can and must be made straightforward. How can this be done? Such a change can be accomplished by amending the Atomic Energy Act to remove its express exemptions of radioactive material from environmental laws. The exemptions of radioactivity make it, in effect, a privileged pollutant. Exemptions from the Clean Water Act and the Resource Conservation and Recovery Act (RCRA) are at the foundation of state and, we submit, even fellow federal agency distrust of both commercial and government-run nuclear complexes.

As the BRC is aware, most federal environmental laws expressly exclude "source, special nuclear and byproduct material" from the scope of regulation by EPA or the states, leaving the field to the DOE and the NRC. In the absence of clear language in those statutes authorizing EPA, or states where appropriate, to regulate the environmental and public health impacts of radioactive waste, DOE retains broad authority over its radioactive mess, with EPA and state regulators only able to push for stringent cleanups on the margins. Indeed, the Draft Report's discussion of the WIPP facility and the State of New Mexico's efforts to regulate aspects of the facility under RCRA is mentioned as a critical positive element

in the development of the currently active site. The NRC also retains far reaching safety and environmental regulatory authority over commercial nuclear facilities, with agreement states able to assume NRC authority, but only on the federal agency's terms.

As we noted in our July comments, states are welcome to consult with the NRC and the DOE, but the agencies can, and will, assert preemptive authority where they see fit. It's happened time and again at both commercial and DOE nuclear facilities. Continuing this outdated regulatory scheme is at the heart of the distrust that has poisoned federal and state relationships involved in managing and disposing of high-level radioactive waste (HLW) and spent nuclear fuel.

If EPA and the States had clear legal authority and could treat radioactivity as they do other pollutants under environmental law, clear cleanup standards could be promulgated, we could be much farther along in cleaning up the toxic legacy of the Cold War, and we could likely avoid some of the ongoing legal and regulatory disputes over operations at commercial nuclear facilities. Any regulatory change of this magnitude would have to be harmonized with appropriate NRC licensing jurisdiction over facilities and waste and EPA's existing jurisdiction with respect to radiation standards, but such a process is certainly within the capacity of the current federal agencies and engaged stakeholders. Some states would assume jurisdiction over radioactive material, others might not. But in any event, substantially improved clarity in the regulatory structure and a meaningful state oversight role would allow, for the first time in this country, consent-based and transparent decisions to take place on the matter of developing geologic repositories.

FEDERALLY CHARTERED WASTE MANAGEMENT ORGANIZATION & FUNDING

We do not have enough information to fully articulate a position on the BRC's proposal for a single purpose federally chartered corporation focused on the development of a repository as well as its access to the Nuclear Waste Fund, but we have several observations to share. First, the failures of the Atomic Energy Commission and its successor agencies (Energy Research Development Agency, the Department of Energy and the Nuclear Regulatory Commission) make a clear case that an alternative should be considered. However, we note that any such corporation must be clearly subject to all of the nation's environmental laws including the National Environmental Policy Act, 42 U.S.C. § 4321, *et seq.*

It has long been NRDC's view that independent oversight is critical to safe and environmentally sound operation of DOE nuclear weapons production facilities and commercial nuclear facilities regulated by the NRC. It must be clear that any federally chartered corporation responsible for siting, developing, operating and ultimately closing geologic repositories for commercial and defense spent fuel and HLW not be responsible for alternative (i.e., closed) fuel cycle research or other reactor developments. Additionally, we are opposed to any use of the Nuclear Waste Fund to support development or deployment of reprocessing and fast-reactor technologies. The separation must be unequivocal and clear. Separating responsibility for waste management/disposal from other fuel cycle functions is key to garnering support and public trust from NRDC and many others.

ADVANCED FUEL CYCLES, REPROCESSING, & FUTURE RESEARCH

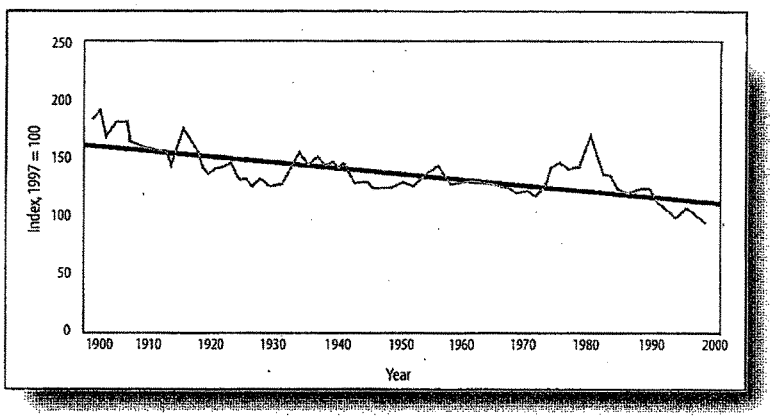
> *... [W]e cannot be sure today of the national and global context that will determine which nuclear fuel cycle technologies and systems will be considered for use in the future. Concerns over global climate change and greenhouse gas emissions, the cost and sustainability of alternatives to nuclear power, and any number of other factors may appear very different to future generations than they do to us today. The integrated and flexible strategy that we propose for nuclear waste management puts a premium on creating and preserving options that could be employed by future generations to respond to the particular circumstances they face. RD&D is a key to maximizing those options. [p. 112]*
>
> *Thus, it is impossible at this time to distill quantitative comparisons across alternative nuclear energy systems and then draw definitive conclusions based on those comparisons. [p. 115]*

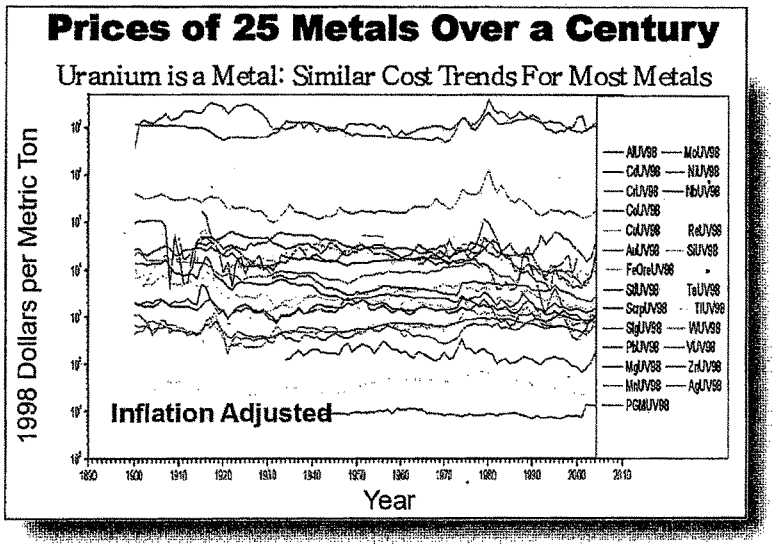
These statements are largely inaccurate and imply that we cannot make reasonable judgments regarding risks and benefits of various fuel cycle options and therefore should pursue everything, which of course is not the case. The analysis of advanced fuel cycle technologies contained in the Draft Report is inadequate, and the broad sweeping conclusions are not supported by a more rigorous comparison of current once-through versus advanced closed fuel cycles. As evidenced below, one can determine the relative attractiveness and economic outlook of various reactor and fuel cycle concepts and the likelihood that various options will be implemented in the United States. Consequently, rather than promoting a large R&D program covering a wide range of alternative fuel cycles, one can narrow the options and focus on those that are most promising. Given that there is no closed fuel cycle that can economically compete with the current open cycle, the government R&D funding should be prioritized to support technologies that can mitigate climate change in the near-term at the least cost. This would exclude government funded R&D on closed fuel cycles.

With regard to fuel cycle costs and sustainability, please consider the following:

1. For all significant minerals, the historical trend in the cost (in constant dollars) has been roughly flat or declining over the past 100 years. Appendix 5.E, Figure A-5.E.2 reproduced below.[3] The figure shows the composite mineral price index for 12 selected minerals, 1900 to 1998, in constant 1997 dollars.

[3] *The Future of Nuclear Power.* Massachusetts Institute of Technology (2003)

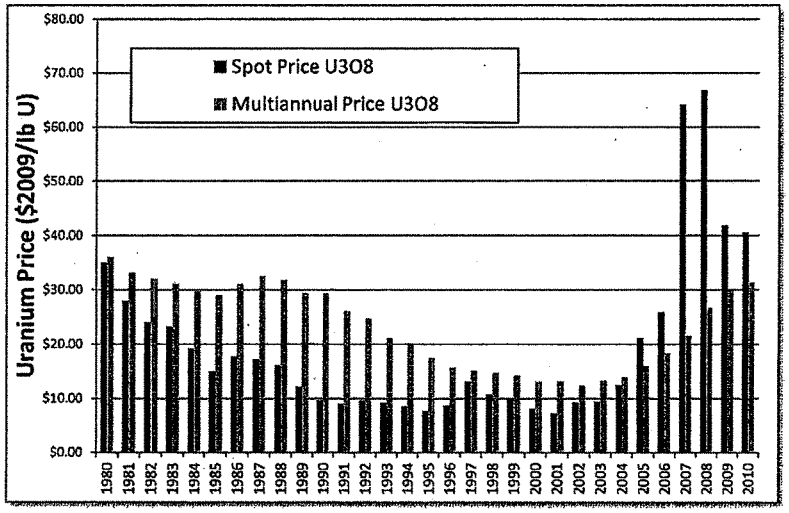




As part of its more recent uranium resource analysis, the MIT Fuel Cycle Study Group presented a graph showing the price history of 25 separate minerals over a century in constant dollars, shown above. These relatively flat trends in the inflation adjusted cost of mineral extraction

were known some 35 to 40 years ago to mineral economists.[4] They reflect the fact that for virtually all major minerals, improvements in the efficiency of extraction outpaces depletion of the resource.

2. The constant dollar average cost of uranium has experienced a couple of short-term increases in price due to short-term market fluctuations, but the long-term trend in constant dollar average cost of uranium has remained relatively flat, like other minerals. In the figure below, we show that the price of long-term uranium supply contracts for members of the European Atomic Energy Community (Euratom)[5] has remained fairly stable over a 30-year period from 1980 to 2010, and exhibits no discernible long-term upward trend. While uranium "spot prices" -- short-term cash market transactions for immediate delivery – exhibit a wider range, these transactions typically account for only about 15% of the uranium market, and likewise show no long term persistent upward trend.



Comparing these long-term contract costs to even older price schedules from the 1960s, we see that the price of uranium ore (U_3O_8) was $4.73 per pound according to a price schedule (expired in 1962) from the Atomic Energy Commission.[6] In present-day dollars, this comes to an equivalent $34 per pound of high-grade ore, which further illustrates that the cost of uranium

[4] *Trends in Natural Resource Commodities*. Potter, N. and Christy, Jr., F. (Johns Hopkins Press, 1962)
[5] *Euratom Supply Agency Annual Report 2010*. Euratom (European Union, 2011)
[6] *The Atomic Energy Deskbook*. Hogerton, John F. (Reinhold Publishing Corporation, 1963) p. 588.

has not dramatically changed in the manner that would substantiate arguments for closed-cycles over resource utilization based on these costs.

Additionally, the historical trend in the constant dollar cost of separative work has been downward, and because there is ample room for efficiency improvements in the processes for enriching uranium, this downward trend is likely to continue.

3. **Consequently, the constant dollar cost of LWR O&M costs (including fuel cost) is likely to continue to be flat or trend downward.**
4. The cost of O&M for closed fuel cycles is currently higher than the O&M cost for the once-through cycle and this is unlikely to change in the foreseeable future.
5. In another MIT study[7], the work concluded, "[t]here is no shortage of uranium resources that might constrain future commitments to build new nuclear plants for much of this century at least."
6. **Consequently, the once-through LWR fuel cycle is can clearly be "sustained" globally for 100 years or more, and there is no need to invest significant government funds now in partially-closed or fully-closed fuel cycles to meet a "sustainability" objective.**
7. R&D on partially closed and fully closed fuel cycles carries very high proliferation risks if carried out in some non-weapon states that rely on nuclear power or plan to rely on nuclear power. Consequently, engaging in R&D on these technologies in the United States, because it encourages other states to follow the U.S. lead, carries societal—namely, proliferation—risks.
8. The capital cost of a liquid metal fast power reactor is on the order of 20 to 50% higher than the capital cost of a LWR.
9. **Consequently, it is highly unlikely that liquid metal fast-spectrum reactors will be economically competitive with LWRs operating on a once-through fuel cycle for the foreseeable future. Therefore, there is no need to invest significant government funds in liquid metal fast-spectrum reactors in the foreseeable future.**

An often neglected discussion, including in this report, is how future fuel cycle initiatives can reduce frequently ignored environmental externalities, such as the land and water resource damage caused by uranium mining and milling at the "front end" of the fuel cycle? These holistic considerations must be factored into comparative cost estimates in order to pave the way for a meaningful public dialogue over the future of the U.S. nuclear power infrastructure that serves to clarify rather than obscure the important environmental, waste management, and nonproliferation policy tradeoffs involved in different nuclear fuel cycle options. For example, the goal of minimizing front end environmental harms by significantly reducing mined uranium requirements, via economically practical actinide recycling, is indeed a laudable one, but it must be weighed against the increased production of low-level and intermediate wastes from spent fuel reprocessing, dramatically higher costs, and the attendant proliferation risks.

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[7] *The Future of the Nuclear Fuel Cycle*. Massachusetts Institute of Technology (2010)

The Draft Report fails to advance a comprehensive values framework or matrix for making these complex comparisons and tradeoffs. The Report should explicitly call for incremental nuclear fuel cycle improvements that stand on their own as potential contributions to overall environmental sustainability but fall far short of the holy grail of "closing the fuel cycle," for example by urging research into technologies that would reduce the footprint of uranium mining, such as co-extraction of uranium from *already mined* phosphates, and extraction from sea water, to name a few.

We note that there is no meaningful discussion of the proliferation risks in the international arena associated with the United States pursuing some of these advanced fuel cycle technology options, when we know non-weapon states of concern will use the U.S. research efforts to justify their own R&D programs that carry a high proliferation risk. This situation is not a supposed possibility but is actually playing out in the South Korean reprocessing programs that U.S. nuclear technical cooperation and training has fostered, such as the Atomic Vapor Laser Isotope Separation (AVLIS) experiments conducted in the late 90s or the more recent pyroprocessing program. The Draft Report goes so far as to attribute the "potential for societal benefits" to a number of these unproven and risky technologies.

REBALANCE RESEARCH EFFORTS TO IMPROVE ONCE-THROUGH FUEL CYCLE

> *... [N]o current available or reasonably foreseeable reactor and fuel cycle technology developments—including advances in reprocess and recycle technologies—have the potential to fundamentally alter the waste management challenge this nation confronts over at least the next several decades, if not longer. [p. 113]*

NRDC shares this view, and we urge that this sentiment be extended to decisions on research funding and underlying policy objectives for the U.S. R&D infrastructure, which includes national laboratory directives as well as associated university funding priorities. Unfortunately, the Report concludes this same section by suggesting that "RD&D should continue on a range of reactor and fuel cycle technologies, described in this report, that have the potential to deliver societal benefits at different times in the future." This wording, similar to other sections in the Report, is weak and side-steps any opportunity to provide informed, common-sense recommendations on restructuring the focus of various research institutions within the federal government, and in the same breath, endorses an ineffectual license to pursue anything and everything related to future nuclear fuel cycle technology.

This misdirection is reinforced by the failure to come to grips with the fact that the vast bulk of DOE's civil nuclear RD&D funding goes to sustain a wide array of legacy infrastructure and staff organized in an inefficient and duplicative network of civil nuclear fuel cycle research laboratories (Idaho, Argonne, PNNL, and Oak Ridge, with occasional contributions from the three nuclear weapons laboratories and Brookhaven). Along with non-competitive nuclear economics (without carbon accounting) vis a vis polluting carbon-based fuels, this structural legacy of nuclear state socialism is a major reason why the United States lags in the development and deployment of commercially viable nuclear power technologies with improved safety, greater capital and fuel efficiency, and reduced environmental impacts.

The Committee bemoans the loss of U.S. technology leadership in the global nuclear power arena, but in fact suggests no meaningful steps to address it, and winds up endorsing a continuation of the status quo – broad-based advanced nuclear fuel-cycle research, unmoored from any plausible market-relevant applications, conducted by the current array of duplicative legacy research institutions –while U.S. utilities continue to lead all U.S. industrial sectors in how *little* of their own funds they invest in RD&D of new energy technologies.

Section 10.3 is titled, "The Case for Continued Public and Private Investment in Nuclear Energy R&D and the Status of the Current DOE Program," but actually only discusses the case for continued *public* investment, neglecting both a critique of the historical ineffectiveness of the DOE/NE RD&D program and any discussion of a plausible method for leveraging more private industry investment in nuclear energy RD&D. A serious attempt to restore U.S. nuclear technology leadership would tie the vast bulk of DOE's nuclear technology research – with the exception of university research and training funds – to a 49/51 cost-sharing approach with industry and/or utilities, in which the commercial enterprises have the majority "skin-in-the-game," and there are clear "off-ramps" for the government's minority participation when specific technology advances and cost milestones are not achieved within defined timeframes relevant to the evolving commercial energy marketplace.

When faced with the immediate task of averting catastrophic climate change by deploying efficient and sustainable low-carbon energy technologies within the next 30 years, spending hundreds of millions or billions of dollars in the near term to study speculative and costly closed fuel cycles, which offer no definitive waste management advantages until they reach "equilibrium" 300 years from now, makes absolutely no sense to us. Such a course will do nothing to remedy the ills that have befallen the U.S. nuclear power effort – on the contrary, it will only prolong them. Indeed, at other points in the narrative, the Committee shows an awareness that "with federal discretionary budgets under increasing pressure, the ability to articulate a clear direction or agenda for the U.S. nuclear energy R&D program, to prioritize elements of that agenda, and to set performance objectives and evaluate the effectiveness of related activities on an ongoing basis, will obviously be critical." (BRC Draft Report, p. 121). But the actual policy recommendations of the report fall far short of, and even run counter to this critical insight.

Rather than perpetuating a disproportionate allowance for technologies that have not been proven commercially viable over the six decades in which they have been pursued, the BRC should take this opportunity to suggest a rebalancing of the priorities of the nuclear engineering research infrastructure to support those technologies that actually have the potential to improve the current (and preeminent for the foreseeable future) once-through uranium cycle. Continuing to spend our way to the end of an advanced-cycle "nuclear rainbow" will not resonate with the American public or rational policy makers, when known vulnerabilities exist in the current system regarding severe accidents, such as that which occurred at Fukushima Daiichi.

One such vulnerability is that of hydrogen production within reactor containments following a severe accident and/or station blackout. If the industry and NRC are taken at their word, it is only logical to

conclude that we do not know enough about the progression of accident sequences in the context of hydrogen production rates, and the catastrophic consequences if the produced hydrogen is detonated. During a September 8, 2011 meeting of the Advisory Committee on Reactor Safeguards ("ACRS"), committee member Dana Powers was quoted as follows in reference to events of the Japanese reactor explosions:

> *Not only do we have hydrogen -- we've got hydrogen detonations. And detonations are just extraordinarily hard to get. I mean, even when you do them in an experiment, you have a tough time doing a detonation because of the ignition problem. And we got them, and it just strikes me that gee, how much information do I need to know about specifically Fukushima. I got hydrogen. I see lots of ways of getting hydrogen. Go take care of it. We did it for Mark IIIs, why can't we do the same things for ones and twos. It's obvious that inerting is just not enough.*
>
> (*See* http://pbadupws.nrc.gov/docs/ML1125/ML11256A117.pdf, p. 95)

Internationally, the issue of hydrogen mitigation is taken very seriously. The level of resources and research given to this field makes the U.S. fleet appear out of step with current trends in reactor safety engineering. Within this particular knowledge gap exists multiple opportunities for worthwhile funding including but not limited to:

- Development of safer cladding materials, such as silicon carbide, which are not susceptible to the dangerous hydrogen-producing reactions of current cladding materials. Additionally, these new materials exhibit properties that could sustain increased core burnup, thus, improving fuel utilization and plant efficiency.
- Much-needed modeling using novel computational fluid dynamics methods to simulate the production and transport of hydrogen within these complex reactor system volumes.

Other research avenues could include: improvements in the efficiency of air-cooled reactor heat exchangers, to reduce consumptive use and thermal pollution of inland and estuary water resources for reactor cooling; and studying the viability and implementation of thorium and denser uranium metal fuels in commercial LWRs as well as the further development of small modular reactors (which the BRC does suggest).

In particular, DOE should be tasked now with a detailed economic modeling effort to develop a correct understanding of the scale and rate at which various proposed SMR types would need to be produced and deployed in order to compete favorably with large LWRs and other electricity generation technologies likely to enter the market in the same time frame. While there is much current enthusiasm for the potential benefits of SMRs among political and policy circles in Washington, we have encountered severe skepticism among utility executives regarding the future economic viability of SMR power plants. A major effort should be made to parameterize the likelihood that SMRs can be a fruitful avenue for the future deployment of low-carbon electricity, or an economic dead end.

This more focused research agenda will continue to provide support for basic science research at both the national laboratory level as well as university partnerships, but with the gained benefit of improving the safety and efficiency of the *current* and plausibly deployable commercial reactor fleet as well as promoting systems that leverage the uranium cycle's strengths to bring more affordable systems to the market (e.g., small modular LWRs). NRDC agrees with the BRC in its suggestion that the DOE's nuclear energy R&D Roadmap should provide "more detailed, frequently updated and transparent research and implementation plans."

Finally, the Report suggests that 5 to 10 percent of total federal funding for reactor and fuel cycle technology be directed to the NRC to support the development of a regulatory framework for advanced nuclear energy systems. Considering that this is a substantial request, the Report should be very clear about the overall intent of this funding. Related to previous comments, the NRC should not be in the business of envisioning regulatory frameworks for "novel" energy systems if those systems are known to be economically unrealistic and largely irrelevant for the next several decades, e.g., fast-spectrum reactors and reprocess/recycle operations. If this support is within the context of bringing potential commercially viable improvements to the current and next generation fleet of reactors, then NRDC can agree that some effort should be expended to ensure that the time required for the NRC licensing process to perform its indispensable nuclear safety function does not unduly lengthen the time to deployment of these innovations. However, we see no point in diverting resources to development of a premature regulatory framework in the vain hope of lowering commercial investment barriers to systems that at a fundamental level have proven too risky for investment and offer no foreseeable economic benefit over the current market.

EDITORIAL COMMENTS

P. 1, Paragraph 5: "Substantial amounts of radiation..." should read "Substantial amounts of radioactive materials..."

P. 13, BOX GRAPHIC: This chart of "average exposures," while true, is terribly misleading in that the exposures from medical procedures, dominated by CT scans is to a limited population, mostly adults, with medical conditions, where the diagnostic benefits of the exposures ostensibly offset the risks. Moreover, the Report should indicate that based on a best estimate of risk using BEIR VII, Phase 2 (2006), on the order of one in five Americans will get cancer from this level of exposure and roughly one half of these will be fatal.

P. 14, Paragraph 3: We recommend adding, "The reader is cautioned that activity alone is not an appropriate unit for measuring risk, or comparing the relative risk, to human health."

P. 21, BOX GRAPHIC: The Report should mention that approximately one-half the TRU waste—most of that produced prior to 1972—is not destined to be disposed at WIPP, but will remain in shallow land burial grounds at DOE sites. The TRU that has been sent to WIPP is not based on rational risk assessments.

If you have questions, please do not hesitate to contact us at (202) 289-6868. Thank you for considering our views on these important matters.

Sincerely,

Geoffrey H. Fettus
Senior Project Attorney

Christopher Paine
Director, Nuclear Program

C. Jordan Weaver, Ph.D.
Program Scientist

Senator CARPER. Thank you so much.
Mr. Wright, please proceed.

STATEMENT OF DAVID WRIGHT, PRESIDENT, NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS, AND VICE CHAIRMAN, PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

Mr. WRIGHT. Good morning, Chairman Carper, Ranking Member Barrasso, Senator Udall, and other Subcommittee members as they come in.

Thank you for the opportunity to appear before you today. My name is David Wright, and I am a Commissioner with the South Carolina Public Service Commission, and I invite you to Myrtle Beach, to the beaches around Hilton Head and Charleston, South Carolina.

[Laughter.]

Mr. WRIGHT. I also have the privilege of serving as the President of the National Association of Regulatory Utility Commissioners, otherwise known as NARUC, on whose behalf I am speaking this morning.

NARUC is a quasi-government, non-profit organization founded in 1889. Our membership includes the public utility commissions serving all State and U.S. territories. NARUC's mission is to serve the public interest by improving the quality and effectiveness of public utility regulation. Our members regulate the retail rates and services of electric, gas, water, and telephone utilities.

We are obligated under the laws of our respective States to assure the establishment and maintenance of such utility services as may be required by the public convenience and necessity to assure that such services are provided under rates and subject to terms and conditions of service that are just, reasonable, and non-discriminatory.

NARUC and State utility commissions in 40 States served by nuclear generated electricity have been involved in the troubled history of nuclear waste disposal since 1983. That is when the utilities which own used fuel were required by the Nuclear Waste Policy Act to enter into contracts with the Department of Energy. Those contracts called for payments of fees for nuclear generated electricity into the Treasury for deposit into the Nuclear Waste Fund to pay for cost of disposal of the used fuel beginning in 1998. As you know, that disposal has not happened. But the fee payments continue to be made. Or as a former Florida utility commissioner summarized the status in 1991, the Government has our money; we have their waste.

It is now 20 years or more later, and the used fuel remains in indefinite storage at 72 sites in 34 States all across the United States. Utility commissioners care because the utilities pass the cost of these fees to their customers through the electric bill.

Notwithstanding our position on the Administration handling of the Yucca Mountain issue, NARUC was closely involved in the work of the Blue Ribbon Commission. We wrote letters, gave testimony, provided comments, and attended most of the public meetings. We were impressed with the panel's distinguished members, their approach to the task, the talented professional staff, and the

sincere interest in public input. We have asked DOE to preserve and maintain access to the Commission Web site.

As for the recommendations, while we welcome them all, we have the following points. First, reform the Nuclear Waste Fund. Reform of the Fund is essential for most of the recommendations to occur. Next, regardless of what happens with Yucca Mountain, we need another repository. The lessons of Yucca and the better lessons of Finland, Sweden, and WIPP suggest that consent-based siting approach may get better results but will require patience.

We have long favored consolidated interim storage but found the report vague as to quantity, duration, and cost. We are not sure what the effect will be on the fee if the Nuclear Waste Fund is to be used to pay for storage. We agree with the concept and benefits of a new Federal corporation that can focus solely on the waste management mission, hopefully with a fresh partnership attitude for encouraging the consent-based approach. We look forward to refining the concept in enabling legislation. Transportation planning and coordination with States and others cannot begin soon enough.

Finally, we commend the BRC January 2012 report for specifying that the proposed consent-based approach to siting future repositories must be adaptive in the sense that the process itself is flexible and produces decisions that are responsive to new information and new technical, social, or political developments.

Certainly future siting efforts will have to account for a widely divergent demographics populations as well as unique proposed repositories, topologies, and geologies. Since one size certainly does not fit all in this context, NARUC agrees that flexibility in approach is a necessary prerequisite to future siting initiatives. Moreover, the time is not right to commit to a reprocessing strategy as an economic proposition, although R&D should continue as the BRC recommends. Also, we encourage DOE to take steps to seek volunteer host communities to step forward in storage siting without waiting to form a new management organization.

There are two areas where we disagree with the Commission report. The report says overall we are confident that our waste management recommendations can be implemented using revenue streams already dedicated for this purpose. There are no cost estimates to substantiate that belief, which likely also assumes the $26.7 billion in the Nuclear Waste Fund is assured.

The report further says, "We know what we have to do, and we know we have to do it, we even know how to do it." While we may wish that were true, our assessment is that there are too many people who are probably content to pass the problem along to future generations and leave the waste where it is. It is fitting for the Commission to call for prompt action, developing both consolidated interim storage and beginning the search for a new repository. But we may need the public education outreach to help persuade some who seem to favor the no-action alternative. Continuing to kick the dry cask down the road should not be an option.

So yet another study calls for prompt action, yet despite, on paper at least, a financing plan, implementation relies on leadership from the Administration and Congress. NARUC stands ready to assist on behalf of the ratepayers who may not realize that they are overpaying for safe waste disposition.

Thank you.
[The prepared statement of Mr. Wright follows:]

BEFORE THE
UNITED STATES SENATE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY

TESTIMONY OF THE HONORABLE DAVID A. WRIGHT
PRESIDENT, NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS
COMMISSIONER, SOUTH CAROLINA PUBLIC SERVICE COMMISSION

ON BEHALF OF THE
NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS

ON

"Recommendations from the Blue Ribbon Commission on America's Nuclear Future for a Consent-Based Approach to Siting Nuclear Waste Storage and Management Facilities"

June 7, 2012

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Good Morning, Chairman Carper, Ranking Member Barrasso, and Subcommittee Members. Thank you for the opportunity to appear before you today.

My name is David Wright. I am a commissioner with the South Carolina Public Service Commission and I serve as President of the National Association of Regulatory Utility Commissioners (NARUC), on whose behalf I am speaking this morning. I appreciate the opportunity to present NARUC's views on the subject of the disposition of spent or used nuclear fuel from commercial nuclear power plants.

NARUC is a quasi-governmental, non-profit organization founded in 1889. Our membership includes the public utility commissions serving all States and territories. NARUC's mission is to serve the public interest by improving the quality and effectiveness of public utility regulation. Our members regulate the retail rates and services of electric, gas, water, and telephone utilities. We are obligated under the laws of our respective States to assure the establishment and maintenance of such utility services as may be required by the public convenience and necessity and to assure that such services are provided under rates and subject to terms and conditions of service that are just, reasonable, and non-discriminatory.

NARUC and State utility commissions in 40 States served by nuclear-generated electricity have been involved in the troubled history of nuclear waste disposal since 1983. That is when the utilities, which own the used fuel, were required by the Nuclear Waste Policy Act to enter into contracts with DOE. Those contracts called for payments of fees for nuclear-generated electricity into the Treasury for deposit into the Nuclear Waste Fund to pay for the cost of

disposal of the used fuel beginning in 1998. As you know, that disposal has not happened, but the fee payments continue to be made. Or, as a former Florida utility commissioner summarized the status in 1991, "The government has our money—we have their waste." It is now over 20 years later and the used fuel remains in indefinite storage at 72 sites in 34 States all across the United States. Utility commissioners care because the utilities pass the cost of the fees to their customers through their electric bill. Because of the government's failure to move this program forward, customers, through their rates, have had to pay more to cover the cost of re-racking of the utility spent fuel pools to accommodate more spent fuel, more to cover the costs of on-site dry cask storage, and more to cover the costs of increased security and monitoring. All taxpayers, through the Judgment Fund, continue to pay damages for the lawsuits brought to date (damages which already total $2 billion as of December 2011 according to Table 2 in the Blue Ribbon Commission's Final Report) and to be responsible for the damages that continue to accrue and will be the subject of future lawsuits.

NARUC followed the slow progress of the civilian radioactive waste management program as it met a variety of setbacks and advances, exacerbated by chronic budget cuts even as the illusion of a multi-billion dollar corpus grew in the Nuclear Waste Fund. A significant milestone was met in 2002 when Congress passed the joint resolution approving Yucca Mountain as the site for the geologic repository, subject to the Department of Energy obtaining a construction license from the Nuclear Regulatory Commission. The next setback was the court remand to the Environmental Protection Agency to revise the regulation setting the radiation standard for the facility. Finally, DOE submitted the license application in June 2008. The NRC

began its review of the 8,000-page application for the first-of-a-kind facility which was expected to take three to four years.

In 2009, the Administration pronounced Yucca Mountain not to be a "workable option" and that it intended to terminate the repository development. In March 2010, DOE asked the NRC's Atomic Safety Licensing Board for permission to withdraw the application with prejudice. In June of that same year, the ASLB rejected the request, ruling that once a valid license application was submitted under the NWPA, the NRC was required to review and act upon the application. The decision was appealed to the NRC.

While the NRC was disposing of the license matter, the President directed that the Secretary of Energy appoint the Blue Ribbon Commission on America's Nuclear Future (BRC) to consider and recommend a new strategy; a strategy that soon became a "post-Yucca" strategy.

In 2010, NARUC, and several other parties, petitioned the U.S. Court of Appeals for the District of Columbia Circuit challenging DOE's authority to withdraw the Yucca Mountain license application, but the case was dismissed because there had been no final agency action by the NRC on the appeal of the Board's decision rejecting DOE's request. After lengthy and unnecessary delays, the NRC Chairman ultimately released a decision. The NWPA mandates that once the Yucca Mountain license was submitted the NRC only had three years to complete the review proceedings. Those three years have expired. Currently, the NRC faces a mandamus action to force it to complete the required review in the Court of Appeals. NARUC is one of

several petitioners in that suit. Oral argument was held last month and we are hoping the Court will issue its decision soon, perhaps before Labor Day.

Just last week, another NARUC appeal resulted in a D.C. Circuit remand to the Secretary of Energy requiring DOE to justify the approximately $750 million it collects annually from the nuclear power industry for waste disposal given that DOE no longer plans to develop a depository at Yucca Mountain and has no existing Congressional sanctioned disposal alternative program. As the Court noted:

> Although the Act mandates that the Fund cover the lifetime costs of the civilian disposal program – estimated to last over a hundred years – any excess funds must be returned to the payors. Congress anticipated that costs would be uncertain and could well change as the program progressed, so the Secretary [is] obliged to "annually review the amount of the fees to evaluate whether collection of the fee will provide sufficient revenues to offset the costs as defined in subsection (d)."

The three judge panel specified that the DOE 2010 fee determination was "legally defective" and directed the agency to re-evaluate whether collection of the fee will provide too much or too little revenue to offset costs of the nuclear-waste disposal program – a program which – pending the restart of the Yucca Mountain License review – does not exist. The Court cited, with masterful understatement, DOE's "disposition to delay" as the basis for retaining jurisdiction of the case and requiring a DOE response within six months.

Notwithstanding our position on the administration's handling of this issue, NARUC was closely involved in the work of the Blue Ribbon Commission. We wrote letters, gave testimony, provided comments, and attended most of the public meetings. We were impressed with the panel's distinguished members, their approach to the task, the talented professional staff, and the

sincere interest in public input. We have asked DOE to preserve and maintain access to the Commission website.

As for the recommendations, while we welcome them all, we have the following points:

- Reform of the Nuclear Waste Fund is essential for most of the recommendations to occur.
- Regardless of Yucca Mountain, we need another repository. The lessons of Yucca and the better lessons of Finland, Sweden and WIPP suggest the "consent-based" siting approach may get better results, but will require patience.
- We have long favored consolidated interim storage, but find the Report vague as to quantity, duration, and cost. We are not sure what the effect will be on the fee if the Nuclear Waste Fund is to be used to pay for storage.
- We agree with the concept and benefits of a new federal corporation that can focus solely on the waste management mission, hopefully with a fresh partnership attitude for encouraging the consent-based approach. We look forward to refining the concept in enabling legislation.
- Transportation planning and coordination with States and others cannot begin soon enough.
- We commend the BRC January 2012 report for specifying that the proposed "Consent-Based Approach to citing" future repositories must be "adaptive" in the sense that the "process itself is flexible and produces decisions that are responsive to new information and new technical, social or political developments." BRC report at 47. Certainly, future siting efforts will have to account for widely divergent demographics/populations as well as unique

proposed repository topologies/geologies. Since "one-size-certainly-does-not-fit-all" in this context, NARUC agrees that flexibility in approach is a necessary pre-requisite to future siting initiatives.

Moreover, the time is not right to commit to a reprocessing strategy as an economic proposition, although R&D should continue, as the BRC recommends. Also, we encourage DOE to take steps to seek volunteer host communities to step forward in storage siting without waiting to form the new management organization.

There are two areas where we disagree with the Commission Report:

- The Report says: "Overall, we are confident that our waste management recommendations can be implemented using revenue streams already dedicated for this purpose." There are no cost estimates to substantiate that belief, which likely also assumes the $26.7 billion in the Nuclear Waste Fund is assured.
- The Report further says: "We know what we have to do; we know we have to do it, and we even know how to do it." While we may wish that were true, our assessment is that there are too many people who are content to pass the problem along to future generations and "leave the waste where it is." It is fitting for the Commission to call for prompt action developing both consolidated interim storage and beginning the search for a new repository, but we may need public education and outreach to help persuade some who seem to favor the "no action" alternative. Continuing to "kick the dry cask down the road" should not be an option.

So, yet another study calls for prompt action, yet despite (on paper) a financing plan, implementation relies on leadership from the Administration and Congress. NARUC stands ready to assist on behalf of the ratepayers who may not realize that they are overpaying for safe waste disposition.

Senator CARPER. Did you quote a Nuclear Regulatory or public service commissioner in Florida?

Mr. WRIGHT. I did. I believe it was Mike Wilson.

Senator CARPER. Correct me if I am wrong, I think you said that he may have said, the Government has our money; we still have our waste. I think that was the quote.

Mr. WRIGHT. Correct.

Senator CARPER. And I thought about that, and I thought maybe another way of thinking of it is, the Government has the ratepayers' money, and the utilities still cost via the waste created by their nuclear reactors. So I would look at it just maybe a little different.

Having said that, the status quo is not acceptable, and we have to be smarter than this. And we are going to be. Thank you.

Mr. WRIGHT. And I appreciate that, too, Senator. And I will tell you that I don't refer to it as nuclear waste myself. I refer to it as a nuclear resource.

Senator CARPER. That is good.

Mr. Howes, welcome.

STATEMENT OF ERIC HOWES, DIRECTOR OF GOVERNMENT AND PUBLIC AFFAIRS, MAINE YANKEE

Mr. HOWES. Good morning, Chairman Carper, Ranking Member Barrasso, Senator Alexander, Senator Udall.

I am Eric Howes, the Director of Government and Public Affairs at Maine Yankee. I appreciate the invitation to appear before you today on behalf of the Yankee companies, Maine Yankee, Connecticut Yankee, and Yankee Atomic in western Massachusetts.

We and our fellow sites that comprise the decommissioning plant coalition worked closely with the Blue Ribbon Commission to ensure it understood the unique impacts that our three sites and the six other permanently shut down reactor sites face. The Yankee Companies and others in the DPC especially endorse those BRC recommendations concerning permanently shut down plants that are most directly achievable: the prompt establishment of a voluntary incentive-based siting program that would lead to the licensing of a consolidated interim storage facility or facilities, the establishment of a first in line priority for the movement of spent fuel and other material being stored at permanently shut down reactor sites to those licensed consolidated storage sites, and the prompt initiation of programs to coordinated Federal, State, and local efforts to plan for the transportation of this material to consolidated storage and disposal facilities.

The Blue Ribbon Commission noted the success that we enjoy with our citizens advisory panels at the Yankee Companies that help demonstrate how a community-based process works to address issues in meaningful discussions that yield results. In summary, the Blue Ribbon Commission agreed that it makes no sense to keep this material at former reactor sites scattered around the nation. We believe that fiscal year 2013 efforts should even more aggressively advance the resolution of issues identified in the BRC report.

We are pleased to see that the Department has committed to restore funding for the regional transportation planning groups, is beginning site-specific assessments of the infrastructure, transpor-

tation readiness, procurement, and construction needs at each of these former reactor sites.

What is yet needed is the initiation of dialogue between the Government and a partnership of local communities, State governments, and industry in an effort to develop a consensus siting approach for both consolidated interim storage and future repository facilities. These are activities that must be sustained if we are going to be serious about the timely implementation of the BRC's recommendations.

Consolidated interim storage is a needed and important element of spent fuel management, regardless of the decision on a repository for the material. Through the prompt siting of consolidated interim storage facilities, the Federal Government will demonstrate its capability to fulfill its promises and commitments to remove and manage this material. The ratepayers and taxpayers will be relieved of the obligation to pay twice for storage costs and damages for the Government's contractual failure. And we will avoid future costs that will only accelerate if the material remains onsite for an indefinite period.

In short, consolidated interim storage makes it possible to design a facility that maximizes security effectiveness and economies of scale, and encourages and facilities desired storage research efforts. Among those supporting consolidated interim storage are two organizations represented on this panel. NARUC commented that we fully concur that the spent fuel from decommissioned reactor sites should be first in line for shipment and storage at a new consolidated storage facility. NRDC testified before the Blue Ribbon Commission that NRDC believes it makes sense to provide for consolidated dry storage of spent fuel from permanently shut down reactors that are not at sites with reactors still operational.

In addition, we note the support of such organizations as the New England Governors Conference, the MIT Center for Advanced Nuclear Energy Systems, the Nuclear Energy Institute, the New England Council, the National Conference of State Legislators, the Nuclear Waste Strategy Coalition, the Government Accounting Office, the Keystone Center, the National Commission on Energy Policy, and the American Physical Society.

We are also grateful for the enduring support for priority movement of our material to consolidated interim storage of the many Members of Congress who represent districts and States where our sites are located. Thank you very much for the opportunity to testify today, and I am glad to answer any questions that you may have.

[The prepared statement of Mr. Howes follows:]

Statement for the Record
Mr. Eric Howes
Director of Government & Public Affairs, Maine Yankee
Subcommittee on Clean Air and Nuclear Safety
Senate Committee on Environment and Public Works
June 7, 2012

Good Morning Chairman Carper, Ranking Member Barrasso, and Members of the Subcommittee. I am Eric Howes, public and government affairs director at Maine Yankee. I appreciate the invitation to appear before you today on behalf of the Yankee Companies: the Maine Yankee Atomic Power Company, the Connecticut Yankee Atomic Power Company, and the Yankee Atomic Electric Company.[1]

We and other owners of permanently shut down nuclear reactors that comprise the Decommissioning Plant Coalition (DPC)[2] worked closely with the Blue Ribbon Commission on America's Nuclear Future (BRC)to ensure it understood the unique impacts faced by our 6 sites, and the 3 other permanently shut-down reactor sites across the Nation.[3]

The Yankee Companies greatly appreciate the hard work of all the BRC Members and salute the co-Chairmen and the Commission for producing a thorough report that has many specific and achievable recommendations. We especially endorse those that are most directly achievable concerning the decommissioned sites:

- The prompt establishment of a voluntary, incentive-based siting program that would lead to the licensing of a consolidated interim storage facility (or facilities);
- The establishment of a "first in line" priority for the movement of spent fuel and other material being stored at permanently shutdown reactor sites to those licensed consolidated storage sites; and
- The prompt initiation of programs to coordinate federal, state and local efforts to plan for the transportation of this material to consolidated storage and disposal facilities.

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[1] Connecticut Yankee, Yankee Atomic, and Maine Yankee are fully decommissioned nuclear power plants storing spent nuclear fuel and Greater than Class C waste generated during plant operations at their Independent Spent Fuel Storage Installations. The annual cost to operate the three sites is approximately $24 million. Each Company also has ongoing litigation with the U.S. Department of Energy in federal court seeking an approximate total of $440 million in monetary damages resulting from the DOE's failure to fulfill its obligations to remove the spent nuclear fuel and Greater than Class C waste from the former plant sites for the years 1998-2008.

[2] Permanently shutdown plants represented by the DPC include: Big Rock (MI), Connecticut Yankee (CT), Dairyland (WI), Maine Yankee (ME), Rancho Seco (CA) and Yankee Rowe (MA).

[3] In addition to the above, Humboldt Bay (CA), Trojan (OR) and Zion (IL) have ceased operation and are permanently shut down; a tenth, Ft. St. Vrain (CO) is licensed to the DOE.

We also agree with their call for Congress to create a new, single-purpose organization to implement a focused, integrated program for the transportation, storage and disposal of spent nuclear fuel and nuclear waste and to amend its budget rules so that this new organization would have assured access to the existing Nuclear Waste Fund and the revenues generated by annual payments to that fund. Underpinning and backstopping all of these recommendations is the panel's finding that the U.S. should continue to adhere to the international consensus regarding the ultimate need for deep geologic disposal of this material; and we concur in their judgment that the best means of accomplishing this goal will require the creation of a voluntary siting process that provides incentives to host localities and states.

In adopting its recommendation for voluntary siting approaches, the BRC took note not only of international siting efforts, but the success we enjoy with our Citizens Advisory Panels that help demonstrate how a community based process works to address issues in meaningful discussions that yields results. We appreciate that the Commission's Transportation and Storage Subcommittee, at the invitation of the Maine Yankee Community Advisory Panel, held an August 2010 meeting in Wiscasset, Maine that included a first hand look at a fully decommissioned reactor site that continues to exist only to store spent nuclear fuel until the federal government removes this material as required by contract and statute.
After examining multiple issues such as cost, security, equity and numerous other factors detailed in their report, the BRC agreed that it makes no sense to keep this material at former reactor sites scattered around the Nation.

New England ratepayers met their obligation to pay for the federal government to begin picking this material up in 1998 and it's time for the government to fix this program and put it on a footing that will lead to success in that mission.

Much work remains to be done to make the BRC recommendations a reality. DOE has formed an internal working group that is assessing the BRC's recommendations and developing a strategy for the safe and secure storage and management of used nuclear fuel that builds on the Commission's work. We are pleased to report our understanding that virtually all of the BRC recommendations as they relate to CIS are under active review and that the forthcoming strategy will likely build on the $60 million for nuclear waste R&D included in the Department's budget request for FY '13; we note that the current budget request includes some preliminary evaluation of Consolidated Interim Storage (CIS) and related transportation issues -- focused initially on decommissioned nuclear reactor sites -- and the initiation of actions identified by the National Academy of Sciences 2006 transportation report Going the Distance.

We believe that FY '13 efforts should even more aggressively advance the resolution of issues identified in the BRC report that will affect the timely removal of material from permanently shutdown reactor sites. We are pleased to see that the Department has committed to restore funding for the regional transportation planning groups that have seen their budgets curtailed in recent years. Also, the

Department is now beginning site-specific assessments of the transportation readiness at these former reactor sites, and the procurement and construction needs for transportation infrastructure that includes shipping casks and appropriate rail cars. What is yet needed is the initiation of dialogue between the government and a partnership of local communities, state governments and industry in an effort to develop a consensus siting approach for both CIS and future repository facilities. These are examples of what should and can be sustained if we are going to be serious about the timely implementation of the BRC's recommendations.

CIS is a needed and important element of spent fuel management regardless of the decision on a repository for the material. First, it is important to our communities that the federal government at long last demonstrates its capability to fulfill its promises and commitments to remove this fuel from these communities. Second, the ratepayers and taxpayers must be relieved of the burden occasioned by that failure as they pay in turn, and in our localities twice, for the operating costs of on-site storage and the damages that result from the government's continuing failure. Third, these costs will only increase as this material remains on these individual sites for an indefinite period as new regulatory and research initiatives take effect; a repository will not be available for a significant period of time from now. Finally, CIS makes it possible to design a facility that maximizes security effectiveness and economies of scale and encourages and facilitates desired storage research efforts.

We are not alone in endorsing a priority for our sites for CIS. Among those supporting CIS are two organizations represented on this panel. The National Association of Regulatory Commissioners commented on June 29, 2011; "We fully concur that the spent fuel from decommissioned reactor sites should be first in line for shipment and storage at a new consolidated storage facility." Dr. Thomas B. Cochran, Senior Scientist for the Nuclear Program for the Natural Resources Defense Council testified before the Blue Ribbon Commission on May 25, 2010: "NRDC believes it makes sense to provide for consolidated dry storage of spent fuel from permanently shut down reactors that are not at sites with reactors still operational."

In addition, we note the support of such organizations as the New England Governors' Conference, the MIT Center for Advanced Nuclear Energy Systems, the Nuclear Energy Institute, the New England Council, the National Conference of State Legislators, the Nuclear Waste Strategy Coalition, the Government Accounting Office, The Keystone Center, the National Commission on Energy Policy, and the American Physical Society. We are also grateful for the enduring support for priority movement of our material to CIS of the many Members of Congress who represent districts and states where our sites are located.

Thank you for the opportunity to testify today, and I will be glad to answer any questions.

Senator BARRASSO [presiding]. Thank you, Mr. Howes. We will get to the questions in a little bit.

Dr. Metlay, we would like to call on you, please.

STATEMENT OF DANIEL S. METLAY, SENIOR PROFESSIONAL STAFF, U.S. NUCLEAR WASTE TECHNICAL REVIEW BOARD

Mr. METLAY. Thank you very much.

Chairman Carper, Ranking Member Barrasso, Senator Udall, Senator Alexander, my name is Daniel Metlay. I am a member of the Senior Professional Staff of the U.S. Nuclear Waste Technical Review Board, an independent Federal agency.

I thank you for inviting me here today to provide some background information on the international experience related to consent-based programs for siting facilities for storing or disposing of high level nuclear waste. I will summarize my remarks and ask that my full statement be included in the hearing record.

This Subcommittee undoubtedly is familiar with the experiences in the United States, both before and after site characterization was limited to Yucca Mountain. It may be less familiar with the experiences of other countries. These, I believe, can be very instructive, so I will focus my comments on them today.

In the last 40 years, a dozen countries, including the United States, have initiated more than two dozen efforts to identify potential repository sites. Only three of those efforts have succeeded in choosing a site and are still on track. All three have relied on volunteerism and a consent-based process.

In discussing site selection strategies for geologic repositories, it is important to note that they involve both technical and non-technical considerations. The process can start with a search for a technically qualified site, or for a willing host. Either approach can succeed, although the suite of sites that may emerge as potential candidates may be quite different.

Virtually all national programs with the exception of the Finnish one have experienced shaky starts. Several consent-based programs, however, are today making considerable progress. Two municipalities in Sweden have agreed to host a repository. A community in France volunteered to host an underground research facility, knowing ahead of time that the facility could evolve into a full scale repository. One area in the United Kingdom and more than a dozen localities in Canada are now involved in discussions with the implements of their respective national waste management programs.

But here I caution you: volunteerism does not guarantee success. In Japan, even before the damage caused to the Fukushima facility by the tsunami, a 10-year-old consent-based process had bogged down. In Germany, a site proposed more than 35 years ago by the state of Lower Saxony appears to be in limbo.

In short, although the disposal of high activity radioactive waste in deep mined geologic repositories is the preferred option internationally, what most characterizes national programs is their diversity and their variety. Some programs focus from the beginning on specific host rock formations. Others start with generic qualifying and disqualifying conditions. Some countries evaluate sites

one by one. Others adopt a parallel approach characterizing and comparing at least two sites simultaneously.

In any case, communities already hosting nuclear facilities may be especially receptive. And the prospective of receiving a generous benefits package appears to be have been instrumental in gaining community acceptance, at least in some cases.

So to sum up, we have learned from the experience in the U.S. and abroad that one, potential host communities must at least acquiesce to site investigations. Two, implementers must engage potential host communities by establishing a strong and long-term local presence. Three, potential host communities must have a realistic and practical way to withdraw from the siting process.

In the United States, the experience of the Nuclear Waste Negotiator may be especially relevant because that effort was truly a consent-based siting process.

I will close by observing that in a consent-based site selection process, public trust in the institutions is essential. It is vitally important that potential host entities have confidence in the credibility of the process and the trustworthiness of the implementer of the program.

I thank you very much, and I look forward to questions from the Committee.

[The prepared statement of Mr. Metlay follows:]

Summary

Statement of Dr. Daniel S. Metlay,
Senior Professional Staff
U.S. Nuclear Waste Technical Review Board
Before the
Subcommittee on Clean Air and Nuclear Safety
Committee on Environment and Public Works
United States Senate
June 7, 2012

- *The U.S. Nuclear Waste Technical Review Board* was created in the 1987 amendments to the Nuclear Waste Policy Act to provide an ongoing and independent technical and scientific evaluation of activities undertaken by the Secretary of Energy related to implementing the Nuclear Waste Policy Act.
- *Site-selection strategies* for a deep-mined geologic repository involve two "filters," one consisting of technical requirements and the other consisting of nontechnical considerations. The two filters can be applied in any order, although the suite of sites eventually selected may be different.
- *The Nuclear Waste Policy Act, passed in 1982*, provided for two repositories, one that presumably would be in the western U.S. and another presumably one in the east. Three western sites were to be characterized simultaneously to assess their suitability as the location of the first repository. After the second repository program was suspended in 1986, Congress amended the Nuclear Waste Policy Act in 1987. Among other things, the amendments act identified one of the western sites, Yucca Mountain in Nevada, as the sole site to be characterized for the first repository. The Department of Energy (DOE) recommended the Yucca Mountain site to President George W. Bush in 2002, and Congress overturned a veto by the State of Nevada of the site recommendations later that year. In 2008, DOE submitted a license application for the Yucca Mountain repository to the U.S. Nuclear Regulatory Commission. DOE requested withdrawal of the license application in 2010. A final decision on whether the licensing process will proceed is pending in the courts.
- *A deep-mined geologic repository is the preferred option of all countries* for disposing of high-activity radioactive waste. In the last 40 years, the U.S. and other nations have initiated roughly two-dozen efforts to identify potential repository sites. Only three of those efforts have led to the selection of a site and are still on track. In no case has a construction license for a high-activity waste repository been issued by the responsible regulatory authority.
- *The experiences in selected countries can be summarized briefly*:
  - In France, two communities volunteered to be considered for an underground research laboratory (URL), but the granite underlying one of them proved to be technically unsuitable. Today a URL has been constructed in clay near the village of Bure. A site adjacent to the laboratory has been chosen for a repository for high-activity waste.
  - Sweden's consent-based siting process resulted in a competition between two municipalities, Osthammar and Oskarshamn, to host a repository for high-activity waste. Osthammar ultimately was selected.

- The United Kingdom initiated a new approach to repository siting, inviting communities to express interest in hosting such a facility. Several borough and county councils near the Sellafield reprocessing site in West Cumbria are considering whether to participate. A decision is expected in the fall.
- In Canada, after a deliberate effort by the siting implementer to understand the views of Canadians, including Canada's aboriginal people, more than a dozen communities have expressed interest in learning more about the implications of hosting a repository.
- Japan called for volunteers to host a repository more than a decade ago. The one mayor that accepted the offer was recalled, and no other communities have come forward since. The damage to the facilities at the Fukushima-Daiichi site caused by last year's tsunami may have reduced the prospects for finding a volunteer host still further.
- In Switzerland, after identifying regions of Opalinus clay as potentially suitable for repository siting, discussions are underway with communities to determine their willingness to host a disposal facility. The Swiss government will ultimately make the siting decision, but the decision could be overturned by national referendum.
- The German State of Lower Saxony invited the German Federal Government to develop a repository at a salt site near the community of Gorleben decades ago, but the expression of interest created considerable controversy nationally. After 35 years, the site is still under consideration, but selection of the site remains problematic.

- *What characterizes national repository programs most is their variety.* In some cases, efforts to identify candidate sites have focused from the beginning on specific host-rock formations. In other cases, countries have used generic qualifying and disqualifying conditions. Some countries evaluate sites one by one, while others adopt a "parallel" approach, characterizing and comparing at least two sites simultaneously.
- *Communities already hosting nuclear facilities* may be especially receptive to consideration as a candidate repository site. The prospect of receiving a generous benefits package is instrumental in gaining community acceptance, in some cases.
- *Lessons that can be taken from the U.S. and other countries*: (1) Potential host communities must at least acquiesce to site investigations. (2) Implementers must engage potential host communities by establishing a strong, long-term local presence. (3) Potential host communities must have a realistic, practical way to withdraw from the siting process.
- *The experience of the U.S. Nuclear Waste Negotiator may be especially relevant* because it reflects a consent-based siting effort undertaken in the U.S. The Negotiator was given authority to search for a voluntary host for a storage facility or a permanent repository site and could negotiate a benefits package with any acceptable incentives. Approval by act of law would have been required to complete the process. At least one Native American Tribe sought to negotiate an agreement, but funding was eventually eliminated for the Negotiator's Office by Congress.
- *Public trust in the institutions involved in a consent-based site-selection process* is an essential element underlying the potential for success of all the efforts discussed in this testimony. It is vitally important that entities and localities that might consider hosting a storage or disposal facility for high-activity waste have confidence in the credibility of the process and the trustworthiness of the implementer of the program.

Statement of Dr. Daniel S. Metlay
Senior Professional Staff
U.S. Nuclear Waste Technical Review Board

Before the

Subcommittee on Clean Air and Nuclear Safety
Committee on Environment and Public Works
United States Senate
June 7, 2012

Mr. Chairman and members of the Subcommittee, good morning. My name is Daniel Metlay. I am a senior professional staff member at the U.S. Nuclear Waste Technical Review Board. The Board was created in the 1987 amendments to the Nuclear Waste Policy Act to provide an ongoing and independent technical and scientific evaluation of activities undertaken by the Secretary of Energy related to implementing the Nuclear Waste Policy Act. The Board's 11 members are technical and scientific experts who are nominated by the National Academy of Sciences and appointed by the President. A small professional staff supports the work of the part-time Board members. I am a member of that staff. I hold a Ph.D. in public policy, and I have a scientific undergraduate degree. Over several decades, I have held various positions in academia and in government related to nuclear waste management and disposal. A short biography is attached to this statement. My responsibilities on the Board staff include nuclear waste transportation, institutional issues, and, most particularly, the ongoing work in other countries for managing their high-level radioactive waste and spent nuclear fuel.

Today, I have been asked by the Subcommittee to provide a historical perspective on efforts in this country and in other countries for establishing a consent-based process for siting nuclear waste storage and disposal facilities. Developing such a consent-based approach to siting was a major recommendation of the Blue Ribbon Commission on America's Nuclear Future (BRC).

Before I begin, I want to make clear that I can only convey Board comments that are part of publicly available Board documents; I cannot speculate about Board opinions, findings, or recommendations. What I will try to do is provide relevant general information that is based on my own experience and expertise and on information that is included in two Board publications: *Survey of National Programs for Managing High-Level Radioactive Waste and Spent Nuclear Fuel*, issued in October 2009; and *Experience Gained From Programs to Manage High-Level Radioactive Waste and Spent Nuclear Fuel in the United States and Other Countries*, issued in April 2011. I also have attached to this statement a letter that the Board wrote to the Secretary of Energy on the BRC recommendations. These and all other Board documents, including Board presentations and correspondence to the BRC, are available on the Board's Web site at www.nwtrb.gov. I hope that the Committee will find these perspectives useful as context for considering BRC recommendations on establishing a consent-based process for siting a nuclear waste storage or disposal facility in the United States.

I will begin today by talking generally about the requirements for developing a siting process. I then will provide a brief history of efforts in this country to site and develop storage and disposal facilities for high-level radioactive waste and spent nuclear fuel. I next will discuss factors affecting consent-driven site-selection activities in other countries. I will end with some tentative conclusions that might be drawn from these efforts and with a short discussion of some factors that may limit the lessons that can be applied to this country from international experience.

Designing a Siting Process

Site-selection strategies for a deep-mined geologic repository necessarily involve passing candidates through what is, in effect, two different "filters." On the one hand, detailed and

quantitative technical requirements have to be met. They include such issues as suitability criteria related to geologic stability, hydrologic conditions, geochemical conditions, disruptive processes, coupled processes, and operational practicality. On the other hand, sites could be disqualified because of nontechnical considerations, such as the "lack of social acceptance, high population density, or difficulty of access." These two filters, the "technical" and the "non-technical," can be applied in any order, although the suite of sites eventually selected might be different.

In constructing the filters, formal processes need to be crafted that can be used to establish technical criteria, prescribe how the criteria will be updated, specify how a "safety case" will be constructed, lay out compliance methodologies, and provide resources for public involvement and support of local and state oversight activities. Describing every aspect of these filters and how they have been applied would require a very long discussion. I will limit my testimony to the experiences in the United States and internationally that are relevant to the BRC's recommendation for a consent-based site-selection process

History of the U.S. Program

Members of the Subcommittee are familiar with how the waste management program in the United States has evolved to its present state. I will mention just a few salient episodes.

Early efforts to develop a permanent repository for high-activity radioactive waste focused on finding a site in salt, a host-rock recommended in a 1957 National Academy of Sciences report. In 1970, on the basis of some preliminary investigations undertaken by Oak Ridge National Laboratory, the Atomic Energy Commission (AEC) announced plans for siting a repository for high-activity waste at an abandoned salt mine near Lyons, Kansas. The AEC's announcement took state and local officials by surprise. The State Geologist, strongly supported

by the Kansas congressional delegation, opposed this siting effort. In the end, unresolved technical issues forced the AEC to abandon its plans in 1974. Subsequently, two other salt formations were considered as potential locations for a repository. Community leaders in Carlsbad, New Mexico, launched an initiative to persuade the AEC to look at potential repository sites in the Permian Basin; at the same time, the federal government sought permission from governors to investigate possible locations for a repository in the Salina Basin around the Great Lakes. The latter efforts provided futile, but, as the Subcommittee knows well, a sustained campaign by congressional, legislative, and community leaders around Carlsbad resulted in the construction of the Waste Isolation Pilot Plant (WIPP) repository, which began receiving transuranic-contaminated waste in 1999.

Problems encountered in trying to site a repository for high-activity radioactive waste led policy-makers in the late 1970s and early 1980s to try developing principles that would form the basis of a national policy for managing and disposing of spent nuclear fuel and high-level radioactive waste. President Jimmy Carter created the Interagency Review Group on Nuclear Waste Management (IRG) in 1978. Represented on the IRG were more than 20 federal agencies that had a "stake" in the long-term management of high-activity waste. Of particular importance was the IRG's recommendation that a policy of "consultation and concurrence" be adopted. Such a policy would walk a fine line between, on the one hand, outright federal preemption of any state role in siting a repository, and, on the other, an absolute state veto, exercised at one specific moment in time. Instead, the IRG argued for an adaptive process with full involvement by affected states. "Under this approach, a state effectively has the continuing ability to participate in activities at all points throughout the course of [site investigations] and, if it deems appropriate, to prevent the continuance of Federal activities."

Although other elements of the IRG recommendations found their way into the Nuclear Waste Policy Act (NWPA), which passed in 1982 after almost 4 years of debate, Congress transformed the notion of "consultation and concurrence" into "consultation and cooperation." The NWPA also provided that the President's decision to develop a repository could be vetoed by the governor of the *situs* state. That veto, however, could be overridden by a majority vote in both Houses of Congress.

To increase geographic equity, the Act also authorized the development of two repositories, presumably one in the eastern United States and one in the west, which would be selected after a technically based evaluation process. Three western sites eventually were chosen that would be characterized simultaneously for their suitability as the location of the first repository. As opposition grew in the eastern United States to a second repository, Secretary of Energy John Harrington suspended the second repository program in 1986.

In 1987, Congress tried to address the resistance that had developed over time to some of the policies and practices established in the NWPA. Congress amended the NWPA in December of that year and identified Yucca Mountain in Nevada as the sole site to be characterized for a first repository. The Office of the Nuclear Waste Negotiator also was created in the Amendments Act. The Negotiator was authorized by the legislation to "find a State or Indian tribe willing to host a repository or monitored retrievable storage facility at a technically qualified site on reasonable terms and...to negotiate with any State or Indian tribe which expresses an interest in hosting a repository or monitored retrievable storage facility." After several years of effort, the first Negotiator, David Leroy, and then his successor, Richard Stallings, were unable to reach an agreement with a willing host, although one Native American

tribe, the Mescaleros of New Mexico, expressed some interest. Congress defunded the Office of the Nuclear Waste Negotiator in 1995.

For more than 20 years after passage of the Amendments Act, the Yucca Mountain site was technically evaluated by the U.S. Department of Energy (DOE), even as the State of Nevada voiced its strong and unwavering opposition to locating a repository at the site. In early 2002, DOE recommended to President George W. Bush that the site be developed as a repository. Congress overturned a veto of the President's suitability decision by the state of Nevada later in 2002. In 2008, DOE submitted a license application for a Yucca Mountain repository to the U.S. Nuclear Regulatory Commission. DOE requested that the license be withdrawn in 2010. A final decision on whether the licensing process will proceed is pending in the courts.

Now I will move on to a discussion of factors that have shaped the site-selection approaches of other countries.

International Experience in Site Selection

Almost universally, policy-makers have determined that disposal of high-activity waste in a deep-mined geologic repository is the preferred option for protecting human health and the environment for many millennia. In the last 40 years, the United States and other nations have initiated roughly two-dozen efforts to identify or create processes for identifying potential repository sites. Only three of those efforts have identified a potentially suitable site *and* are still on track. In no case has a license been issued by the cognizant regulatory authority to construct a deep-mined geologic repository for high-activity radioactive waste. The experience in selected countries can be summarized briefly.

France

When the call went out for volunteer communities to host underground research laboratories both in clay and in granite, potential host localities knew from the start that if the laboratory site or a site nearby were found to be technically sound, then a full-scale repository might be constructed there. Two communities stepped forward. However, the granite formation underlying one of them proved technically unsuitable for repository development. After several years of informal consultations and negotiations by the French Government, no other community was willing to volunteer to host an underground laboratory in granite. Today, the village of Bure, the community that agreed to host an underground laboratory in clay, strongly supports activities conducted by the implementer, the National Radioactive Waste Management Agency (ANDRA), related to constructing a repository. Noteworthy, however, is that when ANDRA called for volunteers to host a separate repository for long-lived, intermediate-level waste, several communities in the same province as Bure declined.

Sweden

Perhaps the most encouraging example of the efficacy of a consent-based siting process is the approach used in Sweden. In the 1970s, the implementer there, Swedish Nuclear Fuel and Waste Management Company (SKB), developed a disposal concept, which evolved incrementally into the current concept, KBS-3. The disposal concept received strong technical support from the international scientific community. It could be employed throughout most of Sweden, which lies largely on the granitic Baltic Shield. In the late 1980s, SKB unilaterally sought to characterize sites in several areas. That effort was met by strong opposition and blockaded entry roads. Reassessing the situation, SKB approached four northern municipalities, asking for their consent to initiate site investigations. Two municipalities declined early on;

referenda were held in two others, and, by varying margins, those municipalities also declined to participate further. Without hesitation, SKB stopped its work in all four places.

Subsequently, SKB invited approximately a dozen communities to join in a process to explore whether they would be interested in hosting a repository for high-activity waste. At the end of a very extensive engagement process, two municipalities, Osthammar and Oskarshamn, signaled that they were prepared to host such a facility. SKB ultimately selected Osthammar.

United Kingdom

In 2006, the government of the United Kingdom approved a new approach—Managing Radioactive Waste Safely—for developing a repository. Key to that new approach was an invitation for willing and informed communities to express an interest in hosting such a facility. The response from communities in the United Kingdom, however, has been quite subdued to date. Several borough and county councils near the Sellafield reprocessing plant in West Cumbria have begun investigating whether they should participate in the new initiative. Studies by the British Geological Survey suggested that at least some of the "rock" in the area might be suitable for constructing a repository. A decision by the West Cumbria partnership on whether to participate is expected in the fall. Ironically, the same councils that denied local planning permission for constructing an underground research laboratory 20 years ago are the ones now considering participation in the repository program. One important factor that may have caused this shift in attitude has been the concerted efforts by the U.K. implementer, the Nuclear Decommissioning Authority, to establish trustworthy relations with the localities.

Canada

Perhaps the most promising national initiative that relies on a consent-based siting process has unfolded in Canada. Adopting a very deliberate and careful approach to understanding the views of Canadians, especially those belonging to that country's aboriginal people, the implementer, the Nuclear Waste Management Organization (NWMO), put forward a plan for adaptive management of Canada's high-activity waste. NWMO is working with more than a dozen communities that have expressed interest in learning more about the implications of hosting a deep-mined repository.

Japan

In sharp contrast to the Canadian experience, more than a decade ago, Japan's implementer, Nuclear Waste Management Organization (NUMO), called for volunteers to participate in a stepwise siting process. Although the mayor of one southern Japanese town accepted NUMO's offer, opposition quickly developed at both the local and prefectural levels. The mayor was recalled; no other community has come forward since. After the damage caused to the Fukushima-Daiichi reactors and spent-fuel storage pools by last year's earthquake and tsunami, the prospects for volunteers now appear to be even slimmer.

Switzerland

In Switzerland, the steps of the typical siting process have been reversed. Under the country's Sectoral Plan, the implementer, National Cooperative for the Disposal of Radioactive Waste, first identified potential regions where Opalinus clay might be suitable for locating a repository. Altogether, five regions were identified in the first phase of the plan. Now, in the plan's second phase, discussions are under way with communities in the regions to determine if

any of them are prepared to host a facility for disposing of high-activity waste. Ultimately, the Swiss Federal Government will decide where a repository will be sited, but that decision could be overturned by a national referendum.

Germany

In many respects, the siting efforts in Germany parallel those in the United States. When, in the 1970s, the State of Lower Saxony invited the German Federal Government to develop a repository in salt near the community of Gorleben, that expression of interest aroused considerable controversy nationally. Although the site is still under consideration 35 years later, its selection remains problematic.

What Can We Learn from U.S. and International Experiences?

In discussions of the international efforts for implementing a consent-based approach, it is important to remember, as noted above, that there are several aspects to the process that can have significant consequences for the outcome. First are technical factors, including choices about what reactor technology to adopt and about what nuclear fuel cycle to pursue. Others are social and political in nature, including how concerns about intergenerational equity should be addressed and what pace should be followed in implementing a long-term management option. Importantly, the interdependencies, both subtle and overt, among the technical, social, and political forces are inescapable.

Because of those interdependencies, what characterizes national programs most notably is their variety. In some cases, efforts to identify candidate sites have focused from the beginning on specific host-rock formations. The choice of those formations has been dictated by constraints imposed by a country's geology or land-use patterns, by a view that particular host-

rock formations possess distinctive advantages in terms of isolating and containing high-activity radioactive waste, or by a combination of these rationales. In other cases, efforts to identify candidate sites cast the net more broadly by enumerating generic qualifying and disqualifying conditions. Qualifying conditions must be satisfied for a candidate site to be considered acceptable; disqualifying conditions eliminate a candidate site from further consideration.

An additional source of variation among national programs can be traced to policies that govern the sequence for accepting or rejecting a candidate site. A country can adopt a "serial" policy whereby sites would be evaluated formally one by one until a suitable site is found. Alternatively, a "parallel" approach can be adopted in which at least two candidate sites would be characterized simultaneously and compared.

Just as the construction of the technical filter introduces considerable variation in strategies for selecting candidate sites for a deep geologic repository, so does the construction of the nontechnical filter. Arguably this filter's most important property relates to the power that a state or community can exercise. Since the early 1990s, nations outside the United States increasingly have constructed their nontechnical filters in ways that empower local jurisdictions. Especially when issues of federalism come to the fore, how power is distributed between the central government and state governments can be very consequential, as the cases of Japan, Germany, and the United States illustrate. So does the situation in Switzerland. There, a change in the law governing the management of high-activity waste eliminated the possibility of a cantonal referendum after one canton (roughly equivalent to a U.S. state) disapproved of the siting of an intermediate-level waste repository.

Experiences in the United States and other nations also suggest that communities already hosting nuclear facilities or communities where benefits might make a significant economic or

social difference may be especially receptive to being considered a candidate repository site. For example, in Sweden and Finland, candidate sites were identified in communities with nuclear reactors, and in the United Kingdom, borough and county councils in West Cumbria near the Sellafield nuclear facilities have expressed interest in becoming considered a repository site. For many, but not all, municipalities and states, the prospect of receiving generous benefit packages is instrumental in gaining community acceptance for a repository.

Lessons from all of these siting experiences have not been lost on the directors of national waste-management programs. Siting efforts now under way in Canada and the United Kingdom reflect these lessons, and the recommendations by the BRC in the United States are in line with this "new" understanding:

- *Potential host communities must at least acquiesce to site investigations.* Carlsbad, New Mexico, the town closest to WIPP, assertively lobbied for the facility. The Meuse and Haute Marne districts surrounding Bure in France welcomed the construction of a URL, knowing that if the argillite clay there was suitable, a full-scale repository might be constructed nearby. In Finland and in Sweden, the town of Eurajoki and the municipality of Osthammar, respectively, responded positively to invitations from the two national implementers, Posiva and SKB, respectively.

- *Implementers must work intensively to engage potential host communities by establishing a strong, long-term local presence.* DOE required that officials involved with the WIPP project and researchers from National Laboratories live in Carlsbad, New Mexico, even requiring those not already living there to relocate. In France, a Local Information and Oversight Committee has been established so that representatives of communities in the Meuse and Haute-Marne districts near Bure can continuously interact with ANDRA. In

Sweden and Finland, the potential repository host communities had already become familiar with the implementers because they (or their consortium members) had operated nuclear reactors at those sites for a long time. In each case, however, interactions were intensified when the municipalities began to be considered potential locations for deep-mined geologic repositories.

- *Potential host communities must have a realistic, practical way to withdraw from the siting process.* The state of New Mexico was a full partner in negotiating the terms of the Land Withdrawal Act that permitted WIPP to operate. In France, the districts near Bure willingly accepted the prospects of hosting a deep-mined geologic repository when they volunteered to host the research laboratory. Yet, despite considerable effort by the French Government, no community located above a granite formation was willing to step forward, and none were forced to. In Finland, Eurajoki's consent was required before Parliament could pass the "decision-in-principle" to site the proposed geologic repository. In Sweden, Osthammar must agree to the granting of a license by the government. If the municipality decides for some unexpected reason to exercise its veto power, the veto could, in theory, be overridden by the government. As a pragmatic matter, however, national culture and historical precedents would make such an override highly unlikely.

In the United States, the experience of the Nuclear Waste Negotiator may be especially relevant because that effort was truly consent-based. The Negotiator was given authority to search for a voluntary host for a storage facility or a permanent repository site and could negotiate a package with any acceptable incentives. Approval by act of law would be required to complete the process. Some local communities expressed interest, but the states in which they were located prevented them from pursuing an agreement with the negotiator. Some Native

American Tribes sought agreements, but funding was eventually eliminated for the Office of the Negotiator by Congress. It is not clear what factors would lead to a different outcome if that effort were reinitiated today.

Finally, public trust in the institutions involved in a consent-based site-selection process is an essential element underlying the potential for success of all the efforts I have discussed today. Vitally important is that entities and localities that might consider hosting a storage or disposal facility for high-activity waste have confidence in the credibility of the process and the trustworthiness of the implementer of the program.

Summary

In closing, I would observe that few public policy issues rival the management of high-activity radioactive waste in terms of the demands placed on scientific research and engineering practice and the controversy that is engendered. After decades of dedicated work in more than a dozen nations, evidence is beginning to increase confidence that "solutions" can be found to this pressing environmental problem. More important, lessons are being learned about how to design social processes that lead to technically and politically defensible outcomes. Given this progress, and because the stakes are so high, it would be unfortunate if temporization displaced action.

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
2300 Clarendon Boulevard, Suite 1300
Arlington, VA 22201

April 18, 2012

The Honorable Steven Chu
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Secretary Chu:

The Nuclear Waste Technical Review Board (the Board) has read with considerable interest the final report of the Blue Ribbon Commission on America's Nuclear Future (the Commission). The report addresses a number of major issues that are important for our nation to succeed in answering the question of what we are going to do with our nuclear waste. The Commission conducted a comprehensive review of the problem and produced a frank and informative report on the many dimensions of a workable solution. The Board endorses the Commission's commitment to independent technical review, and believes that public trust in the storage and repository siting process can be enhanced by demonstrating that policy decisions have a firm and independently reviewed technical basis.

We understand that you have now appointed a Working Group to advise you on how DOE should respond to the recommendations in the report. Policies regarding nuclear waste must inherently involve questions of a technical nature. For the consideration of the DOE Working Group, we offer comments here on some of the more salient technical issues that we believe can affect the implementation of policies and the realization of plans to manage the nation's nuclear waste.

A New Consent-Based Approach to Siting Nuclear Waste Management Facilities

The Board has for some time had a keen interest in the domestic and international experience with consent-based siting approaches for nuclear waste storage and disposal facilities. We have also lamented, in the Commission's words, "the erosion of trust in the federal government's nuclear waste management program," which has certainly complicated finding technical solutions to the nuclear waste problem in our country. One aspect of establishing trust is to ensure a thorough consideration of technical issues that can guide the site-selection process. The establishment of site-independent safety criteria must be based on informed technical considerations, including technical lessons learned from both successful and failed projects in the U.S. and abroad.

Lessons learned from U.S. and international experience should be taken into account in developing guidelines, for siting, for the solicitation of volunteer sites, and for integrating the overall process. In particular, lessons learned from the failure of the nuclear waste negotiator approach should inform any consent-based volunteer-siting process.

A New Organization to Implement the Waste Management Program

The Board encourages the pursuit of the idea of "a new, single-purpose organization to provide stability, focus, and credibility." The Board has been concerned for some time with the lack of stability and, hence, of technical focus that results from management changes that accompany inevitable changes in the federal administration. This seemingly non-technical aspect of the program can in fact have severe implications for the technical direction and emphasis of a developing waste management program, which we see as being fundamentally one of science and engineering. We agree that the issues that the Commission defines regarding organizational structure require attention. We would add that rigorous peer review of technical aspects of the project must be part of the structure as is clear from the broad international experience to date.

The Commission declined to comment on the issue of comingling of waste from defense programs with the spent nuclear fuel from commercial power reactors at a single repository site. Nevertheless, we think that this is a technical issue that deserves consideration as a new organizational structure is considered. Because spent-fuel and high-level wastes are quite different in volume and activity, we think that a technical study to determine whether to separate commercial spent-fuel from defense and DOE wastes should be expeditiously completed in order to help establish a clear vision and mission for the organization charged with implementing the waste storage and disposal program.

Prompt Efforts to Develop a New Geologic Disposal Facility

The Board agrees with the Commission's position that disposal must be pursued with the same vigor as interim storage, because both need to be done in order to provide confidence that there is a solid integrated technical solution to the problem of the disposition of nuclear waste. One item that should be addressed expeditiously is the establishment of clear guidelines for identifying, and also potentially disqualifying, possible locations for one or more repositories. This work can draw on information from a variety of sources including geological information, census data, transportation networks, and so forth. In addition, the experience gained in other national programs should be carefully considered.

However, we are not particularly convinced that a demonstration of bore-hole disposal should be given the same priority as identifying, characterizing, designing, and developing a mined disposal site (to the point of a licensed demonstration project). The bore-hole concept has simply not yet been vetted technically to the extent that deep-mined geological disposal has. Furthermore, the need to disassemble fuel assemblies to implement bore-hole disposal would result in unnecessary worker exposure, and a decision to use bore holes might preempt retrievability options at a later time.

Another issue that the Commission recognized was the need to establish a new standard for repositories, because 10 CFR 63 is specific to Yucca Mountain. Specific choices related to the time period(s) chosen for demonstrating compliance with a standard are policy decisions, but we think scientific insights can be instructive and should be included in consideration of new standards and regulations.[1] Although one can greatly benefit from the use of probabilistic risk assessment methodologies in developing strategies for the safe disposal of highly radioactive waste, the length of the compliance period may well modify how these methods are applied. As an example, surface facilities that operate for 100 years can use methods of analysis presently applied to conventional reactor-type standards, while a geologic repository, for which compliance periods stretch to hundreds of thousands of years, may require additional considerations.

[1] For example, the Advisory Committee on Nuclear Waste issued a letter on the time of compliance (TOC) following a workshop that involved multiple parties (Letter of November 14 1996 to Chairman Shirley Jackson), in which it was stated that, "The dilemma in developing a TOC is that the time span must be sufficiently long to permit evaluation of potential processes and events leading to the loss of integrity of the repository and transport of radionuclides to the critical population. Yet the period must be short enough that inherent uncertainties in processes and events and in the biosphere and critical population group, which will increase with time, will not invalidate the results of the evaluation."

Support for Underground Test Facilities

From a technical point of view, the Board generally supports the development of underground research laboratories as a preliminary step in designing and constructing a full-scale geologic repository. International experience has demonstrated the scientific and public acceptance benefits of the concept of geologic disposal. The ideal scenario from the point of view of economics and timing is a laboratory at a site that has been selected on the basis of a comprehensive siting process, the suitability of which is confirmed with strong scientific evidence from a variety of sources, including the underground research laboratory. To be sure there are circumstances where it may be expedient to use a surrogate site for an underground research laboratory that is an analog to the actual site or sites selected. There is the possibility that social or other reasons may exist for not locating an underground laboratory at a potential repository site. There is also the possibility that by the time a site is selected in the U.S. sufficient underground research exists in different geological media that a convincing scientific and technical basis can be developed to support a site without the need for a site-specific laboratory. The key point is that the siting process, whether it is for a repository, a laboratory, a pilot repository with a laboratory, or the combination of a laboratory and a full-scale repository, must make the intentions explicitly clear and acceptable to all stakeholders prior to project initiation.

Prompt Efforts to Develop One or More Consolidated Interim Storage Sites

Spent fuel is presently being stored at reactor sites. The BRC recommended, for several reasons, that this spent fuel be moved to one or more centralized interim storage sites. With the curtailment of the Yucca Mountain Project, the appeal for this interim step increases since it is not clear when a disposal site might be available. This is particularly true for decommissioned sites where the only remaining vestige of nuclear power operation is the spent fuel casks on secure pads. In the spirit of a pilot-scale approach, the Board recommends that an interim site be used for the early demonstration of the safe shipment of spent fuel to a centralized interim storage site. This would provide early technical input regarding the implementation of a much larger transportation program described below. Logical site choices with the consent of the states and local population would include national laboratories, DOE facilities, and former military sites where security and infrastructure would already be present. The interim nature of this storage would be evidenced by moving this spent fuel to the centralized storage facility when it becomes operational in the future.

Early Preparation for the Eventual Large-Scale Transport of Spent Nuclear Fuel and High-Level Waste to Consolidated Storage and Disposal Facilities

Regarding transportation, which is a near-term need for centralized interim storage and a mid-term need for repository disposal, the Board does not believe that the Commission report goes far enough. In order to handle the massive shipments of spent fuel that will be involved and to implement the needed infrastructure in terms of rail cars and handling systems, work needs to be started now. The technical challenges of upgrading existing rail lines have been evident in just the maintenance of the infamous Northeast Corridor to carry high-speed rail traffic. Different but analogous technical challenges can be expected to accompany the adaptation of existing rights-of-way to accommodate nuclear waste shipments, even if they will not travel at commuter speeds. The construction of new rail lines where none at all currently exist might present even greater technical challenges. The early selection of a centralized interim storage site could be the starting point for developing strategies and methods for the transport of highly radioactive waste to a geologic repository. The Private Fuel Storage Project has done much of this work already and that should be used as a basis. A solid technical understanding of the capacities and limitations of the existing rail network and the possibilities for expanding it may have profound effects on where candidate sites can reasonably be located.

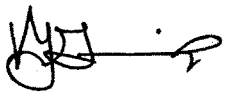
We support the recommendation that DOE should make public its suite of preferred routes for shipment of nuclear waste, because independent of site location this can reveal technical challenges involved (such as possible pinch points) and encourage open discussion of innovative technical solutions. We also support strongly the development of a technical basis for burn-up credit, i.e., the taking into account the reduction in reactivity that results from nuclear fuel having been used in a reactor, because this will greatly simplify all aspects of storage, transportation, and disposal. Finally, while the Commission has addressed transportation in its report, it does not address the difficult process of dealing with multiple state agencies for the transportation of spent fuel across states. The merits of having initial and daily inspections designed to insure the safety of the shipments augmented by detailed inspections at each state border deserve discussion that includes technical issues that may help shape risk-informed regulations.

Updating the Waste Classification System

Lastly, we support the need to review the outdated waste classification system and make it based on the form and activity of the waste rather than its source. Currently there is some waste generated at DOE sites that is orphaned in that there is no regulatory path for disposal. Rationalization of the waste classification system is needed to resolve this problem.

In summary, the Board believes that there are many technical issues that should be part of the discussions of the Working Group. Our aim in this letter is to convey what the Board considers to be some of the most important issues. Thank you for considering our thoughts on these important matters.

Sincerely,



B. John Garrick
Chairman

cc:
Subcommittee on Energy and Water Development, Committee on Appropriations, U.S. Senate
Committee on Energy and Natural Resources, U.S. Senate
Subcommittee on Clean Air and Nuclear Safety, Committee on Environment and Public Works, U.S. Senate
Subcommittee on Energy and Water Development, Committee on Appropriations, U.S. House of Representatives
Subcommittee on Environment and the Economy, Committee on Energy and Commerce, U.S. House of Representatives
Committee on Science, Space, and Technology, U.S. House of Representatives

BIOGRAPHICAL SKETCH
DANIEL METLAY

Daniel Metlay received his Bachelor of Science degrees from the California Institute of Technology in molecular biology and medieval history. He received his Masters and Doctoral degrees in political science and public policy from the University of California, Berkeley. He taught in the Political Science Department of Indiana University, Bloomington for six years before teaching political science and technology policy at the Massachusetts Institute of Technology. During that time, he worked in the Office of Technology Policy during the Carter Administration, where he was responsible for developing the core policy analysis for the Interagency Review Group for Radioactive Waste Management. Most of the key ideas accepted by the IRG were ultimately adopted by Congress in the Nuclear Waste Policy Act of 1982.

After spending time at Brookhaven National Laboratory under a contract from the Nuclear Regulatory Commission to look at operational issues and emergency planning at several nuclear power plants, Dr. Metlay worked as a task force director of the Secretary of Energy Advisory Board under James Watkins. He was responsible for developing the document, *Earning Public Trust and Confidence: Requisites for Managing Radioactive Waste.*

Dr. Metlay is now a member of the Senior Professional Staff of the U.S. Nuclear Waste Technical Review Board, an independent federal agency charged under the Nuclear Waste Policy Amendments Act to "evaluate the technical and scientific work" carried out by the Secretary of Energy to develop long-term approaches for the disposition of high-level radioactive waste and spent nuclear fuel.

Dr. Metlay has authored numerous publications dealing with technology policy, regulation, organization behavior, and radioactive waste. He has served as a consultant to the Office of Technology Assessment, the OCED's Nuclear Energy Agency, and the International Atomic Energy Agency.

Senator Carper asks: *In your testimony, you say that Canada and Sweden seem to show promising examples of consent-based siting approaches, can you tell us in greater detail how the Canadian and Swedish experience might be instructive in designing a consent-based approach in the United States?*

Although the site-selection processes in Canada and Sweden are quite different, they illustrate well the range of possibilities for implementing a consent-based approach in the United States.

In Sweden, consent has both an informal and a formal component. In 1992, the Swedish implementer, the Swedish Nuclear Fuel and Waste Management Company (SKB), asked roughly a dozen municipalities located at or near three out of the four nuclear power plant sites whether they would agree to having feasibility studies conducted within their jurisdictions. Most declined, but ultimately two communities, Oskarshamn and Östhammar, agreed. SKB actively engaged the citizens of both municipalities for more than a decade, and, during that time, support for developing a repository increased significantly. In 2010, SKB selected Östhammar as the site for a repository. A year later, SKB submitted a license application to Sweden's regulator, Swedish Radiation Safety Authority. Before the application can be approved, Östhammar must formally certify to Government that the community agrees to host the facility. In other words, although the process to date appears to be highly collaborative, Swedish law effectively does provide municipalities with an unconditional veto over the development of a repository within their borders.

In Canada, consent by the affected communities and/or provincial governments, so far at least, is not a legally codified requirement. Instead, after an exhaustive two-year process of listening carefully to the views and preferences of a wide range of Canadians, the implementer, the Nuclear Waste Management Organization (NWMO), decided that it only would investigate potential repository sites in communities that had requested to be considered. Starting in 2010, communities began to express interest in learning more about the implications of hosting a radioactive waste repository. Based on very general technical site-suitability criteria, which NWMO developed in an open and participatory process, the Canadian Geological Survey has conducted a very preliminary screening in each community that expressed interest. Currently 15 communities are actively involved in the site-selection process. It has been so successful in generating interest that NWMO announced it would no longer screen sites unless communities propose them by September 30, 2012.

Although both the Swedish and Canadian "models" can provide some insights into how to design a consent-based process in the United States, the constitutional frameworks and political culture in both countries differ in significant ways from the framework and culture in this country. For example, the relationship between the central government and the equivalent of state governments is much different in Sweden and Canada than in the United States, where federal preemption is a well-established constitutional principle. Whereas the United States' approach to developing public policy can often be highly politicized and adversarial, the Swedes and, to a somewhat lesser extent, the Canadians place a high value on compromise and accommodation. In short, insights can be gained from the experiences of other countries, but the differences just described must be taken into account when a new consent-based approach is formulated in this country.

Senator CARPER [presiding]. Thank you so much for your testimony.

Mr. Orrell.

STATEMENT OF S. ANDREW ORRELL, DIRECTOR OF NUCLEAR ENERGY AND FUEL CYCLE PROGRAMS, SANDIA NATIONAL LABORATORIES

Mr. ORRELL. Chairman Carper and Ranking Member Barrasso and the distinguished members of the Committee, thank you for inviting me to testify.

My name is Andrew Orrell, and regardless of how it is pronounced, I have the pleasure of serving as the Director of Nuclear Energy and Fuel Cycle Programs at Sandia National Laboratories.

Throughout my career working on both the Waste Isolation Pilot Plan and the Yucca Mountain project, I have experienced firsthand the meaning of consent-based approaches to repository projects and the cauldron of public controversy that can surround them. It is from this perspective that I offer my comments today, recognizing any such comments are my own and do not necessarily represent the opinions or positions of the Department of Energy or of the Sandia National Laboratories.

We are fortunate that the United States contains many geologic formations that are considered to be technically suitable for deep geologic disposal of nuclear waste. And even more locations technically suitable for interim storage. But challenges still remain to site facilities that are socially and politically acceptable to both local communities, host States, and the Federal Government.

One exception has been the Waste Isolation Pilot Plan. While noting the success of the WIPP, the Blue Ribbon Commission correctly notes that "No one could have designed the process that was ultimately followed ahead of time, nor could that process ever be replicated." While the WIPP process can't be replicated exactly, it does offer important lessons, especially in regard to the need for unquestioned credibility and integrity in both the institutions and individuals representing the Federal interest.

In all consent-based approaches, the placement of trust and credibility will be a prerequisite for success, which leads me to what I believe are other prerequisites that if addressed will enable and encourage more potential host communities and States to consider the siting of new nuclear waste management facilities, but that if left unresolved can be expected to stifle or confound any consent-based siting process.

The first issue to clarify is the uncertainty of exactly who will be the Federal representative of a consent-based negotiation: the Department of Energy or as the Commission recommends, a new Government-chartered corporation. Complicating this uncertainty is the unresolved issue regarding whether or not to commingle the management responsibility of defense and commercial waste.

The second issue needing clarification is to finalize what the new disposal standards and regulations will be that govern the determination of safety. The Commission correctly calls for the development of a new generic disposal standard and supporting regulatory requirements that "should be finalized prior to the site selection

process." And we need to recognize that these are often long lead time items.

The third issue centers on when there will be a confidence that a geologic repository for permanent disposal of spent fuel and high level waste will be realized. The Commission correctly notes "The challenge of siting one or more consolidated storage facilities cannot be separated from the status of the disposal program." The lack of a discernible repository development program can be expected to thwart the willingness of some communities or States to consider the siting of needed waste management facilities and perpetuate the moratoria on new nuclear power plant construction.

Simply, consent-based siting efforts will be stifled so long as potential host communities and States have uncertainty over who, what, and when. Who will be the organization representing the Federal interest when negotiating for a consent? What are the final regulations that will govern a determination of safety? And when will there be a confidence over whether a geologic repository for permanent disposal will actually be available?

In a broad sense, the intent of the BRC recommendations are to open new opportunities for the Federal Government to meet its nuclear waste management obligations and to promote a larger number of opportunities for States and communities to willingly host needed storage and disposal facilities. The technical solutions for developing one or more storage and disposal facilities do exist or are readily developed. Given that technical solutions to storage and disposal are readily available, the timeframes of decades often suggested for siting new facilities are thus rooted in the prerequisites to initiating a consent-based program. Prompt action on resolving the items noted will help minimize further delay and better enable this generation to meet its obligations for responsible nuclear waste management.

I thank you for the opportunity to testify, and look forward to answering your questions.

[The prepared statement of Mr. Orrell follows:]

Statement of S. Andrew Orrell
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Sandia National Laboratories

United States Senate Committee on Environment and Public Works
Subcommittee on Clean Air and Nuclear Safety
Recommendations from the Blue Ribbon Commission on America's Nuclear Future for a Consent-Based Approach to Siting Nuclear Waste Storage and Management Facilities
June 7, 2012

Chairman Carper and Ranking Member Barrasso, and the distinguished members of the Committee; thank you for inviting me to testify before you today. I am Mr. Andrew Orrell, and I have the pleasure of serving as the Director of Nuclear Energy & Fuel Cycle Programs at Sandia National Laboratories.[1]

I am proud of the numerous science and engineering contributions Sandia has made for over 35 years in the fields of repository science and nuclear waste management, including transportation, storage and disposal. Sandia has provided the Department of Energy the program leadership and technical expertise for several nuclear waste management initiatives including the Waste Isolation Pilot Plant (WIPP) and the Yucca Mountain Project.[2] I personally have over two decades of technical and managerial experience supporting the development of both these repository projects, as well as the transportation program for WIPP. I lived in Carlsbad New Mexico in the 8 years leading up to the compliance application submittal, and in Las Vegas Nevada for the 12 years leading up to the license application submittal, in addition to interfacing with several international repository programs. Throughout my career I have experienced first-hand the meaning of consent-based approaches to repository projects and the "cauldron of public controversy"[3] that can surround them. It is from this perspective that I offer my comments today, recognizing any such comments are my own and do not necessarily represent the opinions or positions of the Department of Energy or Sandia National Laboratories.

That some communities are vigorous in their demands to have spent nuclear fuel and high-level waste removed from their backyards, while other communities are now equally interested in hosting the storage and disposal of that very same material simply illustrates the adage that one man's waste is another man's treasure, but it also begs the question what's the problem? It would seem it is a matter of reaching an agreement that some would argue is right before us.

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[1] Sandia is a multi-program, multi-disciplinary Department of Energy national laboratory operated by Sandia Corporation as a Federally Funded Research and Development Center. We are an independent entity sponsored by the U.S. government to provide detailed technical expertise on complex national challenges.
[2] Sandia was designated as the Science Advisor for WIPP salt repository science in 1975 (and continues as such today) and designated in 2006 as the Lead Laboratory for Repository Systems for Yucca Mountain under the former DOE Office of Civilian Radioactive Waste Management.
[3] Quotation excerpted from comments made by former NRC Chairman Richard Meserve: "Any decision about the management of nuclear wastes must be made in the cauldron of intense public controversy."

But nothing is as simple as it seems, especially when it involves nuclear waste management and the issues of consent.

The United States contain many geologic formations that are considered to be technically suitable for deep geologic disposal of nuclear waste, and even more locations technically suitable for interim storage. Given appropriate repository designs, there is substantial confidence that compliance with regulatory standards for waste isolation can be demonstrated for several geologic settings, disposal concepts, and rock types, including salt, shale, volcanic rock, granite, and deep boreholes. Thus, I and my colleagues are confident there are a number of technical solutions available, and stand ready to serve the nation once again in developing safe, secure and responsible solutions to nuclear waste storage, transportation and disposal. However, despite a plethora of technical solutions, challenges remain to site and develop facilities that are socially and politically acceptable to both local communities, host states, and the federal government. In large part, the intent of the Blue Ribbon Commission recommendations is to open opportunities for the federal government to meet its nuclear waste management obligations and to promote a larger number of opportunities for states and communities to willingly host needed facilities. Achieving and sustaining the federal-state-local partnership that will be needed (beyond the passive sense of consent) is the ultimate objective of the consent-based approach to siting.

When discussing consent-based approaches to siting nuclear facilities, the Commission's report makes liberal reference to the successful outcome of the WIPP development history. I can assure you the WIPP is a phenomenal facility, developed and managed by remarkable people, with an envious safety record both in operations and confidence in its long term performance. The commission report also correctly notes that the success of WIPP was not straightforward or quick. Indeed, even with many factors in its favor, the first shipments to WIPP were over a decade later than planned. I agree with the Commission's statement in the report that " . . . no one could have designed the process that was ultimately followed ahead of time nor could that process ever be replicated."[4] While the WIPP process can't be replicated exactly, it does offer important lessons. We need to recognize the Commission's recommendation for a consent-based, staged and adaptive management approach is intended to provide all parties a siting experience that is understood looking forward as well as in hindsight.

Many of the challenges and conditions experienced on WIPP, and elsewhere, are unique and not likely to be experienced again in any new project. For example, the WIPP facilities were built under a period of DOE self-regulation; only after it was built and ready for operation, and regulatory authority assigned to the Environmental Protection Agency (EPA), was the compliance application prepared and submitted. Secondly, the WIPP was permitted under a containment standard[5], and deemed compliant with safety standards via the EPA's

[4] See BRC final report page 49.

[5] As noted on page 90-91 of the BRC final report, containment-based standards (e.g. 40 CFR Part 191) are designed to limit cumulative releases of key radionuclides, while risk-based standards (e.g. 10 CFR Part 60) are designed to limit doses (radiation exposure) to individual members of the public.

Administrative Procedures rulemaking process, in contrast to the legally-intensive adjudicatory process of NRC hearings.

Regardless, many aspects of the WIPP path to success can be replicated, and should be replicated in any new consent-based initiative, and several of these are recognized in the details of the BRC's recommendations.

Foremost perhaps are the qualities of credibility (i.e. I believe you) and integrity (i.e. I trust you even when I don't fully understand) that must be unquestioned in both institutions and individuals. Such qualities are synonymous with individuals and institutions long held as crucial to WIPP's opening; for example George Dials (Manager of the DOE Carlsbad Area Office), Wendell Weart (Technical Director for Sandia National Laboratories WIPP Science Advisor role), and similarly with Ward Sproat (Bechtel M&O General Manager) on Yucca Mountain, and the New Mexico Environmental Evaluation Group.[6] In virtually all consent-based approaches, the placement of trust and credibility of institutions and individuals will be a prerequisite for success. Care must be exercised to not design or implement solutions which achieve any objective while eroding the placement of trust and credibility.

Which leads me to what I believe are other prerequisites and priorities for a consent-based approach to siting new nuclear waste management facilities. While all of the Commission's recommendations are important some are particularly relevant to the issue of pursuing a consent-based program. I identify three extant uncertainties in the future direction of the nuclear waste management program that left unresolved can reasonably be expected to confound any consent-based siting process.

1. Who will be the federal representative of a consent-based negotiation, the Department of Energy or a new government-chartered corporation?

The commission calls for establishing a new single-purpose independent (outside DOE) government-chartered corporation with a mission-oriented responsibility for implementing the nation's program for managing spent nuclear fuel and high-level radioactive wastes (responsibilities currently assigned to the U.S. Department of Energy). If such a government-chartered corporation is to be the primary mechanism to "re-establish trust with the public and key stakeholders" and to implement the consent-based siting process, then its existence would seem to be a prerequisite to initiating the siting process and the solicitations of interest from potential host communities and states. As such, the basic question of whether to implement the recommended government-chartered corporation (and requiring congressional action) is unresolved in the eyes of potential host communities. This creates another uncertainty of whether a potential host community is now dealing with the Department of Energy but will later be directed to a new responsible entity with potentially new liberties or constraints, changes in any preliminary understandings, etc. Such uncertainty over who the federal actor will be could further complicate perceptions of the validity and integrity of the consent-based process.

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[6] This list is not exhaustive.

Complicating this uncertainty is the unresolved issue raised by the Commission regarding whether or not to continue to commingle defense and commercial waste management responsibility. The Commission notes " . . .a decision to move responsibility for defense wastes to a new organization (versus leaving that responsibility with DOE) would have major implications for the scope of responsibility for the new organization . . ." Indeed, the concerns raised by the uncertainty of who will be the federal representative for consent-based negotiations are exacerbated by the possibility that there could be more than one actor (one inside DOE, one outside DOE) representing federal interests, potentially with different processes.

Prompt action toward the designation of the federal actor (or actors) in the consent-based process yet to be defined, even if it is to re-affirm that the responsibility will remain with the Department of Energy, will remove this uncertainty and enable potential host communities to act with confidence. If defense and commercial wastes are separated, then care will be needed to ensure the institutions, the actors involved and the processes utilized are harmonized to the extent possible.

2. What are the disposal standards and regulations that will govern safety?

The Commission notes the first requirement in siting a repository for disposal centers on the ability to demonstrate the site adequately complies with the performance criteria that provide for the protection of the public health and safety and the environment. To this end, the BRC report calls for development of a new generic disposal standard and supporting regulatory requirements that "**should be finalized prior to the site selection process**"[7] (emphasis added).

The BRC correctly notes that doing otherwise risks public and stakeholder suspicion that safety standards are being adjusted to fit a particular site and therefore not fully protective of health and safety. The Commission also calls for the development of a "safety case"[8] early in the process of exploring potential sites, which I agree with. The development of iterative safety case assessments is a hallmark of most repository development programs and typically provides the frame of reference by which safety is assessed for stakeholder, regulator, and implementer alike.[9] While not strictly necessary for at least initial safety case development, the availability of final disposal standards and regulations is helpful in reducing speculation in the assessment of safety by stakeholders.

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[7] See BRC final report page 94

[8] A safety case is the collection of quantitative analyses, qualitative arguments, and other lines of evidence that serve to assess the potential performance of a site and disposal concept relative to the safety and performance criteria, and assembled with information available at that time.

[9] Ultimately the determination of safety and compliance with performance standards rests with the regulatory authority, and thus early safety cases must take care not to be proffered as or perceived to be advocacy trumping the regulatory authority role.

The call to finalize such disposal standards and regulations prior to the site selection process raises two concerns:

a) a review of the development history of prior repository standards and regulations indicates they typically take years longer than anticipated (often ~18 months beyond the 1-2 years allotted in the directive to the agency, and occasionally years longer), potentially lengthening an already extensive process, further eroding confidence in the siting process among potential host communities, and,
b) without final disposal standards and regulations, some potential host communities may be unable or unwilling to provide expressions of interest to host a facility if they lack a standard by which to assess safety and the risks they may assume, which could further limit options available to site such facilities. Proceeding with even preliminary site evaluations and expressions of interest without final standards is counter to the transparency called for in the consent-based process.

Both these concerns are addressed by taking prompt action to direct the EPA and NRC to develop the new disposal standards and regulations called for by the Commission. Doing so will remove one more potential impediment to the timely initiation of a transparent, consent-based siting process. In addition, prompt action on promulgating final disposal standards and regulations will help resolve the societal value judgments and technical debates concerning the appropriate form and stringency that new regulatory standards should take.

3. Is there confidence that a geologic repository for permanent disposal of spent nuclear fuel and high-level waste will be realized in a timely manner?

The commission correctly notes ". . . the challenge of siting one or more consolidated storage facilities cannot be separated from the status of the disposal program." Further they note ". . . a program to establish consolidated storage will succeed only in the context of a parallel disposal program that is . . . making discernible progress in the eyes of key stakeholders and the public." The answer to the question of what will constitute stakeholder-acceptable "discernible progress" is unknown, but logic would suggest the greater discernible progress the better.

At the present, the DOE is pursuing through the Office of Nuclear Energy Used Fuel Disposition Program a R&D program looking at a broad range of technical issues generic to the repository sciences. At present, it would be difficult to characterize this program as a disposal program with discernible progress toward implementation simply because it is not designed or authorized to do so. As with the uncertainty over who will be the federal representative for a consent-based process (item 1 above) the question of discernible progress in a disposal program is compounded by the whether or not the defense and commercial wastes will continue to be commingled for disposal.

The uncertainty regarding discernible progress toward a disposal program implementation is analogous to the 'waste confidence decision' (which in its most recent rendering has prompted

legal challenge over the change to an unspecified timeframe for repository availability)[10] and the basis for several states moratoria on new nuclear power constructions. By extension the lack of a discernible, mission-oriented repository development program can be expected to thwart the willingness of some communities or states to consider the hosting of needed waste management facilities (i.e. storage facilities and repositories) and perpetuate the moratoria on new nuclear construction.

Thus, as the BRC notes, "discernible progress" on a disposal program, or what I term 'repository confidence', will likely be needed to ensure the potential for community and state interest to host consolidated storage (what some see as more pressing to reduce federal liabilities). This can be achieved by the clear signal that the current repository science program is moving toward a disposal mission-oriented program as called for by the BRC (p. 62). An actual repository development program with substantive progress (i.e. a site or sites identified, either through volunteer processes or by siting criteria, under active site characterization or development) would likely bring a determination of discernible progress and the attendant 'repository confidence' that would lend itself to more expressions of interest from potential host communities or states.

In this regard, it is logical to consider the benefits of a new repository development mission in the Delaware Basin of New Mexico. Such an effort could provide an accelerated availability of both repository capacity and consolidated storage capacity simply because of the ability to leverage the substantial technical and scientific basis that already exists for salt-based repositories. Much of the site characterization data already developed for WIPP is extensible to other nearby locations within the Delaware Basin, and thus could be used to offset an otherwise time consuming site characterization effort. While a repository program could be developed in many locales and geologies, few other locations in the US would have the relevant data and data density expected of an extensive site characterization program. This is not to suggest avoiding development of repository capacity elsewhere, but simply to consider such development of additional Delaware Basin repository capacity in the overall sequence and timing of needing two or more repositories as noted by the BRC. When additionally recognizing the local community has already expressed interest in hosting storage and disposal capacity, and that the State of New Mexico has indicated an openness to consider such possibilities pending determinations of safety, then the strategic value to both the federal and local interests, as a consequence of the WIPP experience, will need to be confronted.

Summary

Writ large, the intent of the BRC recommendations is to open opportunities for the federal government to meet its nuclear waste management obligations and to promote a larger number of opportunities for states and communities to willingly host needed facilities. Given the clear international and domestic evidence as to the fragility and limited number of such opportunities, actions or positions which preclude or limit those opportunities from either perspective are counterproductive and jeopardize the interests of all concerned.

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[10] The BRC Final Report, page 25-26 provides a summary of the Waste Confidence Decision and its evolution.

To this end, the issues of consent-based approaches to the siting of consolidated storage and permanent disposal capacity hinge to a large degree on a few uncertainties that should be addressed before the details of consent-based mechanisms can be confidently worked by either the potential hosts or the waste management organization. These uncertainties and their needed action include;

- ***Who will be the federal representative of a consent-based negotiation, the Department of Energy or a new government-chartered corporation?***
  Take action to identify unequivocally the responsible institution for carrying out the future of the US nuclear waste management program.
- ***What are the disposal standards and regulations that will govern safety?***
  Take action to initiate development of new disposal standards and regulations, and resolve the commingling decision.
- ***Is there confidence that a geologic repository for permanent disposal of spent nuclear fuel and high-level waste will be realized in a timely manner?***
  Take action to initiate a change to a mission-oriented repository development program.

The challenge to develop one or more consolidated storage facilities and one or more geologic disposal facilities, with local and state consent, is not a trivial one. However, the technical solutions for storage, transportation and disposal exist or are readily developed. The Blue Ribbon Commission final report notes (page 44): "Simply put, it will take years to more than a decade to open one or more consolidated storage facilities and even longer to open one or more disposal facilities." Given the technical solutions to storage and disposal are readily available; the timeframes suggested are thus rooted in the prerequisites to initiating a consent-based program. Prompt action on resolving the items noted above will help minimize further delay and better enable this generation to meet its obligations for responsible nuclear waste management.

Thank you for the opportunity to testify; I look forward to answering the Committee's questions.

Senator CARPER. Thanks very much.

I would like for each member of the panel to briefly react to what you just heard from Mr. Orrell.

We will start with you, Mr. Fettus. Just briefly, 15 seconds.

Mr. FETTUS. I think it would be extraordinarily premature for Congress to not take its time to do precisely what I outlined and what I think Dr. Peterson and General Scowcroft outlined, which was to methodically work through the process of creating new legislation and assess the criteria.

Senator CARPER. OK, thanks so much.

Mr. Wright.

Mr. WRIGHT. From what I heard, I tend to agree. I agree with a lot of what he has laid out. I think it is sensible.

Senator CARPER. All right.

Mr. Howes.

Mr. HOWES. I would agree that what he has laid out makes a good deal of sense.

Senator CARPER. Dr. Metlay.

Mr. METLAY. I would certainly agree, and my board has certainly take the position that there are no technical impediments to developing a repository.

Senator CARPER. All right, thank you.

Another question for you, Dr. Metlay. You mentioned in your testimony that the U.S. Nuclear Waste Negotiator, which was established, I think, in the 1987 amendment to the Nuclear Waste Policy Act—could you just take a minute, I don't think you mentioned in your testimony, but take a minute if you will and talk more about the Negotiator's intended role, and is this something that we should or could pursue this time around. If you could. And be fairly brief in your response.

Mr. METLAY. Certainly. The Negotiator, as you said, was established as part of the 1987 amendments. He was given a broad charter to negotiate with any State or native American tribe an agreement to host either a repository or an interim storage facility.

After many years of effort, that task proved unsuccessful, and I believe it was in 1993 the Congress decided to get rid of the Office of Negotiator. Certainly the idea was a useful one, and other countries have tried it.

Senator CARPER. With success, or not?

Mr. METLAY. Not so much.

Senator CARPER. All right, fair enough.

For Mr. Orrell, and Commissioner Wright, the Blue Ribbon Commission recommends pursuing consolidated storage facilities in parallel to a disposal program. Some in Congress believe we can pursue interim storage first without also pursuing a parallel disposal program.

Based on your experience and knowledge, how easy or difficult would it be to get consent at all levels of government if interim storage is pursued without pursuing a disposal program? That would be for you, Mr. Orrell, and Mr. Wright.

Mr. ORRELL. Well, my personal opinion——

Senator CARPER. I will ask you to be brief.

Mr. ORRELL. Yes. My personal opinion is at the moment, without a robust, discernible repository development program, the enthu-

siasm for moving early on consolidated storage will probably be short lived.

Senator CARPER. All right, thanks.

Mr. Wright.

Mr. WRIGHT. What he said.

[Laughter.]

Senator CARPER. You guys are getting good at this. I might invite you to come back to be our third panel today.

This is one for the entire panel. If all of you were in our shoes, what would be your first action to get this country started on a consent-based approach toward finding a final resting place for our spent fuel? And what should Congress' first step be, and is there any action that we shouldn't take that we should rule out at this stage? That would be my question.

Do you want to go first, Mr. Fettus?

Mr. FETTUS. You should start by doing what you are doing precisely today, with these kinds of hearings. You should start with additional hearings on the issues that are going to be very complicated, like fees. The issue of site selection process, the issue of standards. And finally, I think the one mistake you could make is to commence site selection process right now, where you start down the road of an interim storage site that jumps ahead of the line in all of this.

Senator CARPER. Good.

Mr. Wright, a somewhat longer response than you gave to my last question, but not a lot longer.

Mr. WRIGHT. There are actually two things that jump out right away. The first is to pursue the Fed corp, because you have to do something with the fee to make things happen. And transportation, moving the decommissioned sites right away can happen and needs to happen, so that these sites can be put back to productive use.

Senator CARPER. All right, thanks.

Mr. Howes.

Mr. HOWES. We agree, the Yankee companies agree that the dual track makes sense. However, the repository could be quite a number of years away. And so we are very appreciative of the language in the Senate Appropriations bill that calls for a pilot project for decommissioned plant fuel. We think that there is a good deal of lead time, both for transportation and other planning, that needs to go into that along with developing a consent-based approach for identifying a volunteer host community.

So we think there are near-term actions that the Department of Energy, with Congress' support, could certainly get started on while we work out some of the knottier issues down the road.

Senator CARPER. All right, thank you.

Dr. Metlay, just very briefly, please.

Mr. METLAY. Based on the international experience, it is clear that those countries that have had a successful siting program have figured out the problem of distributing power between the central government and the periphery. Countries like Germany, Japan, and Switzerland where you have a Federal system have had a much more difficult time.

Senator CARPER. All right, thank you.

Mr. Orrell.

Mr. ORRELL. Two issues. One, make the fundamental decision about whether to use Fed corp as the Blue Ribbon Commission recommends. It is a fundamental issue that translates to all of the other recommendations in some form.

Then two, I would encourage the promulgation of the new disposal standards and regulations, as these to take very long period of time.

Senator CARPER. All right, good. Thank you all very, very much.

Senator Barrasso. He is going to yield to you, Lamar.

Senator ALEXANDER. He already did that once. I am getting in his debt.

[Laughter.]

Senator ALEXANDER. This has been very helpful and very, very interesting.

Mr. Howes, let me ask you about the Yankee companies. You have three sites, right? How many reactors?

Mr. HOWES. There were three reactors, but the sites are fully decommissioned.

Senator ALEXANDER. So you have stranded fuel?

Mr. HOWES. We have stranded nuclear fuel at our three sites. The reactors and all of the buildings have been removed. The sites are fully decommissioned except for the stranded fuel.

Senator ALEXANDER. So you have the fuel that we are supposed to be taking care of?

Mr. HOWES. Our fuel is licensed by the NRC for both storage and transport, and it is ready to go when the Federal Government comes to pick it up.

Senator ALEXANDER. Well, the suggestion, and you mentioned the language in the appropriations bill, which comes from an impulse to—these things take a while. The stalemate has been 25 years. It takes Congress a little while to pass any kind of legislation.

So our thought with the appropriations bill was, can we take a step or two while we work out the comprehensive piece, or legislation, which would then take over the whole process. Do you think that is reasonable?

Mr. HOWES. Yes, we do. We think that there are near-term actions that could be taken. I think as was mentioned earlier, before you could actually move to consolidate interim storage, you would have to amend the Nuclear Waste Policy Act to do that. But there are any number of things you could do leading up to that, including beginning the transportation planning, identifying the routes for moving this material. Even if you are not sure where it is going, you pretty much know the routes going out of the sites.

So yes, we think that it is eminently feasible to get started on this.

Senator ALEXANDER. In the proposal in the Appropriations bill, of course, any site that is chosen, even as a pilot site, would have to be approved by the Congress. In other words, a law would have to be passed. So I would guess that the law that would be passed would be the comprehensive next step forward.

From your company's point of view, how would such moving ahead with such a consolidation site affect the Yankee companies?

Mr. HOWES. As I indicated, there are any number of steps that need to take place. For example, a transportation cask doesn't yet exist. The Department of Energy would need to provide a transportation cask to move our material.

There are years of lead time to do this. Our sense is that there are things that can be done within existing authority at the Department of Energy to get started on this track, with the hope that Congress in fact will make the needed changes to the Nuclear Waste Policy Act to allow this to go forward.

Senator ALEXANDER. Mr. Wright, do you agree or disagree that if we in the Congress try to move as aggressively as we can to pass a comprehensive piece of legislation, that it is prudent to go ahead with the language in the Appropriations bill that allows the Department of Energy to begin the process of identifying a consolidation site?

Mr. WRIGHT. Yes, I believe—well, we are in favor of doing that.

Senator ALEXANDER. I know. I just wanted to get you to say that.

Mr. WRIGHT. Absolutely.

[Laughter.]

Senator ALEXANDER. And what are the advantages of it, if you are in favor of it?

Mr. WRIGHT. I think it does a number of things. One, it proves that you can move it. And No. 2, the Government is on the hook for a lot of money, liability-wise. And this may start to reduce their exposure to some of that.

Senator ALEXANDER. Mr. Fettus, you are not in favor of that?

Mr. FETTUS. No.

Senator ALEXANDER. And your reason?

Mr. FETTUS. The reason quite simply, Senator Alexander, is that we think that not treating the storage process—and by the way, as was cited here today by Mr. Howes, we don't have objection to the stranded fuel potentially going to an operating reactor site as a consolidated storage. We think that makes imminent sense. And we have said that repeatedly, for years.

That said, within the structure of where we are now, and after the 20 some years of gridlock, if you don't set the chess board properly for the next site of steps going forward, we think you could prematurely choose sites that either may not be suitable, will not fall into the consent-based process that Congress is going to have to very arduously try and build.

Senator ALEXANDER. Thank you. Sometimes we do things better step by step than we do comprehensively. Henry Clay nearly killed himself trying to pass his compromise and went to Nantucket to recover, and Senator Douglas from Illinois picked up the compromise and offered each piece of it separately. And they all passed, with Senator Houston being the only Senator to vote for each piece.

We don't want to go so fast in identifying a consolidation site that we don't do an appropriate job on the second repository. But we have been stuck so long on the Yucca stalemate that my hope, Mr. Chairman, is that we can find prudent ways to move ahead on the consolidation site, while at the same time being very careful as we work through the authorization legislation to go aggressively for a repository and let the processes learn from one another and eventually be the same process.

And that will not be derailed by the Yucca debate. We have conclusively demonstrated that we have a big difference of opinion over Yucca Mountain. I don't think we need 25 more years to do that. We also, I think, have everybody here, and if anyone disagrees with that, I hope you will say so, that even if we opened Yucca Mountain, we will soon need, or maybe immediately need, a second repository for the material we already have. So we need consolidation sites and we need a second repository or more. And so we are looking for a prudent way to get on with it.

This hearing is a good help to that, and the testimony today has been very useful.

Senator CARPER. I agree.

Senator Udall.

Senator UDALL. Thank you, Senator Carper.

This question is to Mr. Orrell and Mr. Fettus. I am trying to drill down a little bit, because the BRC, on this issue of parallel, versus what we have in the law now, as you all know, DOE can't open an interim or consolidated site unless a permanent site is already open. So the BRC talks about parallel. How far along, in your opinion, do we need to be toward a permanent site before you start opening an interim site or a consolidated site?

Mr. FETTUS. I am very happy to begin. A lot farther along than we are now. I will start with that. As I outlined extensively in my written testimony, there is a long, and I think it is safe to say tortuous history of the repository program, as well as sputtering attempts at an interim storage program. And as Dr. Metlay I think effectively outlined today, countries that are having any progress are countries that have resolved the allocations of power. If we don't do that, and I have a set of suggestions in my testimony as to how we begin to do that in a more thoughtful way that avoids the mistakes of the past, I think we could do it.

But Congress has a significant amount of work to do before we do anything remotely related to site selections or moving forward on that front. And that includes storage, or that includes final disposal.

Senator UDALL. Mr. Orrell.

Mr. ORRELL. Well, as was noted earlier, this somewhat hinges on the definition of consent and how you would secure that. If a host community needs consent on allowing interim storage, or consolidated storage facility, and it would like to have knowledge that there is a repository program behind it, it will probably define what the level of progress would be.

But one other measure might be simply an uncontested waste confidence decision. We have a recent waste confidence decision from the NRC that unfortunately has been legally contested. That brings at least suspect whether or not we have a sufficient progress on a repository program.

Senator UDALL. Thank you.

Mr. Fettus, you recommend removing the exemptions radioactive pollutants from State environmental authority. Why would giving States more authority over a nuclear waste site making consent-based siting more likely, and what does the WIPP experience tell us about State authority?

Mr. FETTUS. First, in answering this question, I want to respond briefly to Senator Carper's admonition that these things are seen as dumps. They are. This is some of the most toxic and dangerous waste that will be radioactive for a million years. This is a difficult thing to manage and is why the scientific consensus for over half a century has been deep geologic disposal. NRDC concurs with that consensus. This is a difficult matter with extraordinarily dangerous waste.

That said, I am informed by my work for Senator Udall, when he was the attorney general of New Mexico, the only meaningful time that States felt in any measure comfortable in terms of accepting this kind of facility within their borders, no matter the incentives, if it were simply a matter of financial and monetary incentives or structural, then Yucca Mountain would have been built a long time ago, or built and actually operating a long time ago.

What it is is when States essentially have a measure of skin in the game. And a Governor, an attorney general, its congressional delegation can say, we can make a deal here, because we have control, with of course a Federal floor, that I am quite sure EPA and the NRC and the Energy Department or whatever new entity can harmonize their standards.

But when States have a measure of control to say, we can regulate this according to the most strict and protective standards that we see fit. And when that is the case, there is a potential for this kind of very complicated, difficult decision to go forward. Without that, it is not going to happen in our Federal system.

I think the evidence bears me out on that.

Senator UDALL. Thank you.

Senator CARPER. I would like to ask Senator Barrasso if he feels prepared to bring us home and to be our last questioner. He is up to it.

Senator BARRASSO. Thank you, Mr. Chairman.

Mr. Howes, I am concerned about how long it has taken to address the long-term storage of nuclear waste. It is a process that began three decades ago. We are no closer to a solution.

With regard to interim storage, you talk about wanting to see the timely implementation of the Blue Ribbon Commission's recommendations. What is your opinion? What would be timely, when you talk about a timely implementation, to see these recommendations implemented?

Mr. HOWES. We recognize that nothing proceeds very quickly when we are talking about nuclear waste. I think the Blue Ribbon Commission recognized that there are long lead times for developing any of the consolidated storage options, including looking at transportation and other issues.

The Blue Ribbon Commission, I believe, said that this might be able to be done in a decade or so. I think that would be a wonderful thing. I think it may be optimistic. We are prepared to work with other stakeholders to get this done as rapidly as possible, but we are not naive enough to think that it is going to happen overnight.

Senator BARRASSO. And Mr. Wright, you said in your testimony that you have long favored consolidated interim storage but find the report vague as to the quantity, the duration and the cost. These are very big issues to solve. Could you elaborate a little bit

more on that point, what details we have that this Committee and the public at large need to see here? What do we need to see from this Commission and the Administration before signing off on a plan?

Mr. WRIGHT. I do believe that you do see things better now than maybe what has been mentioned in years past. You really are starting to focus on it, and I have been very gratified with what I have heard here today. It is still, and I agree with Mr. Howes, it is going to take lead time. Ten years is what has been thrown out on some of that stuff. But you have EIS reports and NEPA things that you have to go through; there are hoops that have to be jumped through.

The bottom line, I think, for the confidence of commissions and States and the utilities that we serve and regulate is the money. Making sure that the money is used for what it is supposed to be used for, and that trust that needs to be built with any partnership with the Federal Government and States and communities that you are going to be dealing with. I think that is huge.

Senator BARRASSO. Thank you, Mr. Chairman.

Senator CARPER. I am going to ask just one more question, and if my colleague want to ask another question, they are welcome to. Sometimes when we have a panel, this has been a really good hearing, and I appreciate all of you being here, certainly appreciate our colleagues being here.

Here is my question. One of the things, as my colleagues may recall, I like to look for consensus from a panel. You all agree on some things, and you disagree on some things. Maybe just to start with you, Mr. Orrell, one major point where you think there is consensus from this entire panel, what might that be?

Mr. ORRELL. Well, I would say that the general feeling of the time has come to take action.

Senator CARPER. OK.

Dr. Metlay.

Mr. METLAY. My board has written in one of its publications, it would be a shame if we temporize.

Senator CARPER. OK.

Mr. Howes.

Mr. HOWES. The Federal Government needs to fulfill its obligations.

Senator CARPER. Mr. Wright.

Mr. WRIGHT. It is probably time to move the decommissioned plant site waste and get that moved to a consolidated place.

Senator CARPER. All right, thank you.

Mr. Fettus.

Mr. FETTUS. I think there is an acknowledgment that a consent-based process is what has to come out of Congress now. There are very different views on how that can come about, but I think there is an acknowledgment that that has to be first.

Senator CARPER. OK.

Senator Alexander, anything else?

Senator ALEXANDER. No. I hope we will have more of these when it is appropriate, and I hope all of the other hearings are as useful as this one. Thank you very much.

Senator CARPER. And I would echo that. I think our colleagues have 2 weeks—our colleagues, some of whom were not able to be here, would like to ask questions of you. They have 2 weeks to do that. We simply ask if you receive those questions that you just respond to them in a prompt manner.

Great to be with all of you; thank you for your participation today and for your help. Thanks.

With that, this hearing is adjourned.

[Whereupon, at 12:20 p.m., the Committee was adjourned.]

[Additional statements submitted for the record follow:]

STATEMENT OF HON. JEFF SESSIONS,
U.S. SENATOR FROM THE STATE OF ALABAMA

Thank you, Chairman Carper and Ranking Member Barrasso, for your leadership on nuclear energy issues. I look forward to hearing from the members of the Blue Ribbon Commission and our other witnesses.

I would begin by noting that, even as our nation builds more nuclear power plants like those at Plant Vogtle, we still do not have an operational repository for spent nuclear fuel. Why?

As explained in the Department of Energy fiscal year 2011 budget justification, the Obama administration unilaterally "determined that developing the Yucca Mountain repository is not a workable option and the nation needs a different solution for nuclear waste disposal."

I do not believe it was the right decision.

First, the law of the land—the Nuclear Waste Policy Act—established Yucca Mountain in 1987 as the designated site for the nation's geologic repository for spent nuclear fuel. That law has not been changed.

Second, the Yucca site has been fully studied and found to be a safe place to store spent nuclear fuel. This was an effort that took more than 25 years and cost taxpayers more than $14 billion. The geological, hydrological, geochemical, and environmental impacts have been studied, including a detailed evaluation of how conditions might evolve over hundreds of thousands of years at Yucca Mountain. The Department of Energy has summarized these studies in several scientific reports which served as the basis for the 2002 decision to approve Yucca Mountain as a site repository.

Third, there is a misconception that the Yucca repository is "unworkable" because of a lack of "local support." In fact, the Board of County Commissioners of Nye County, Nevada—the county where the Yucca repository would be sited—wrote the Blue Ribbon Commission in February 2011 to say that "strong local community support for Yucca Mountain exists at the host county level." The county's letter states that their "own research . . . convinces us that the science embodied in DOE's license application for Yucca Mountain and its hundreds of supporting documents is sound . . . " They write that the Yucca repository has been "hijacked by the politics of a single powerful Senator and what some view as complicity by the NRC Chairman." Attached to the Nye County letter is a 2011 resolution by the Board of Commissioners urging completion of the Yucca Mountain licensing proceedings and resolving that "the Yucca Mountain repository can be constructed and operated safely."

So, again, this is the county where the repository would be sited, and the county leadership is clearly stating, on the record, that they support the Yucca Mountain repository.

Finally, I would note that the Nuclear Waste Fund is about to reach $28 billion. Those dollars were paid by electricity ratepayers and were intended for a permanent solution for spent nuclear fuel. On June 1st the U.S. Court of Appeals for the D.C. Circuit raised serious questions about this matter, and the court indicated that it may even issue an order halting the collection of the nuclear waste fee.

Chairman Carper, thank you again for holding today's hearing. I look forward to hearing from the members of the Blue Ribbon Commission, and I greatly appreciate the work they have done on this issue.

STATEMENT OF HON. MIKE CRAPO,
U.S. SENATOR FROM THE STATE OF IDAHO

Good morning. I thank Senator Carper for scheduling this hearing on the recommendations stemming from the Blue Ribbon Commission on America's Nuclear Future.

I also appreciate the participation of our panelists: Lieutenant General Brent Scowcroft, who served as Co-Chair of the Commission, and Dr. Per Peterson, who served with him on the Commission. Thank you both for the time and consideration you put toward this effort.

In carrying out its work, the BRC noted a clear "erosion of trust in the Federal Government's nuclear waste program," which requires new approaches to the long-familiar challenges of siting, licensing, operating, and funding waste management activities.

Consistent with this finding, BRC recommended the creation of a separate new organization dedicated solely to implementing a waste management program. This organization would be separate from the Department of Energy which currently has responsibility for management of defense and civilian nuclear waste.

While there are no commercial nuclear power plants in Idaho, significant quantities of nuclear waste stemming from defense activities are currently stored in the State. Idaho is proud of the role it continues to play in support of national defense activities, including the Naval Nuclear Propulsion Program.

It is critically important that the Federal Government not lose sight of its commitment to remove defense waste in accordance with established agreements with Idaho and other States by 2035. I fear that any comprehensive re-organization of nuclear waste management responsibilities heightens the risk that established agreements may be violated. This is an entirely unacceptable outcome.

The BRC recommended that the Administration launch an immediate review of the implications of managing defense wastes within the DOE versus a new organization, correctly noting that the issue raises key questions of funding, governance, and congressional oversight. I support this review and urge that defense waste removal remain a top priority within the Department of Energy.

I continue to support Yucca Mountain as the legally mandated, permanent geologic repository for both defense and civilian high level waste. Much of the DOE inventory, including the naval reactor spent nuclear fuel now stored in Idaho, has been managed and placed into a condition suitable for ultimate disposal in just such a deep geologic disposal facility.

The BRC contends that the question of managing defense waste separately from civilian waste need not delay implementation of other BRC recommendations. However, it is crucial that whatever the actions Congress and the Federal Government may take to move nuclear waste disposal forward, we remain appropriately focused and committed to existing agreements with the States regarding the removal of defense wastes. Nothing whatsoever should be done to delay the permanent disposal of this waste, relative to the disposition of civilian waste.

Again, I appreciate the participation of the panel members this morning and look forward to your insight.