BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE

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MEETING

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TUESDAY,
NOVEMBER 16, 2010

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The Commission convened at 8:30 a.m. in Salons B, C and D of the Marriott Metro Center at 775 Twelfth Street, Northwest, Washington, D.C., Lee Hamilton and Brent Scowcroft, Co-Chairs, presiding.

MEMBERS PRESENT:

LEE HAMILTON, Chair
BRENT SCOWCROFT, Chair
MARK AYERS
VICKY BAILEY

ALBERT CARNESALE
SUSAN EISENHOWER
CHUCK HAGEL
JONATHAN LASH
ALLISON MacFARLANE
RICHARD MESERVE
ERNIE MONIZ

PER PETERSON
PHIL SHARP

ALSO PRESENT:

TIM FRAZIER, Designated Federal Official

KEVIN KAMPS, Beyond Nuclear

SUSAN CORBETT, Sierra Club

HANK JENKINS-SMITH, University of Oklahoma

JOHN GARRICK, US Nuclear Waste Technical Review Board

ANDY KADAK, Massachusetts Institute of Technology

JOHN KOTEK, BRC Staff Director

PUBLIC COMMENTERS:

ALEX PAVLAK

BRENNAIN LLOYD

LINDA LEWISON

ELLEN THOMAS

ALFRED MEYER

DAVE KRAFT

CASH JASZCZAK

KEITH LARSON

DAN BROWN

DIANE D'ARRIGO

JAY MARX

T-A-B-L-E O-F C-O-N-T-E-N-T-S

P-R-O-C-E-E-D-I-N-G-S

(8:32 a.m.)

MR. FRAZIER: We are going to go ahead and get started. I would like to welcome you to Day 2 of the full commission open meeting of the Blue Ribbon Commission on America's Nuclear Future.

My name's Tim Frazier. I'm the Designated Federal Officer, and without any further wait, Congressman Hamilton, if you're ready, sir?

CHAIR HAMILTON: We're ready. Thank you very much, Tim. Good morning. Welcome back to the meeting of the Blue Ribbon Commission on America's Nuclear Future.

Let me remind the audience that at the end of today's session, we will hear from any member of the audience who wishes to speak. A sign-up sheet for the public comment period is available at the registration desk.

Please sign up before 11:00 a.m. so we have an accurate count. The amount of

time allotted to each speaker will depend on the number of people who sign up to speak.

Our first presentation this morning is by Susan Corbett and Kevin Kamps. Ms. Corbett chairs the South Carolina chapter of the Sierra Club.

Mr. Kamps holds the title of radioactive waste watchdog with Beyond Nuclear located in Takoma Park, Maryland.

Ms. Corbett and Mr. Kamps are here representing a large number of organizations and individuals who have signed a petition that, we understand, they will present to the Commission. They will also discuss their views on the questions that the Commission has asked our three subcommittees to address.

Ms. Corbett and Mr. Kamps, we thank you very much for being with us this morning, and we ask you now to come to the microphone, if you will. This is Kevin Kamps, I presume?

MR. KAMPS: Yes, it is.

CHAIR HAMILTON: All right. Mr. Kamps, we're delighted to have you here. Thank you, and you may proceed.

MR. KAMPS: Thank you, Chairman. Chairman and Commissioners, my name is Kevin Kamps, and I serve as radioactive waste watchdog at Beyond Nuclear based in Takoma Park, Maryland.

It's an honor and a privilege for me to have been asked by a community of 167 national and grassroots environmental and public interest groups across the United States to speak on their behalf before you to convey their strongly-held conclusions about radioactive waste management.

I gave Mary Woollen, who then handed out to you a copy of a packet, and I'll go through it very quickly here so you know what the pieces are.

The topmost piece is a cover letter from a core group of organizations that helped coordinate this group statement. The

next piece down is the document itself, which is the answers to BRC key questions, and you'll see at the end the 167 groups that are signed on.

After that, the principals for safeguarding nuclear waste at reactors and then the statement by myself and then Susan Corbett's statement.

So, I would like to begin by thanking President Obama and Energy Secretary Chu for their wise decision to cancel the proposed Yucca Mountain, Nevada dump site for high level radioactive waste.

This geologically unsuitable site, which belongs to the Western Shoshone nation by treaty right, should have been declared unsuitable long ago.

I'd also like to take this opportunity to thank President Obama for his Women's History Month proclamation of March 2009 in which he honored Native American environmental justice activist Grace Thorpe.

President Obama proclaimed, quote, Grace Thorpe, another leading environmental advocate, also connected environmental protection with human well being by emphasizing the vulnerability of certain populations to environmental hazards. In 1992, she launched a successful campaign to organize Native Americans to oppose the storage of nuclear waste on their reservations which she said contradicted Native American principles of stewardship of the earth. She also proposed that America invest in alternative energy sources such as hydroelectricity, solar power, and wind power, end quote. That's from the President's Women's History Month Proclamation of March 2009.

In addition to adamant opposition to reprocessing and a call for isolation of radioactive wastes from the living environment for as long as they remain hazardous, the main message I bring you today from the 167 groups

which have signed onto the answers to the key Blue Ribbon Commission questions, is that the only real solution to the radioactive waste problem is to stop making it.

For the 63,000 metric tons of commercial, high-level radioactive waste that already exists in this country, an interim first step to address dire safety and security risks is hardened onsite storage wherever feasible.

Nuclear weapons facilities must devote all resources to exhuming, treating, containing, and isolating from the environment the decades old radioactive wastes, particularly high-level liquids and sludges and completely end development of new nuclear weapons.

Any centralized interim storage and the transport associated with it should only be undertaken to enhance safety, security, public health, and environmental protection. Anything less would represent a

highly risky radioactive waste shell game on our nation's roads, rails, and waterways.

Regarding stop making it. High level radioactive waste has been accumulating for 68 years since Fermi first split the atom during the Manhattan Project, and we don't even know how to safely and soundly and permanently manage the first cupful.

Electricity is but the fleeting byproduct from atomic reactors. The actual product is forever-deadly high-level radioactive waste. We need to stop making it.

As of spring 2010, enough irradiated nuclear fuel and high-level radioactive waste had been generated to completely fill the now-cancelled Yucca dump to its legal limit at least until a second dump was opened in the east.

But the 104 operating commercial reactors annually churn out an additional 2,000 metric tons of irradiated nuclear fuel, all of which from now on is excess to the

first repository's capacity to accept necessitating a second dump.

The Nuclear Regulatory Commission over the past decade has rubber stamped 59 of 59 applications from nuclear utilities for 20-year license extensions at aged, deteriorated reactors.

In addition to the safety risks of such decisions are the 20 metric tons per year of additional irradiated nuclear fuel that will be generated at each license extended reactor. Now there is talk of 80 years of waste generation at these reactors.

In addition, between 2007 and 2009, NRC docketed 26 applications for new reactors. If licensed, if financed by transferring most of the financial risk on the U.S. taxpayers and/or rate payers, if actually constructed and if actually operated, these reactors would add to the mountain of radioactive waste nearly 70 years high at this point.

Incredibly, the Department of Energy signed contracts with nuclear utilities proposing 21 new reactors, transferring ultimate liability onto the American taxpayer.

When were these contracts signed? In the waning days of the George W. Bush administration beginning on November 4, 2008, the very day Barack Obama was elected President and ending on January 22, 2009, two days after he took the oath of office.

How do we stop making high-level radioactive waste? Arjun Makhijani's 2007 book Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy shows the way. It showed that by 2050 not only nuclear power but also fossil fuels can be phased out from the U.S. economy and replaced with energy efficiency and diverse forms of renewable sources such as wind, solar, and many others.

This can be done affordably and with no further technological breakthroughs required. Dr. Makhijani has since revised his

findings forward and says that this can now be accomplished by 2040.

In fact, Mark Cooper of Vermont Law School reported last year that rather than build 100 new atomic reactors, the U.S. could provide the same electrical end product for as much as $4 trillion less via efficiency and renewables.

Moving on to hardened onsite storage, or HOSS, storage pools densely packed with irradiated nuclear fuel at reactor sites are one of the most potentially catastrophic safety and security risks in the U.S.

Whether due to accident or attack, the loss of pool cooling water could result in a matter of hours in a radioactive waste inferno releasing more hazardous radioactivity than was released by the Chernobyl nuclear catastrophe.

The overall objective of HOSS should be that the amount of radioactivity releases projected and even severe attacks

should be low enough that the storage system would be unattractive as a terrorist target.

Operating pools must be hardened and transitioned to open-frame, low-density storage, but current onsite dry casks storage is far from good enough. Dry casks stored in the open air were not designed nor manufactured with terrorism in mind leaving them vulnerable to attacks.

In addition, very serious quality assurance violations have taken place with both the design and manufacture of currently deployed dry casks, as well as the pads they rest upon.

For such reasons, periodic review of HOSS facilities and fortified pools should be required. Funding should be dedicated to enable local and state governments to independently monitor the sites.

The signatories to the current Answers document feel so strongly that HOSS should be implemented as soon as possible that

they have endorsed use of the nuclear waste fund to do so, even though the nuclear utilities that have generated the irradiated fuel in the first place and not the rate payers should be held responsible and liable for these costs.

Originally proposed by the safe energy community in 2002, HOSS is now one of the widest points of consensus among communities impacted by nuclear energy and supported by those near nuclear weapons production sites, as well.

Unfortunately, to date, this proposal has been largely ignored by the industry, its regulators, and elected officials. A position statement, Principles for Safeguarding Nuclear Waste at Reactors, it's self-signed by 170 groups, has been delivered to you today.

Regarding centralized interim storage, Winona LaDuke, an Ojibwe environmental justice and anti-nuclear leader,

has quipped, "The greatest minds in the nuclear field have been hard at work for over 50 years in search of a solution to the radioactive waste problem, and they finally found one. Haul it down a dirt road and dump it on an Indian reservation."

Keith Lewis, a Serpent River first nation environmental defender from near the uranium mines and mills of Elliot Lake, Ontario, has said that, "There is nothing moral about buying out somebody who is starving."

As President Obama himself indicated by honoring Grace Thorp, such environmental injustice must be stopped once and for all. Parking lot dumps for irradiated nuclear fuel as licensed by NRC at the Skull Valley Goshutes Reservation in Utah as promoted by DOE's nuclear waste negotiator, David Leroy at Mescalero Apache Reservation in New Mexico, and as yet being pursued at Native American reservations as we speak by the

nuclear power utilities are intolerable and insufferable.

Nearly 450 national and grassroots groups indicated just that in a statement declaring private fuel storage at Skull Valley unacceptable five years ago.

In addition to the hazards of the back end of the uranium fuel chain being targeted at low income and people of color communities, often too the front-end hazards of the uranium fuel chain are targeted at these same communities.

Uranium mining proposals are currently threatening not only the Grand Canyon's indigenous inhabitants, the Havasupai, but also the sacred Mount Taylor, as well as Navajo Indian country despite the Navajo tribal council's clearly stated law banning any and all uranium mining, milling, and processing activities on its land.

Thus, the phasing out of nuclear power and its replacement with efficiency and

renewables will end such environmental injustices at the front end of the uranium fuel chain, as well.

Finally, regarding transportation, the shipping of a irradiated nuclear fuel by truck, train, and barge has been described by phrases such as mobile Chernobyl and dirty bombs on wheels.

Again, irradiated nuclear fuel shipping containers were not designed with terrorist attacks in mind and their questionable structural integrity raises serious concern about their ability to withstand severe accidents, as well.

The movement of such potentially catastrophic hazards through major population centers must occur only when it improves safety, security, and the protection of public health and the environment.

In closing, on behalf of 167 national and grass roots environmental and public interest groups, I emphasize the urgent

need to safeguard and secure the high-level radioactive wastes currently stored at reactor sites in hardened onsite storage as an interim measure. I emphasize the wisdom of phasing out dirty, dangerous, and expensive nuclear power and replacing it with safe, secure, ever more cost effective and truly clean efficiency and renewables.

This will also benefit environmental justice, which also demands that the lands and communities of indigenous peoples never again be targeted by the most hazardous stages of the uranium fuel chain from uranium mining to radioactive waste storage and burial.

The final thing I'll mention is that in addition to the 167 groups on the statement, this is a petition containing over 3,300 signatures from individuals, and I can leave this copy, as well. With that, I'll turn it over to Susan.

CHAIR HAMILTON: Thank you very

much, Mr. Kamps. We'll now hear from Susan Corbett.

MS. CORBETT: Good morning. Thank you all for allowing me to be here today and speak. My name is Susan Corbett. I live in Columbia, South Carolina. I drove up yesterday and driving back today after I finish here.

I am the chair of the South Carolina chapter of the Sierra Club. We have over 5,000 members in our state. I'm also the chair of the national Sierra Club Nuclear Issues Activist Team, which is the national Sierra Club team that kind of watchdogs nuclear issues.

I serve in a volunteer position. I don't get paid to do this. I'm a layperson, but I have been kind of involved in watching these issues since the 1970s when they built the VC Summer Plant about ten miles from where I was living.

I'm here today to represent, as

Kevin did, 167 different groups around the country who have expressed their concerns about nuclear waste and what to do with it, but also very importantly to you. I'm also here today representing a coalition of South Carolina groups, which is called the common agenda, which is a collective effort of 36 organizations in South Carolina representing over 45,000 South Carolinians.

South Carolina is one of the most nuclear states. Sorry for my throat. We have seven operating reactors. We have the Savannah River site. We have the Barnwell Low-Level Waste dump, we call it.

We have the Westinghouse Fuel Fabrication Plant. We have a Nuclear Laundry. I'm sure we have more, but we are definitely a state that is heavily invested in all things nuclear.

But, our point here today is that we feel like the government in partnership with the nuclear industry has been running a

kind of deficit program. It's not a deficit in a traditional sense, but it's a deficit nonetheless because we have been taking the benefit of the electricity created by nuclear power, but we really haven't been paying the bill in full.

We've been allowing this nuclear waste to accumulate thinking that we would find some way to deal with it and now here we are. We -- thank you. The day has come. We have got to pay this bill. We can't keep going forward kicking this can down the road.

The failure of Yucca Mountain has made that very obvious to us, and we're very concerned that we must take every conceivable step to isolate these long-lived radioactive materials from groundwater. We must not allow this to get into the groundwater, either current or future supplies of groundwater. It's going to be very important that we protect our water in the future and we don't want radioactive material seeping into that.

So, what to do with the 67,000 tons of irradiated spent fuel? It's a major concern to reactor communities, and it's very much a concern to communities that know they're being targeted as some kind of site for nuclear waste disposition.

We down in South Carolina know there is a strong push to consider reprocessing. We hear this every day in the state legislature. We hear it down at Savannah River in Aiken and Augusta.

We hear all the glowing, wonderful things about reprocessing, but I am here to tell you today that conservation groups around the country, and particularly conservation groups in South Carolina -- are we going to stand unanimously against this?

Groups in South Carolina cover a wide variety of positions regarding the role of nuclear energy in our future, but we stand together in our opposition to reprocessing because we know what results. We've seen it.

Other communities are going to feel the same way. It's not -- I'm speaking for not just my state, but other communities, too, that are looking at this prospect.

I am sure that you are aware that non-proliferation groups are also very concerned about starting up reprocessing. Two weeks ago I toured Savannah River site. I go there at least once a year or so -- I try to go.

I always come away with a couple of feelings. The first thing I come away with is tremendous, tremendous respect for the people, the men and women, who work there on a daily basis and work all the high-tech procedures and dangerous and they do a great job there.

We want to support missions for Savannah River site that involve clean energy. We're very much in favor of that, but the other thing that I come away with when I'm there is why would we ever consider restarting

a process that created this, one of the biggest environmental nightmares, and other sites, too, around the world.

Why would we ever -- why would South Carolina, or any community, allow this process to restart? Why would any community want DOE to start up a process that's going to create such a legacy of more nuclear waste?

The 36 or so million gallons of high-level waste is sitting in the tanks at Savannah River are significant and very problematic. I go to the Governor's Nuclear Advisory Council meetings all the time and listen to them talk about it.

I mean, it's still decades -- decades have gone by. In 2008, Terrel Spears who was then the assistant manager of the waste disposition project at DOE told the National Academy of Sciences Clean-Up Technology Roadmap Committee that "radioactive waste stored in the Savannah River site tanks poses the single largest environmental risk to

the State of South Carolina."

That's my state. Some of the waste in those tanks -- it was originally -- it was all going to be removed, but now it got through these kind of last minute reclassification. It got reclassified is what it's called. WIR, Waste Incidental to Reprocessing.

So, now it's not even all going to leave. I mean, they're using these grouting methods to grout what they can't get rid of and mix it and then leave it and especially the sludge at the bottom of the tanks and some of that -- some of the tanks that have already been cleaned, there's still a lot of radioactivity in the bottom of those tanks and now the plan is just to grout them and leave them there and this is an area -- it's going to be orphaned there and this is an area with a very high water table.

It sits right atop of the Tuscaloosa aquifer. This -- would new

commercial reprocessing ventures include WIR waste and the abandonment of it at Savannah River? Actions like this are what are causing us to question this whole thing, and we just feel like we're going to become more of a home for more stranded nuclear waste.

We in South Carolina are not alone. I mean, other communities -- I'm speaking for South Carolina, but I'm also speaking for other communities around the country that are very concerned about this same scenario and so they were just -- and DOE has got to resist the temptation to succumb to contractors and those that are seeking to profit from new missions.

We cannot allow them to be characterized as the community -- the voice of the community. Company towns are notoriously unwilling -- they're unable to confront their employers, their fear of job losses, their fear of being ostracized in the community for speaking up.

I mean, I go down to Aiken all the time. Nobody down there will say a word. I mean, a few people will, but every meeting I go to in Aiken and North Augusta, it always starts with a very perfunctory parade of local officials who come out and rubberstamp it and never speak against it no matter how questionable or onerous the mission is.

Then those people are always followed by heartfelt, well-thought-out, well-spoken citizens who might dare venture out. A lot of us have to come from outside the area because the local folks are worried and concerned about speaking up.

I don't understand why the rush is to think about reprocessing because I think if you look around the world, I'm not seeing in what I'm reading that this has really proved to be any good solution, and it creates more volume.

I mean, and I just read yesterday that when you put together the high level and

the greater-than-Class-C waste, you actually end up with more waste that's going to have to go to repository.

Of course, we know you create a larger volume of raw with more low level waste and the other thing that's really disturbing to me is I did some research from -- on this is that the six combined countries that have been reprocessing have now managed to stockpile 215 metric tons of weapons usable plutonium.

I mean, I can't feed it back into the system fast enough, so they got -- you have these stockpiles of this plutonium out there. The proliferation risks of this are significant.

I was going to tell you a story about some Armenians who just tried to smuggle out some highly enriched uranium, but I'm not going to go into that here. I'm sure you all are aware of the proliferation risks of separating out weapons-usable material.

I also think that reprocessing would send the wrong signal to the rest of the world. I know other countries are doing it, but I don't think we should engage in do as we say, not as we do technologies on any level. I mean, what are we going to do?

Are we going to police the whole world and their reprocessing activities? Are we going to get engaged in that or are we going to end up being target by some rogue state who does their own kind of reprocessing?

There are so many reasons to oppose reprocessing. It's hard to talk about them all here. I mean, look at our military sites, Hanford, huge messes we've created there we can't clean up.

Look at West Valley. I just got a report from a friend of mine yesterday, West Valley. Huge plume underground migrating from a spill in the reprocessing building costing taxpayers billions of dollars.

They don't even know if they can

clean it up. They were going to dig it all up and move it somewhere, probably to Barnwell. It's a debacle. It was a financial failure and it was an environmental failure, so we tried reprocessing in this country.

In France, the French are doing it. They're dumping the liquid waste in the North Sea -- in the English Channel, I mean. They don't have a geologic repository, and they also have stockpiled plutonium.

Sellafield, Mayak in Russia, environmental disasters there, very dirty place. The Japanese, I read yesterday, I think, that over $20 billion they've invested in Rokkasho and it still hasn't started and they said that this is the 18th postponement of it and it's 15 years behind schedule.

So, reprocessing is going to put this enormous financial burden on a nation of taxpayers who is already on the edge. It's too expensive. It's too expensive.

Also, if you are trying to promote

nuclear power as some future energy source, according to the GAO, reprocessing adds 25 percent more to the direct cost, so you're kind of -- it's already pricing itself out of competition anyway.

If you add this on top of it, forget it; it's just going to be so expensive. So, you're not helping sell the industry as a power source by adding more cost to it.

It's unnecessary to do this. The people that signed the grassroots answers document feel that the once-through fuel chain is preferred to any kind of reprocessing chain.

So, we urge you to put aside and put away this notion of reprocessing in the United States. We don't need to do it. We totally support hardened onsite storage with improved methods for keeping it onsite, and we know this is not a permanent solution, but we think this is much preferred until we find a permanent geologic repository.

Finally, for the record, I want to say that South Carolina conservation groups are also very opposed to any kind of centralized interim storage as in bringing it down to our state and leaving it there and hoping it's going to get taken care of.

Our former governor, Dick Riley, expressing his aversion to a nuclear waste storage, once pronounced what became known as Riley's law of nuclear waste. He said, "Nuclear waste tends to stay where you put it last."

Certainly, that's been true in South Carolina where we have been the recipients of massive amounts of waste and very little has ever left.

I got this quote from the common agenda folks. "South Carolina's conservation community is opposed to bringing anymore out of compact low-level waste or any high-level nuclear waste into our state and it has grave concerns about further reprocessing missions,

which would dramatically increase the radioactive waste burden at the Savannah River site."

Organizations in our state that have taken this position opposing our reprocessing include Coastal Conservation League, which is the largest group in the state, Conservation Voters of South Carolina, the League of Women Voters of South Carolina, Audubon Society, Friends of the Earth South, Sierra Club, and a whole host of other organizations.

Thinking about decentralized storage is that when you keep it in decentralized locations, you kind of keep multiple congressional districts engaged in the discussion, which is a good thing because otherwise you just get this out of site, out of mind mentality going on.

Just dump it in South Carolina. We'll figure out something later on. Having that same thing with the MOX fuel. They

borrow the surplus plutonium down there to our state. We're going to build this MOX plant and they're scheduled to be -- they have nobody to take the fuel.

Duke backed out of its contract, and we're hearing now it's going to be forced on TVA, but we don't know where that's going, so they cancelled that.

Then there's this big lawsuit about Yucca Mountain because they're saying that all the vitrified waste was supposed to go to Yucca Mountain when we know that really only 10 percent of Yucca was set aside for vitrified -- for DOE waste, and that included all the DOE sites, so really, if you look at the numbers, there was a significant amount of waste that was going to get left at Savannah River I guess for some second repository, whenever that happens, but essentially, it's going to be orphaned there.

So, we in South Carolina are going to look very skeptically at any kind of plan

to stockpile spent commercial fuel in a central location based on our experience in the past.

I think that other states and other communities are going to have that same concern. So, in conclusion, we respectfully ask that this Commission keep this process open for all people to participate and those who are profiting or stand to profit from radioactive waste produced emissions at DOE, they should not be allowed to dictate the policies that further burden these states or make these difficult decisions.

If you're meeting with booster groups because certainly all of these company towns have booster groups, and I know lots of those folks are great folks, but if you're going to meet with those, you should meet with the local conservation groups, as well.

We don't believe that you should be having meetings with special interest groups who seek to profit from these kinds of

difficult decisions.

Finally, I guess the real discussion should be is whether we really, truly need nuclear power in the future. Are there better, safer, cheaper, non-waste-producing, healthy energy sources to replace it in the 21st century and is energy efficiency technologies emerge and new renewable energy sources, we might find that we don't need to depend on this very expensive and problematic energy source. Thank you.

CHAIR HAMILTON: Well, thank you very much, Ms. Corbett. We thank you and Mr. Kamps for your statement. Are you prepared to take questions, the two of you?

MS. CORBETT: Sure.

CHAIR HAMILTON: Would you please? Do the Commissioners have questions? Jonathan?

MEMBER LASH: So, our mandate is not really to make decisions on whether nuclear power makes up part of the future

energy mix to the United States, but the first part of what you said, Ms. Corbett, about we have these wastes, we have a responsibility that we haven't met to address them is at the core of what our responsibility is.

One of the questions for us is not having successfully answered the question about what to do with those wastes over the past 40 years, what kind of institutional arrangements can we create that would work to create both a technically viable and a socially viable solution?

I wonder if you have thoughts for us on that. If you could create an institution to move forward, what would it look like?

MS. CORBETT: Well, this is like -- what is -- what was that conundrum at the Star Trek thing where he says, "No good answer?" You know, it's like you have to fool the computer or something.

There's really no good answer. I

put this out to my son. He said, "We'll just shoot it up to the sun or let it burn up in the atmosphere." Everybody says that. It's amazing how many people think that.

There's no good answer, and I look at this -- this is -- people worry about handing our children this financial debt that we've accumulated. Well, I'm worried about handing them this radioactive debt, too, because it's not going away any sooner.

I think that since this country and all -- lots of states, especially in the East, have benefitted from nuclear power, it makes sense to have everyone share in the responsibility of taking care of the waste.

Right now, the idea of keeping it onsite where it is being kept anyway, just with improved storage methods, hardened onsite, I worry about the fuel pools. I think it's a vulnerable area. It needs to be strengthened.

But, I think it's preferable to

keep it onsite. I know there may be a few locations where it's not -- it's not the best place, but I think that's preferable to a centralized dump or reprocessing and it's just -- there's no good answer.

There is no good solution. We've painted ourselves into a very dark corner here. Kevin, did you have anything you want to add?

MEMBER LASH: Keep it onsite for how long?

MS. CORBETT: Until we can locate a -- several geologic repositories that truly meet the criteria of being able to isolate it from the biosphere.

MEMBER LASH: So, I really wanted to get to the last part of that question. What kind of institution should be responsible for locating, selecting, developing, and building such a deep geologic repository?

MS. CORBETT: Go ahead.

MR. KAMPS: Okay. Yes, the

institutional arrangements -- well, it's interesting that a lot of our groups for a very long time, especially in the heat of the Yucca Mountain debate 15 years ago, 10 years ago, were calling for a blue ribbon commission.

So, we're thankful that there's one in existence. We wish it were more balanced for sure. We don't really feel represented by anyone who serves on this commission.

A lot of our groups have been at this, some of our groups for as long as 30 years or more dealing with the radioactive waste problem. So, institutionally, we would certainly emphasize democratic decision-making, a very diverse group of people at the table representing all kinds of interests, so community groups, environmental groups, grassroots groups.

Certainly traditional Native Americans who've been targeted so many times,

unfortunately, their tribal government sometimes will be working with the Department of Energy, the Nuclear Waste Negotiator, in the past to open these dumps against the will of the people.

In the case of Grace Thorpe, who President Obama honored a year ago, she got that tribal council fired from its job almost immediately because of their position on this issue and replaced with new tribal council government.

So, institutional arrangements must be democratic, must be diverse. I can add that the Department of Energy is very much distrusted by most of the people in our community after the experiences, especially at Yucca Mountain, but others, as well.

The Nuclear Regulatory Commission, as well, is very much distrusted. You asked how long the waste should stay at the reactor sites. Well, the NRC just updated its so-called Nuclear Waste Confidence Decision

recently, which many of our groups see as a con game.

It blocks our groups from challenging the generation of radioactive waste and any licensing proceeding. The NRC is now saying that wastes can stay safely onsite in pools and dry casks for 60 years post-operations.

So, 60 years of operations plus 60 years post-operations is 120 years. Eighty years of operations is being talked about. Eighty plus 60 is 140 years of onsite storage, and the NRC commissioners have now mandated the staff to look at even longer term storage onsite, we're talking centuries, where we're seeing at a place like Palisades in Southwest Michigan the fourth cask they loaded in 1994 has defective welds.

The company swore under oath to a federal judge they would simply reverse the loading procedure back into the pool if there were any problems. That cask has sat loaded

on the Lake Michigan shoreline for 16 years now with defective welds.

As I mentioned, the quality assurance problems -- we're seeing inner-seal leaks with dry casks, so the inert gas that transfers heat and protects the nuclear waste from corrosion is leaking internally.

So, these containers are going to have to be replaced over time. So, that's why we call for hardened onsite storage. It's not just fortifications. It's also a dramatic improvement in the quality of these containers so that we don't see environmental leakage at some point.

CHAIR HAMILTON: Per and then Allison.

MEMBER PETERSON: Thank you. I appreciate very sincerely the opportunity to hear about this report. I'd like to look into one of the questions that's, I think, a real challenge facing our country.

You'd noted that Arjun Makhijani

has done studies on approaches to achieve replacement of existing coal and nuclear infrastructure with non-carbon-emitting sources by 2040.

There's a huge literature on this question because when you look at the magnitude of the challenge, it's enormous to try to replace the energy infrastructure.

One of the papers that's commonly cited is Sokolov and Paka's paper on carbon ledges, and when you start to look at the magnitude of the existing infrastructure plus projections for likely growth, it looks very challenging.

So, the question does relate to the existing infrastructure that we have. Currently, 54 percent of our electricity generation is coal. Twenty percent is nuclear, so that means that we're looking at -- over the next several decades, we will have to replace this existing infrastructure.

In any case, it's at least $2

trillion plus finance charges plus transmission upgrades to attempt to do that, and that's in the face of having to make investments in other infrastructure, clean-up of DOE sites.

I can give you a long list of things which are decaying away in California, buildings which are seismically unsafe, lack of high-speed rail. So, in this challenge, it may take some time to get this infrastructure replaced, and so one of the questions that's directly relevant to this commission is whether it makes sense as a country to prioritize replacing the coal plants first or to replace the nuclear first.

This will have a large impact -- the decision which way to go has a large impact both on U.S. carbon emissions and on waste generation.

So, what I'd be curious about is do Beyond Nuclear and Sierra Club have some position in terms of whether we should be

focused on shutting down existing -- this is existing infrastructure -- coal plants or nuclear plants first.

MS. CORBETT: I can tell you what I think national Sierra Club would say. They have a very big focus on shutting down coal. They know nuclear is problematic, but we have a huge campaign.

We believe that there is global warming caused by human activity and that coal is a major culprit, so we see that as the most threatening energy source being coal, and also with mountaintop removal, which is just horrific what it's doing to the mountains of West Virginia and Kentucky and other states.

So, I would say that Sierra would probably, if you were to talk to the guys at the top, they would say we want to shut the coal plants down first.

But, I've also heard Michael Broome debate the future of nuclear, and he recognizes the tremendous challenges of

keeping it going at the cost, the waste issue, all of that. So, it's -- again, it's a really tough choice, but if I had to speak for Sierra, I would say coal first.

MR. KAMPS: Well, just to follow up on Susan there, with Sierra Club, we have a coalition fighting the Fermi 3 new reactor proposal in Monroe, Michigan, and we're proud that the Michigan chapter of the Sierra Club has joined us in that intervention. There's an example of a new reactor fight.

In terms of old reactor license extensions, Davis-Besse near Toledo, incredibly, has just applied for a 20-year license extension despite its horrible history of operations and we're very proud that the Sierra Club of Ohio has stepped forward and spoken out strongly against that license proposal.

So, to address your question about coal or nuclear, which to phase out first, I think that's the elegance of Dr. Makhijani's

book, Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy. It foresees, envisions, a phase-out of both dirty fossil fuels and dirty and dangerous and expensive nuclear power simultaneously by the year 2040.

Just to give you an example, again, from the Great Lakes. Michigan State University, the Land Use Institute, published a report in October of 2008 identifying 320,000 megawatts of wind power potential on the Great Lakes available to the State of Michigan alone that has yet to be tapped.

We're beginning to see, as with Governor Granholm's Great Lakes Offshore Wind Initiative, the beginnings of tapping that tremendous potential, so there's tremendous potential.

Dr. Makhijani in his work cites seven Great Plains states, any one of which could displace the 20 percent of the electricity this country gets from nuclear power, take Montana as one example, combined

with compressed air storage and we've got the storage we need.

Wind power has tremendous potential. Solar power, geothermal, the list is a long one, and efficiency is the lowest hanging fruit of all.

MS. CORBETT: I would like to add something to that. We did -- we had a booth at the state fair this year, which is always an interesting experience to go, the South Carolina State Fair, and we had a little -- we had a box from the utility company that has like a meter like you have on your house, and we put the incandescent bulb in there.

Of course, the meter goes, "reer, reer," because it's using up so much energy. Then we put a compact fluorescent in there, and it kind of slows down. Then we put a new LED light in there and people were astounded because it doesn't use any electricity. It's so incredible.

So, when you think about just

changing some major things like that. The other thing that's happening in South Carolina is a fourth of our electricity is hot water, electric hot water. In a state with 300 days of sun, we could all have solar hot water heaters.

We could take the $10 billion they're using to build a new nuke, give everybody a solar hot water heater. We don't need the nuke because we got plenty. And, keeping in mind what Kevin said, DOE has determined we have over four gigawatts of offshore wind between Myrtle Beach and Savannah. Four gigawatts of offshore wind. We're just -- we could tap into that.

MEMBER PETERSON: I appreciate that. So, for -- just for clarity then, the Beyond Nuclear would phase out at equal rates coal and nuclear as opposed to prioritizing nuclear for phase out or prioritizing coal for initial phase out?

At equal rates, simultaneously

phase them both out --

MR. KAMPS: Our organization --

MEMBER PETERSON: -- running plants longer.

MR. KAMPS: Our organization is focused on the nuclear power industry, but we recognize the dire crisis of the climate and so we -- I would agree with what you said. I would also urge the Commission, if it hasn't already, to get in touch with Annmarie Levins if you're interested in the economics and the time to deployment of various energy sources and he has shown in his recent studies that micro power and megawatts have out-competed nuclear and that this has been going on for decades.

CHAIR HAMILTON: Okay. Allison?

MEMBER MACFARLANE: Thanks. Thanks a lot for coming this morning and for your words. I want to tap into your long experiences into -- in this issue, in particular, and I acknowledge you guys as

experts because you have been looking at this for so long.

So, I want to sort of revisit some of the issues that Jonathan Lash raised and ask you, in particular, let's set aside what happens with nuclear power, okay. Say it all stops tomorrow, whatever.

We still have this legacy of waste to deal with, and given that, I want to understand how to find a site to deal with this waste and then what -- how to assure that the site is safe.

So, I'd like to understand from you -- I know, Ms. Corbett, you said that you -- we need to take steps to isolate radioactive waste from groundwater, so what would assure you that a site was safe? How would you pick a safe site?

MS. CORBETT: I -- the only thing we can do is get the best geologists in our country to come forward and find those locations where water hasn't migrated, it

isn't likely to migrate.

I mean, I understand from a presentation I saw a couple years ago that there are virtually no places in the western United States where there are stable geologic formations, and all of the really, truly stable geologic formations where this is possible are in the eastern United States.

MEMBER MACFARLANE: No, that's not actually true.

MS. CORBETT: Not totally true? Okay.

MEMBER MACFARLANE: There's plenty in the West that's stable, too.

MS. CORBETT: In the West, too?

MEMBER MACFARLANE: Yes.

MS. CORBETT: Well, I mean stable in terms of not allowing -- not having water pass through there.

MEMBER MACFARLANE: Yes, well --

MS. CORBETT: Wouldn't that --

MEMBER MACFARLANE: -- anywhere on

any piece of land at a certain depth there is water.

MS. CORBETT: Right.

MEMBER MACFARLANE: There's water underlying rocks on the entire globe. That's how the earth --

MS. CORBETT: So, there's no place to put it where water cannot get to it then is what you're saying?

MEMBER MACFARLANE: Well, water actually isn't bad.

MS. CORBETT: Okay.

MEMBER MACFARLANE: Water's your friend, although you've been -- you've been taught -- but Yucca Mountain has screwed up everybody in the United States.

Water is your friend. Everybody else in the entire world is looking at a wet site, and that's better because spent nuclear fuel is stable in a wet site and not stable in a dry site.

So, that's -- but that's

technically --

MR. KAMPS: Yes, I was just going to add that I think the Yucca Mountain history, experience has a lot of lessons to teach us about what not to do, so we saw in 1987 a nationwide site search that involved various geologic media and various parts of this country suddenly suspended for political reasons.

In 1986, the eastern site search was indefinitely suspended and then the screw Nevada bill was passed in 1987 for raw political reasons. That was the beginning of the end for that program.

You saw the resistance with your own eyes over the past 25 years.

MEMBER MACFARLANE: So, what would you do instead?

MR. KAMPS: Well, science has to be the driver and not politics.

MEMBER MACFARLANE: Okay.

MR. KAMPS: We need to take our

time. Again, Dr. Makhijani has done a lot of work on this and had recommendations. Our community looks to him for a lot of leadership, and he has suggested that we take our time. If it takes decades to do studies to make sure that the geology -- and you'll see it in our statement, we are calling for isolation of radioactive waste for as long as it remains hazardous.

We're also calling for zero release into the environment, and that is the position of groups, many of which live at sites targeted for geologic repositories.

In December of 2008 as the Bush Administration was leaving office, the Energy Secretary, Samuel Bodman, put out a report. There's a map of the United States on Page 12 that shows where the DOE was considering for a second repository site.

It's pretty much the entire country, so a lot of our groups are concerned about this issue, as well. But one example,

I'll mention New Hampshire. In mid-1980s, New Hampshire was at the top of the list, one of the top sites in the East, being looked at --

MEMBER MACFARLANE: So what's wrong with New Hampshire?

MR. KAMPS: -- by the Department of Energy. The process, for one thing. The public felt railroaded --

MEMBER MACFARLANE: Okay.

MR. KAMPS: -- and turned out in large numbers at every turn, and just to give you an example of the widespread opposition of -- about -- well over 95 percent of the towns in New Hampshire -- more like 99 percent of the towns in New Hampshire said no way, no repository here.

The concern was not only the fractured geology, the fractured granite that was being looked at, but also the socioeconomic impacts of displacing seven towns centered around Hillsborough.

The first place in the country

named after George Washington was included. The first Seventh Day Adventist Meetinghouse.

MEMBER MACFARLANE: So --

MR. KAMPS: So, there's never been just the technical aspects. There's socioeconomic. There's environmental justice. There's so many issues that are being neglected by decision makers.

MEMBER MACFARLANE: So, I guess I just want to ask you --

MEMBER LASH: Allison, could I just interrupt for a moment?

MEMBER MACFARLANE: Yes. Yes.

MEMBER LASH: So, I was the top environmental official in Vermont when that process came to Vermont, and we did, indeed, have truckloads of Canadian loggers come down and chant in the back of the room and every person in the surrounding towns was angrily opposed, but I have to say no one had explained what this process was.

There was no preliminary effort to

have people understand why the screening was going on or what responsibility we had. There was no indication that local communities would be able to opt out if in the end of this process they decided they wouldn't go forward.

So, of course, they were furious, but that doesn't mean that the process shouldn't look at good geology in Vermont or New Hampshire if it's there and if communities have the right to opt out in the end.

MR. KAMPS: I'm glad you raised the opt out. I think an absolute veto by any potential host is a necessity, and that was another flaw of the Yucca Mountain decision -- was that Congress had the ability to override Nevada's veto.

MEMBER MACFARLANE: Now, did -- so, a question here. Are we talking about -- when you said a veto is essential, a veto for whom? A veto for the town, a veto for the county, a veto for the state, a veto for everybody? Because if you let --

MR. KAMPS: That's a very good question. How do you define consensus?

MEMBER MACFARLANE: Exactly.

MR. KAMPS: Who is consenting to this decision?

MEMBER MACFARLANE: Exactly.

MR. KAMPS: I mean, when you invite tribal governments who are in favor of a dump site on their land, that does not represent the traditionals of the reservation.

It does not represent the environmentalists, and every single one of the scores of Native American reservations that have been targeted for these centralized interim storage sites have stopped it in the end because the people on the reservation were opposed, even though their tribal governments may have been in favor. They've all been stopped.

CHAIR HAMILTON: Excuse me. You wanted to finish your -- I didn't mean to interrupt your --

MR. KAMPS: They've all been stopped by the people who live on the reservations despite the tribal government's support for the proposal.

CHAIR HAMILTON: I'm afraid our time has expired for this session. We thank you very much. I wanted to ask a couple of clarification -- you handed me this petition.

MR. KAMPS: Yes.

CHAIR HAMILTON: Do you know the total number of signatures there?

MR. KAMPS: It's over 3,300.

CHAIR HAMILTON: 3,300?

MR. KAMPS: Individual signatures.

CHAIR HAMILTON: Then you said in your statement that you are speaking, I think, for 167 groups?

MR. KAMPS: That's correct.

CHAIR HAMILTON: How many people would be represented by those groups?

MR. KAMPS: We didn't add it up, but depends on the groups. Some of the

national groups represent hundreds of thousands of people.

CHAIR HAMILTON: I see, so it's a very --

MR. KAMPS: Each.

CHAIR HAMILTON: -- large number. Several hundred thousand would be a fair statement?

MR. KAMPS: That's a conservative estimate, yes.

CHAIR HAMILTON: Well, we thank you very much for your presentations this morning, and we now move to the second speaker.

MR. KAMPS: Thank you.

CHAIR HAMILTON: We'll hear next from Dr. Hank Jenkins-Smith of Oklahoma University. Dr. Jenkins-Smith is a professor of political science and is the associate director of the University Center for Applied Social Research.

He's an expert in public opinion

measurement and the politics of risk perception and is here with us today to discuss the findings of his research into public attitudes towards nuclear waste.

Dr. Jenkins-Smith, thank you very much for coming, and you may proceed.

DR. JENKINS-SMITH: Thank you, sir. It's an honor to be here. The research that I'm going to be presenting for you is based on a fairly large group of individuals at the University of Oklahoma.

This research has been going on really since about 1992 funded by a number of sources, the University of New Mexico, Texas A&M University, University of Oklahoma, Sandia National Laboratories, and the National Science Foundation.

Some of these data are going to reach back pretty far. Others are more recent. If we could go to the first slide first please, or do I have the clicker?

Yes. Here's what I want to

address. I want to give a little bit of context, talk a bit about public beliefs about used nuclear fuels, examine preferences for current and alternative used nuclear fuel options, and then get into what I think is probably the most important part of this, which is policy design variations and the effect that that has on the way that the American public responds to siting debates, and finally get it to the question of proximity if we have time.

I'm not quite sure how to advance. When you measure policy views on complex issues like this, you get into some really tricky terrain. The reason is that the considerations are enormous on both sides of an issue of this kind, and measuring public perceptions requires putting people in the context that they would be in if they were in the middle of a debate of this sort.

So, asking questions about used nuclear fuels requires being able to put the

arguments of various points of view on the table and to what -- and to measure these in a stable way, one that actually replicates what happens when a policy debate is thick around an individual, requires mapping out the kinds of arguments that are being made by both opponents and proponents in something that looks like the pattern that takes place in the press.

So, it's challenging, and it means you can't ask really simple questions of yes/no variety or the kind that you see in newspaper polls. The result is you really have to do a careful design.

You have to provide a format for people to answer in a considered, deliberative format. We do this in our Energy and Environment Survey Project through nationwide annual surveys.

The pattern that you'll see today we've been engaged in since 2006. For the most recent and the next year's focus, we're

looking really at nuclear waste in particular, looking at the policy options and their variations, but the base questions have been consistent over time.

Now, to do this is tricky. To get out the American public is no longer so easy. It used to be that you could rely on telephone surveys to do this, but there's an increasing fraction of the population who don't have fixed phone lines, you can't talk to them on a cell phone because they'll get in a car crash when they answer you, so we have to do a mixed-mode survey with both internet and telephone to really get at the breadth of the American public.

We then try to make sure that we are capturing the breadth of the American demographics in doing this in order to get at a reasonably representative sample of the public. I just want you to know that this is very challenging, and anybody who says they have a simple way to do this is fibbing.

As a result, when you look at these kinds of results, you really do need to consider the way that the data are collected.

I want to show you here some context variables. We were just -- we just heard some very eloquent presentations on the way to think about risks of energy sources, and this is the way the American public now think about the risks posed by fossil fuels, nuclear energy, and renewable energy.

This is just asking about risks, but note that the perceived risks of nuclear energy and fossil fuels are roughly equivalent and have been for some time.

Both are trending down slightly, which happens when economic concerns rise. You get shifts in the way people think about relative risks with renewables essentially bouncing around at much lower levels, and that -- I mean, so don't make the mistake of thinking that the American public don't perceive risks from nuclear energy.

Next slide please. The balance, however, of considerations takes into account risks and benefits. We've -- in the nuclear domain, we've tended to focus on what the perceived risks are and argue about how small they may be, but the fact is that the considerations that inform public positions have as much to do with the perception of benefits as they do with risks.

One more click, please. The most important thing driving attitudes about nuclear energy is their domestic source. The American public is very sensitive to imports and reliance on imports of fossil fuels, crude oil in particular, and when I look at the relationships between benefits and risks, the thing that rises to the top for the American public is having a domestic reliable source of energy that doesn't get us into foreign adventures.

Interestingly, when you think about benefits here, the American public is

not weighing carbon emissions when they think about the benefits of nuclear energy. It comes down at the bottom of the list because there's real dissent in the United States about carbon emissions, and I'll show you another point in a moment about the way that carbon emissions are understood with respect to nuclear energy, but the biggest risk understood for nuclear energy parallels very nicely to discussions we just heard.

The American public are very worried about terror strikes on existing plants, and that's the top fear. The very bottom fear has to do with nuclear proliferation and plutonium production, so you can begin to understand how on average people are putting together the pattern of beliefs that they hold about these things.

Next slide please. That context tells you a little bit about how people are understanding the role of nuclear energy in the future. I'm just going to summarize that

by looking at the support for additional reactors.

You can see there's a slight difference between support for reactors at existing sites and new sites. It's been growing. This parallels the research that's done by many other groups.

We ask these questions in precisely the same fashion each time so that the changes really -- you're representing changes in underlying attitudes rather than variations in questions.

But, note that we're still fairly close to the middle of the scale. This is not -- I mean, what that represents is the central tendency in a distribution of attitudes, and so there's a -- there isn't what you would call strong consensus here, though the central tendency is clearly leaning in the direction of increasing the number of reactors in the U.S.

Next slide please. I want to now

to get to public beliefs about used nuclear fuel, and let me preface this by saying that you can't think of attitudes about nuclear energy or used nuclear fuel as isolated bits of thoughts in people's heads. They're connected to belief systems.

Underlying core values, expectations about the world, who people trust, a whole variety of beliefs about the way nature works, and I want to show you just some pieces of that so that you can -- I want you to understand that the attitudes about used nuclear fuel are not isolated.

They're part of a woven fabric of beliefs that people have that are consistently related. You may disagree with parts of why people believe what they do, but you can't move them around very easily without moving a lot of other stuff.

Okay. Next slide. We've asked a variety of questions over time about what people think about nuclear issues and nuclear

waste. The top question we're asking specifically about the operation of a nuclear power plant and greenhouse gas emissions.

We ask this in part because we're trying to understand the carbon debate that's going on and you can see that we have essentially equal numbers of the American public agreeing and disagreeing with the question of whether a normally operating nuclear power plant is producing significant quantities of greenhouse gas.

This is why, in part, in the American public you don't have a lot of support for nuclear energy that stems from the carbon debate and climate change issues as the connection hasn't happened.

That's a gear that doesn't mesh and that debate I expect to continue. We've seen actually declining public expectations. The greenhouse gas emissions are, in fact, of human origin or that they have any significance for environmental concerns.

This is a fascinating change of views, but it's related to underlying core values that people bring to the specific policy questions.

Spent nuclear fuel can accidentally explode like a nuclear bomb. Now, any engineer knows how difficult it would be to have that happen, I mean, and all of the things that are necessary to generate a nuclear explosion.

Forty percent of the public think that that's -- they agree with that position. The suntan question we ask in order to understand something about perceptions of ionizing radiation and then the dose question.

Now this is -- this should be a dead giveaway in the sense that the dose is the same, but 48 percent of the American public think that manmade radiation, even with the consistent doses, is worse -- more toxic than is naturally occurring radiation.

You know where this stuff comes

from. You all are a bit familiar with popular culture and the way that the ideas are presented, but they become part of the fabric of beliefs that exist out there. I mean, you all watch The Simpsons and Spiderman and all the rest.

Next slide, please. Now, the beliefs that are up there are very much associated with attitudes about things nuclear. I'm simply showing you, if I score these in the sort of more nearly technically correct direction, what happens is the number of correct answers goes up.

The top line in that bottom chart is the perceived -- if the mean perceived risk of nuclear energy. For those that get one or two right, it's about perceived risk are about a seven on that zero to ten scale, and it drops to about four for people who answer these in the more nearly technically correct direction.

Same thing -- same pattern with

the energy benefits index. Benefits rise substantially the more that these perceived -- these questions are understood in the more nearly technically correct direction. Mean support for additional nuclear generation.

Now, I show you these simply to reinforce this point, and that is that beliefs about things nuclear are woven together in a way that you have to worry about if you're trying to change a view over here, it's connected to a lot of other perceptions that also have to change.

This is why telling the public, teaching the public the truth, convincing them of the appropriateness of a particular policy is so hard. It's like turning a supertanker and you collide with all kinds of other beliefs and perceptions.

So, there's no panacea in educating the public, which I hear so often in technical communities. It's -- because public belief systems themselves are thick and rich

and connected and anchored.

Next slide please. Now, in this context, what do people think about what we're doing with spent nuclear fuel now? We've been charting since 2006 what people think is happening with spent fuel currently.

We provide these options, and you can see what's happened over time is gradually there's a dawning awareness that it's onsite, but this tells you something important about public opinion, as well, and that is that as policy debates develop and issues get on the table, greater fractions of the public understand what's going on.

It's a maturation process in a policy debate and we're in the fairly early stages of maturation on this debate.

Next slide, please. We also ask questions about whether there's spent fuel stored onsite in the state of the respondent. This is after informing them chiefly that this is where this storage happens.

Twelve percent of our respondents are able to correctly say whether they're state does or does not have spent fuel stored onsite. Again, the point is that we're early in this debate. There will be changes in these kinds of questions as you see from the top slide, but we are not dealing with a well-informed public on these questions now.

Next slide, please. I want to turn now, one more hit, to preferences for current and alternative used nuclear fuel policy options. I want to remind you that when you ask questions like this, what you have to do is design the question wording so that you capture the primary arguments that are going to surround the policy position in a public debate.

It's a craft job. This is where science and art have to come together, and you really have to be careful with how you do this. It turns out that many of these questions are quite stable.

Question wording does not massively alter the pattern of response, so I will -- I'm reasonably confident that these results will hold over time.

So, the first question is about support for continued onsite storage for the foreseeable future, which is the way the phrasing has recurred a great deal. We explain a bit to the respondent about how storage works in pools and in dry cask.

Then we describe a supporter and an opponent point of view on this, and I'm not going to labor through that, but these are all on the website and can be seen.

The pattern of public support for this, with one more click, is distributed. Again, it represents the fact that we're early in this debate. Note that the mean is toward opposition to continued onsite storage when they hear the arguments from both sides on this policy debate.

Note that mean of a 3.6 on a 0 to

7 scale. That means they're below average, below neutral on this question, but the central tendency is still in the middle.

Next slide, please. We can compare that with preferences for numbers of permanent storage sites, and I'm going to begin walking through features of potential repositories and showing you what happens to public support as you vary them.

Here, we were simply looking at the modal options that we -- that are being discussed broadly in policy communities. One is to construct six to eight regional storage sites. The other is two large centralized storage sites, one in the East, one in the West, to see whether the number of sites actually influences the way people's initial support would look.

Next. You can see here that the -- having six to eight regional storage sites generates somewhat more support than does a centralized repository. Note that both of

these are substantially -- have substantially more support and statistically significantly more support than does the onsite storage option.

So, the initial starting point is people really are leaning in the direction of wanting some kind of repository system.

Next slide, please.

MEMBER SHARP: Do you see that as a significant difference from your --

DR. JENKINS-SMITH: It's statistically significant and in the case of the difference between onsite and the multiple regional, that's substantively significant. You're really moving a policy --

MEMBER SHARP: Right. Right, I can see that --

MEMBER HOLLOMAN: -- scale.

MEMBER SHARP: -- but I didn't know whether we really would want to make policy around -- draw a conclusion around that difference on the regional or multiple site

versus --

DR. JENKINS-SMITH: Could you raise that question when I kind of walk through this because you're getting right at the heart of the thing, and that is what do you do with information of this kind? And I love that question.

Okay. Another feature is the retrievability versus permanent disposal question, and of course, this one is crucial -- has been crucial in Europe in a number of the debates there.

This came up for me a great deal in focus group work where I'm having one-on-one, in-depth discussions with eight to ten people randomly drawn from local publics in which the question came up of what are we doing putting in deep geologic storage?

Would we be able to get into it and deal with it if there's a problem? One of the things that recurred significantly in those discussions was the idea that it may be

hamstringing future generations rather than helping them to make this -- these irretrievable storage facilities, and as a result, we've been asking a question about retrieval and we basically talk about the different options and the pros and cons that are raised in general debate about this.

The retrievable option garners substantially more support. Now, from the focus group discussion, again, what we were seeing here were several features. One was simply knowledge.

The idea in the public -- people would do things like say, "Well, you know, we didn't even have microwaves when I was a kid."

What they're basically getting to is the idea that there's technological change, new learning that takes place, and maybe even new social values that might change the way one thinks about those materials.

This is quite contrary to the initial take with Yucca Mountain, which was

you want to permanently seal the stuff away chiefly driven by the non-proliferation types of argument. This -- there is a disjoint between the dominant public attitudes on this and the way policy has been engaged.

Next slide, please. Reprocessing. We've heard a lot of discussions about reprocessing. This one's a tricky one to get to because, as you know, people have played with this idea calling it recycling and dressing it up in different ways to try to effect public response to it, which basically doesn't make much difference.

I mean, when people think about this question, the responses are fairly robust to the kinds of words that you use to describe it. You do have to get out issues like the generation of plutonium, which can be used to make nuclear weapons.

You have to make sure that when you're getting people to think about reprocessing they're addressing the real

issues that are involved. You can elaborate this, which makes it more challenging to do in a survey setting, but with a basic description, you get a substantial tilt in favor of retaining the prospect for reprocessing.

Most people say we don't -- they aren't saying they want to reprocess now. What they're saying is that they expect evolution over time of understanding, and they want to retain the possibility of reprocessing.

Next slide, please. Storage depth. Now, there's big differences in what we can do here. We can leave it at the surface in hardened sites. We could construct mine-like repositories several thousand feet deep, or we could go with deep borehole up to three miles deep and put it in bedrock.

We were interested in understanding how people thought about that. Remember, we're in the early stages of the

policy debate, but the responses look like this. The mines win by a fair margin. Surface storage sites and boreholes are roughly equivalent in the public mind.

Deep borehole, we asked this question in May. This was not long after the deep borehole in the Gulf issue came up. That's actually remarkable to me that the support was this high given all of the discussion that had been going on about deep well drilling and the problems that were associated with it.

I point this out to you to suggest, first off, that the idea of mines plays back to the question of retrievability, that it's seen as maintaining the prospect for future generations to be able to take -- make their own choices, but it's not seen as risky as surface storage.

Next slide, please.

MEMBER LASH: It's just so striking that most of the answers were, well,

sort of the middle.

DR. JENKINS-SMITH: Yes, correct. The only one that's different is the mines option where you don't have a mode in the middle, which is intriguing to me now given that the deep geologic has been so much a part of the debate for such a long period of time.

One could've anticipated that the discussion of deep geologic storage would've pushed people away from that option. Well, it hasn't. I suppose that's the main message from that slide.

Let's talk about policy design variation and public preferences. Next slide, please.

The -- when you think about a policy, no policy is a single thing. It's like any other good, broadly construed, that you think about that's got multiple attributes.

The Yucca Mountain bundle of attributes was an interesting one. It was --

first off, it was a decide, announce, and defend -- the screw Nevada kind of -- the screw Nevada act kind of a policy, which was -- generated its own enormous hurdles for this policy.

It was also a once-through system meaning that the material was declared a waste of no benefit, but of substantial risk. It was a permanent disposal only, no other options considered policy.

Now, that bundle meant that when you went into communities to talk about the storage of that facility, that's -- that was like the goal posts that were in the policy debate. So, people who wanted to argue for or against this were constrained by those features of the attributes of the policy domain.

There's -- and so, it's not surprising that the debate had to focus on how small can we make the risk. Right? Because there weren't any offsetting features that

really mattered. So, the whole of the debate focused round and round on how small can you make the risk.

Now, in a policy debate, when the risk is the central feature, risk is going to dominate people's considerations, and it's very, very difficult. You know, it's not impossible to do siting with that type of a bundle of attributes, but it's very challenging. What you're doing is you're making it a very steep hill to climb.

CHAIR HAMILTON: Dr. Jenkins-Smith, I'd ask you to wrap up here so we'll have some opportunity for questions.

DR. JENKINS-SMITH: Yes, sir. Next slide, please. The first -- what I've done here is I've set up an experiment in which I varied the features of the policy bundle, and I've used two different bases.

One is the two underground mine repositories, the other is the deep borehole option; randomly assigned people to each of

these groups, and I'm simply looking here at what effect it makes when you change the features of the repository to include other attributes.

Next slide. Now, just as a starting point, if you fully describe the policy options, you get a distribution that looks something like this with some opposition, a lot of neutrality, and some significant support for either of these options.

Next slide. The design options really are an attempt to see what happens to people who previously supported, were neutral, or opposed that site if you add features to the policy.

This is co-locating a research laboratory. One of the things that our focus groups indicated was that people liked options that offset what they saw as the negative features of the site.

A research laboratory that's

designed to reduce risks in the future and think about better ways to handle these materials is one of those things that directly addresses the underlying worries.

So, we added co-locating a research laboratory, and you can see on that top slide what happens. Focus on the neutral and oppose columns within each of the two options.

Half. Half of those who initially opposed the facility said their support for the site would increase if it was more than just a repository. If it was also a center of research and learning for addressing the very problems the repository was created to address.

That's a very robust finding. I did that experiment, as well, in the mid-1990s in Nevada at the heat of that policy debate when 77 percent of the respondents opposed the Yucca Mountain site.

When asked how their view of Yucca

Mountain would change if it was also a national laboratory focused on addressing these risks, then you got half of those opponents saying that they would increase their level of support for the facility.

So, it's not time-bound. It actually operates in the thick of a debate with people who are addressing that kind of question. Co-locating reprocessing facilities have the same feature.

Next slide, please. Compensation is another --

CHAIR HAMILTON: Dr. Jenkins-Smith, we only have about seven or eight minutes --

DR. JENKINS-SMITH: Yes, sir.

CHAIR HAMILTON: -- and we would like to have some time for questions.

DR. JENKINS-SMITH: I'll finish with this slide.

CHAIR HAMILTON: Can you wrap it up very quickly?

DR. JENKINS-SMITH: I'll finish with this slide --

CHAIR HAMILTON: Okay.

DR. JENKINS-SMITH: -- simply showing that compensation has a similar feature although those who initially oppose the facility are not so responsive to funds to the state for the facility.

The final point on this is that the bundle of attributes matters, that it's -- that you really have to think about what you're asking the local community to accept and that the public are responsive to varying that policy design. I'll finish with that point.

CHAIR HAMILTON: Thank you very much, Dr. Jenkins-Smith. We have about eight minutes now before the break time, and we have a full schedule the rest of the morning.

We'll start with Per then do Allison then to Vicky, okay? That may be all we can handle. Okay.

MEMBER PETERSON: Dr. Jenkins-Smith, thank you. This is very interesting, and of course, one wishes you could just run a whole bunch of additional sets.

The thing I'm interested in is that in the United States we have both defense high-level waste and spent fuel.

DR. JENKINS-SMITH: Yes, sir.

MEMBER PETERSON: The defense high-level waste one can convincingly argue is a waste with no potential future value. The spent fuel we don't know today. I'm interested in the question if one were to propose that disposal can be safer if it is made irretrievable because you optimize for that purpose, and if one were to prioritize disposal initially to defense high-level waste and therefore, while you're doing that activity, defer the question about retrieval for spent fuel, how would that fit in sort of a policy option with respect to things that you've learned around desires for

retrievability and also the desires about maintaining the option for reprocessing?

DR. JENKINS-SMITH: You raise a very interesting question. There's two sides to the defense waste. One, it's a national -- the benefit from defense is a national issue. It's one of those questions that in New Mexico mattered because that was defense waste at the WIPP site.

With respect to your question about permanent disposal, I suspect that under those circumstances, if people believe that there was really no future use for this and that it was safer in deep disposal that you would get a positive response to that.

I haven't asked that question. That's something that would certainly be a candidate for future research, but I suspect you'd get support for a mixed system or some irretrievable disposal took place along with some retrievable and that you could differentiate.

CHAIR HAMILTON: Allison and then Vicky.

MEMBER MACFARLANE: Thanks. I find some of this valuable and some I'm a little -- I'd like to add a cautionary note on it. I think your statement about you don't think that we can educate the public out of their -- out of what we perceive this to be their problem is a valuable one, but I would caution us about the reprocessing questions that you've posed here.

Where you've looked at reprocessing in particular, I don't think you've captured the debate properly at all. I think you heard very eloquently this morning what the debate is in large part, and that is not captured at all in your question that you pose here in one of the slides.

DR. JENKINS-SMITH: Could I just interject that that is just a piece of -- I couldn't fit it all on the slide --

MEMBER MACFARLANE: Okay.

DR. JENKINS-SMITH: -- without creating --

MEMBER MACFARLANE: Well, I'd be interested to see the longer thing whether you actually talked about environmental impacts, large stockpiles of plutonium, costs associated with this.

In France and in the U.K. and in Ireland, the debate has largely been about both water-borne and airborne radioactivity releases from reprocessing facilities.

DR. JENKINS-SMITH: Right.

MEMBER MACFARLANE: It's been an international issue for the Irish, in particular. I wonder whether in other questions that you've posed about reprocessing that whether you are actually assuming that reprocessing does not equate with risk, but actually some people view reprocessing as increasing the risks over direct disposal.

So, I would put a cautionary note into a lot of this data.

DR. JENKINS-SMITH: It's a really good point, and all of these questions could be unfolded further. The question, though, that you have to ask in the design phase is which features you're going to add.

You could put a treatise in there and then it's difficult to field in a setting like this, but your points are extremely well taken and very nice.

CHAIR HAMILTON: Okay, Vicky.

MEMBER BAILEY: Thank you, Dr. Jenkins-Smith. I found your presentation extremely interesting. I have a couple of clarifying questions and then just an overall question to ask you.

On your slide on implications of design options --

DR. JENKINS-SMITH: Yes?

MEMBER BAILEY: -- you saw a support increase. Was this an intellectual response or because of additional -- they saw additional benefits to the community?

DR. JENKINS-SMITH: The latter. Again, the focus group work that I was doing had to do with a emotional issue that comes up in a policy debate of this kind, and that is that if you put -- if you have a community that is considering a repository and all of the features of that repository are about risk and minimizing a risk, it's very difficult for them to put themselves in a position of saying that they would be willing to undertake this for some larger benefit to society.

By the kinds of statements that were being made in those focus groups were about give us a reason. What possible reason would we want to take that? If I thought that it was going to be a benefit to future generations and I could argue that we were carrying the burden for larger national well-being, then I could support this.

I could intellectually hold my head up or emotionally hold my head up in a discussion with my neighbors about why we

maybe ought to do this, but if all they're put in the position of doing is talking about how small the risk is, it's very difficult.

You put them on -- in an interesting spot in trying to develop their own support for a facility of that kind and that's the -- that's been the characteristic of the policy debate as it's been waged particularly in Nevada.

The things that we were asking Nevadans to do were not things that they could be proud of.

MEMBER BAILEY: Okay. On this implications of compensation, how do you define compensation?

DR. JENKINS-SMITH: In this case, we took one of the many options that's being discussed and we said compensation would be in the form of -- for states at the state level for those host states that would receive approximately $1 billion in aid for schools, roads, and hospitals.

There, obviously, are many, many ways to define that. We were just taking an initial shot to understand how compensation in general would be viewed.

MEMBER BAILEY: So, actual dollars?

DR. JENKINS-SMITH: Yes.

MEMBER BAILEY: Actual additional revenue to the state --

DR. JENKINS-SMITH: Correct.

MEMBER BAILEY: -- community to do something with, to --

DR. JENKINS-SMITH: Correct.

MEMBER BAILEY: -- increase goodwill. Okay. So, looking at these -- looking at your presentation and these couple slides, so is there feasibility? Is there an opportunity to then think that we might have some voluntary communities around this issue?

DR. JENKINS-SMITH: I suspect there is, if you allow the communities to have some input into the features of the facility

that is going to be considered for their area. There will be strident opposition, as well, so the consideration is going to take place over the course of many iterations of a policy debate where the downsides are going to be emphasized as well as the upsides.

The key feature is, if you want a facility to be siteable, there have to be upsides -- and not just jobs. Jobs doesn't work nearly as well as providing somebody with a value-based orientation to say, I can see myself supporting this because it does some good for people beyond me.

MEMBER BAILEY: Right.

DR. JENKINS-SMITH: If it's all about money, then -- I mean, a lot of the work that's been done shows that that works in the reverse. It becomes blood money --

MEMBER BAILEY: Okay.

DR. JENKINS-SMITH: -- especially for people who are initially skeptical of the site. If you add funds, then all of the

sudden it looks even worse to them.

MEMBER BAILEY: It looks more like a bribe.

DR. JENKINS-SMITH: That's precisely right.

MEMBER BAILEY: Okay. I guess that's what I wanted to hear you say. I thought it was just fascinating what you were showing here, but, obviously, that's what we're grappling with, so --

DR. JENKINS-SMITH: Yes, ma'am.

MEMBER BAILEY: -- thank you.

DR. JENKINS-SMITH: Yes.

MEMBER BAILEY: Thank you.

CHAIR HAMILTON: Okay. The final question will be Richard.

MEMBER MESERVE: I was sort of fascinated by your slide about the balance of nuclear energy risks and benefits, and you correlated it with a slide that shows the importance of reducing dependence on foreign energy.

DR. JENKINS-SMITH: Yes.

MEMBER MESERVE: I wondered whether those were really connected. I mean, we actually heard some testimony yesterday from somebody who was arguing for a particular kind of nuclear project to reduce oil.

DR. JENKINS-SMITH: Yes.

MEMBER MESERVE: Fact is, we don't use oil for producing electricity in the United States.

DR. JENKINS-SMITH: That's correct.

MEMBER MESERVE: So, we don't save foreign dependence by turning to nuclear. I sort of wonder whether that's a question in its relation to people's attitudes towards nuclear is one that you probed --

DR. JENKINS-SMITH: Yes.

MEMBER MESERVE: Because that seems to be another area where there's considerable misunderstanding.

DR. JENKINS-SMITH: Yes. The

connection in the public mind is fairly tricky on this one. However, they are seeing the advertisements for the Volt and substantial opportunity for ground transportation reliance on electricity and other options.

So, in focus group work on this when you apprise them to the fact that most of the imports are for liquid fuels and not easily replaceable with a great deal of our base load electricity supply, they say, "Well, you know, down the road we do expect to see that type of change."

CHAIR HAMILTON: Vicky, final question.

MEMBER BAILEY: Just one quick follow-up in listening to Commissioner Meserve and I forgot to pursue this earlier. When you talk about the public, there are different kinds of publics.

DR. JENKINS-SMITH: Oh, yes. Yes, indeed.

MEMBER BAILEY: Is that not

correct? We talk about educating the public. Is it important then for this commission and in our report to -- when we address our -- address these questions and issues, how can we address them to the public and public concerns?

How would you differentiate the public? What are the segments in which we need to speak to on this issue?

DR. JENKINS-SMITH: Well, it often comes down to the -- I mean, we use the term stakeholder, which is a term I don't like because it's really fuzzy --

MEMBER BAILEY: Yes.

DR. JENKINS-SMITH: -- and doesn't really tell you anything. The public that I'm addressing is the adult population over age 18 in the United States that has any access to the internet or the telephone? So, it's a very broad notion of the public.

In policy processes, however, a crucial element are the organized interests

for who find these policy questions sufficiently motivating that they will, in fact, commit their time and resources to be engaged.

Now, there's a plus to this. These are people who really see themselves as having a stake in the issue one way or another. The problem is that they don't -- I mean, they are often quite different than the American public understood is the adult population over 18 that actually can speak to these questions.

So, I think you need to understand both. I think in the policy process we need to just grapple with the issue that there are multiple publics and understanding these results is different than understanding those of organized interest groups.

It's possible to really get the -- to measure the distribution of attitudes in both, but they are very different.

CHAIR HAMILTON: Dr. Jenkins-

Smith, we thank you for your very insightful comments. You can tell by the questions there is a lot of interest. Our time, however, is expired.

After the ten-minute coffee break, we'll return to hear Dr. Garrick on lessons learned from U.S. and international repository programs. We'll have a very brief discussion period by the commissioners and then hear from the public.

DR. JENKINS-SMITH: Thank you, sir.

CHAIR HAMILTON: We stand in recess for ten minutes. Thank you.

(Whereupon, the foregoing matter went off the record at 10:05 a.m. and resumed at 10:16 a.m.)

MR. FRAZIER: Are you ready, General?

CHAIR SCOWCROFT: Yes, ready.

MR. FRAZIER: General Scowcroft.

CHAIR SCOWCROFT: Thank you. If

the Commission would come to order. Our final presentation today will be from Dr. John Garrick, the Chairman of the U.S. Nuclear Waste Technical Review Board.

He's serves as chairman since 2004, and prior to that, Dr. Garrick served for ten years on the U.S. Nuclear Regulatory Commission's Advisory Committee on Nuclear Waste.

He's a founder of the firm PLG, Incorporated, from which he retired in 1997. Dr. Garrick, the floor is yours.

DR. GARRICK: Thank you very much. I want to thank the Commission for inviting me here today to discuss some lessons learned from U.S. and international waste disposal efforts.

My name is John Garrick. I'm the current chairman of the Nuclear Waste Technical Review Board. There are four members of the Board in the audience today, so I have plenty of backup if I get in any kind

of a jam.

I know that two of your subcommittees have heard from other board members and staff, so I'm only going to very briefly describe the Board and its role.

The Board is an independent federal agency. It has 11 technical and scientific experts. It is non-partisan and apolitical. Members are appointed by the president to four-year terms from a list of nominees, nominations submitted by the National Academy of Sciences.

By the way, I should mention that former Congressman and current Commissioner Phil Sharp played a pivotal role in crafting an amendment that led to the Board's existence in the 1987 amendments to the Nuclear Waste Policy Act. I know also that Senator Domenici played an important role in the passage of that legislation.

The Board is charged with conducting unbiased, ongoing technical peer

review of activities undertaken by the Secretary of Energy related to the implementation of the Nuclear Waste Policy Act.

In particular, we assess the technical and scientific validity of DOE activities to manage and dispose of spent fuel and high-level radioactive waste, which I lump under the rubric of high-activity waste.

The law requires us to report our findings, conclusions, and recommendations at least twice a year to Congress and the Secretary. I should establish at the outset that the Board's statutory mandate continues even as alternatives to a Yucca Mountain repository are being considered.

The Board's current review work in priority task reflect the transition of DOE's nuclear waste management activities to include potential fuel-cycle alternatives to direct disposal of waste.

Let me list very briefly some of

the Board's current priority tasks. Since June 2009, the Board has reviewed the technical issues of long-term storage of commercial-spent fuel. We're developing a white paper on this subject that would be used as a basis for our reviewing of DOE's research related to extended storage of both commercial and government-owned high-activity waste.

Another effort supporting our ongoing review is a material balance analytical tool called NUWASTE, which was introduced to the Blue Ribbon Commission reactor and fuel cycle technology subcommittee last month by my Board colleague, Mark Abkowitz.

The results provide important insights on the potential benefits of different back-end processes and activities such as recycling of uranium and plutonium and long-term storage of spent fuel.

To determine the technical effects of how a delay in repository availability

affects the plans of federal facilities that store government-owned, high-activity waste, the Board has visited most of the facilities where these wastes are stored. We plan to issue a report early next year on our findings and conclusions.

We are in the process of revising the report we published a year ago that presents information on the programs being developed in other countries for managing high-activity waste, and Board staff member Dan Metlay presented the original report to the Blue Ribbon Commission subcommittee on -- disposal subcommittee in July.

The revised report will be extended to include a qualitative and historical assessment of how the countries we survey are going about developing their geologic repository programs, and it will draw some conclusions on how external factors have impacted the repository program in those countries.

Last, but far from the least, is the Board's preparation of a report of technical lessons learned from the U.S. and repository programs worldwide. This report will be made available to the Blue Ribbon Commission when it has become finalized. Much of the balance of my talk will be in connection with that report.

First, however, the Board feels compelled to express its support of the opinion that's been voiced by many others that regardless of the nuclear fuel cycle adopted, a repository for permanent disposal of high activity waste will be necessary.

In addition, I personally believe that having a plan in place for permanent disposition of the waste on which there is agreement and a path forward is essential to gaining public confidence in the nation's ability to manage nuclear waste.

Right now I think we have a temporary fix for a problem that very much

needs a permanent solution. Government-owned, high-activity waste is being stored at several federal facilities and commercial-spent nuclear fuel is being stored at more than 100 nuclear power plants nationwide at over 70 sites.

The current inventory we've already heard is about 60,000 metric tons of heavy metal, and as we've also heard -- and it's being added to it the rate of about 2,000 metric tons per year.

So, what is the solution? Well, that's, of course, part of what the Blue Ribbon Commission has been asked to consider. The deep geologic disposal must be at least part of the answer.

The objective of deep geologic disposal is simply to isolate high-activity radioactive waste from humans and the accessible environment for durations that are unprecedented in our history. Of course, this is easier said than done.

Slide seven highlights some of the challenges and complexities. With these complexities and the resulting technical challenges as background, what lessons have we learned from the experiences of the Yucca Mountain program and other repository efforts that could help us achieve this important permanent solution?

Every time I think or talk about lessons learned or learning from experience, I'm reminded of what President Truman once said, "There is nothing new in the world except the history you do not know."

The late, great nuclear pioneer Walter Zinn several decades ago often pointed out that many scientists and engineers complain that there is too little data when, in fact, the problem really, in most cases, is that we seldom take advantage of the data that's available.

So, in the spirit of President Truman and Dr. Zinn, the Board has attempted

to capture some of the nuggets from what has been learned during the last several decades from disposal efforts in the U.S. and other countries that might be useful in the future.

Because we know the U.S. program from our own involvement, the Yucca Mountain project provides the primary source of information for our retrospective. Obviously, we have learned much more about geologic disposal than I can cover in a few short moments, but let me give you a few examples.

First and foremost, the cumulative experience of the Yucca Mountain program, the Finnish, French, Swedish, Swiss, and the Waste Isolation Pilot Plant program provides a high level of confidence that deep geologic repositories are, indeed, technically feasible.

It should be noted that the planned repositories for these programs and the operating Waste Isolation Pilot Plant are located in different geological environments,

including tuff, granite, clay, clay and granite, and salt.

We learned to expect surprises when you get underground during the site characterizing phase so the sooner you go underground, the better. Two examples of surprises at Yucca Mountain were one, the possible discovery of bomb-pulse chlorine-36 at the repository level, which if eventually confirmed means that a small amount of surface precipitation could reach the repository level in just 50 years or less.

Two, the discovery of a repository environment riddled with pockets. The technical term is lithophysae ranging in size from the diameter of your thumb to the diameter of a basketball and larger, which considerably complicated geotechnical and heat transfer modeling.

Another example of a surprise is that in the early days of the Waste Isolation Pilot Plant characterization, experiments with

heat generating surrogates demonstrated that the creep rate of the salt at higher temperatures was far greater than had ever been determined in the laboratory.

We learned that including a robust engineered barrier system can have significant advantages over a program that relies primarily on what is referred to as the natural system.

Because the materials and manufacturing methods used for the engineered barriers can be specified and controlled, confidence in their predictability may be greater than that of the natural system. Of course, this assumes that the natural -- that this environment in which the engineered barriers would operate is understood.

The result can be much greater confidence in the form, quantity, and rate, that is the radiation source term, of radioactive material from the disposed waste entering the natural system.

We have learned a great deal about the importance of analyzing the contribution to overall risk of different waste farms. A much-improved knowledge base now exists to guide future efforts in specifying the most appropriate waste farms for permanent disposal.

A disposal facility involves many first-of-a-kind systems and components for which there is minimum experience. A carefully planned and systematic program of prototyping six systems and components in their expected environments is essential to understanding and modeling their potential performance.

We learn how important it is to have a waste package design that allows for direct disposal of a variety of canisters, including loaded dual-purpose canisters, to minimize the handling of high-activity waste. Waste handling is considered a significant contributor to the risk of any high-activity

waste management system.

Major advancements were made in the Yucca Mountain project on how to use the risk sciences to quantify post-closure performance over extremely long time periods. An important spin-off of this work is the use of phased and interactive probabilistic performance assessments to tell you what you should be doing in the characterization phase.

We learned how important it is to implement a rigorous and integrative total systems approach to characterizing a repository site, developing a repository, and designing and operating a waste management system that involves such diverse activities as transportation, storage, packaging, handling and disposing.

It is important to know how decisions made in each functional area of the waste management system affect other parts of the system, in particular, the impact of decisions and design requirements having to do

with post-closure have to be traceable to their impact on pre-closure activities including waste handling and transporting and the actual design and construction of the surface facilities for the project to be efficient in its operation.

We learned that it is essential to have a close relationship between the science program and engineering activities in such projects to control costs, schedules and other performance goals.

Experience indicates the importance of making the transition from a science program to an engineering project at the right time.

Finally, experience tells us that our license application in the U.S. can be developed that meets the requirements of the Nuclear Regulatory Commission for accepting a license application to review. This was a major achievement.

Now, experience in other countries

could become increasingly significant depending on when the United States resumes efforts to site and develop a deep geologic repository.

Some findings from the experiences of programs worldwide are repository systems can be developed in a variety of geological environments. There's lots of evidence to that now.

Most proposed disposal concepts rely on both natural and engineered barriers, although the degree of reliance on one or the other varies considerably. Research carried out at depth in underground research laboratories has been extremely valuable.

These are some of the lessons that the Board learned from its review of different high-activity waste repository programs, although I have only had time to present them at the highest level.

As I mentioned, I believe that keeping the focus on a permanent solution is

critical regardless of what interim alternatives to managing high-activity nuclear waste are recommended.

The basis for this view is a permanent solution is critical to building public confidence that there is, indeed, a way of isolating high-activity waste. I don't think the public's convinced that this problem can be solved.

History tells us that institutional stability is not guaranteed forever, and we're dealing with long-time constants here. The longer the delay in resuming a repository program, the higher the probability that it could be disrupted during the operational phase by institutional changes.

An international scientific consensus exists that a permanent geologic repository is the preferred disposal option and that it is technically feasible.

In closing, the following are -- I

believe the following's necessary for us to move forward. Number one, an assessment of repository development experiences to date should be used as a baseline for future geologic disposal programs. We have only really scratched the surface. Site selection and site characterization activities in the U.S. would benefit from such an assessment.

Number two, characterization of waste farms together with existing inventories of high-activity waste should be revisited, and the issue of the optimal method of disposal for each waste farm should be addressed. In other words, the one-size-fits-all approach used at Yucca Mountain may or may not be the best approach.

Number three, once a site has been selected, characterized, and found suitable, an engineering-oriented project plan for the design, construction, licensing, and operation of a geologic disposal facility for high-activity waste should be developed.

At the same time, a scientific research program that is tailored to the requirements of the engineering plan and the repository site selected should continue in parallel both for better technical understanding and identify potential improvements to the engineering plan.

Okay. I hope that this brief representation of some findings from the Board's work undertaken as part of the review of DOE activities has been useful. We look forward to providing other technical information to the Commission for its deliberations, and of course, all of our reports, correspondence, congressional testimony, and meeting materials are available on our website. I thank you, and I'm available for questions.

CHAIR SCOWCROFT: Thank you very much, Dr. Garrick, for a very useful and helpful presentation. Questions? Allison?

MEMBER MACFARLANE: Great. Thank

you very much. That was very interesting. A couple questions. One real quick one, you said reducing waste handling should be a priority of repository design that accommodates the direct disposal of a variety of canister types should be considered. What do you mean by canister types? Materials, different materials?

DR. GARRICK: Well, the waste is shipped from the generator site in different canisters.

MEMBER MACFARLANE: Right. Yes.

DR. GARRICK: They're not all the same, and some canisters are used for both the purpose of storage and the purpose of transportation.

MEMBER MACFARLANE: Right.

DR. GARRICK: Of course, the thought and the idea was to develop a waste package --

MEMBER MACFARLANE: A multipurpose --

DR. GARRICK: -- for the repository that would accommodate multiple canisters --

MEMBER MACFARLANE: Right.

DR. GARRICK: -- to avoid the need to have to keep handling the material.

MEMBER MACFARLANE: Okay. At the end, you said -- you talked about a -- we should consider whether this one-size-fits-all approach is not suitable. What do you mean by that?

DR. GARRICK: Well --

MEMBER MACFARLANE: Do you mean to imply that we need more than one repository that we need a different repository for each different kind of high-level waste or --

DR. GARRICK: I only make that comment because we may want to consider something like that. The whole issue is the integrity of the waste farm under the environment that you're going to put it in.

For example, in Yucca Mountain,

which has a high silica content, probably borosilicate glass waste would be more resistant than spent fuel.

On the other hand, if you're going to put --

MEMBER MACFARLANE: Well, it has nothing to do with the high silica content. It has to do with the oxidizing environment.

DR. GARRICK: Well, that's true, but the silica content does contribute to -- is more compatible with a glass-laced farm than it is with a --

MEMBER MACFARLANE: I think it has to do with the oxidizing environment. I mean, all rocks have a pretty high silica content.

Then, finally, there are lots of -- you make lots of statements about the ability of models to predict repository performance, so I want to understand whether you think that means the current method of U.S. evaluation of repository, in other words, the licensing decision is currently made based

on the results of this very complex and multi-layered model, do you think that's reasonable or should we consider alternatives?

DR. GARRICK: Well, I think my main point there is to simply say that if we keep recycling the performance assessment back to the characterization program in the sense of being able to expose just what it is to quantify the performance, we're probably going to make the characterization program much more specialized to the needs of performance assessment.

This was particularly true where you have a situation where you have the kind of coupled processes that you have in a geologic disposal, the thermal, mechanical, nuclear, and so on.

It isn't just a flow model. It's much more complex than that, and the waste farms become very critical with respect to that.

CHAIR SCOWCROFT: Thank you.

Richard?

MEMBER MESERVE: Thank you, John. I really very much appreciate your presentation. I have a couple of questions, as well. I know that you're familiar with the academy that had argued for an adaptive management approach --

DR. GARRICK: Right.

MEMBER MESERVE: -- recognizing that there are lots of -- as you noted, there are surprises and that you need to, basically, a strategy of preserving options as best you could until you really had to make decisions and preserving optionality for as long as possible.

You didn't explicitly endorse that type of approach and it is a little bit inconsistent with your statement about the problems of institutional stability.

DR. GARRICK: The problems of what?

MEMBER MESERVE: Of institutional

stability --

DR. GARRICK: Right.

MEMBER MESERVE: -- and institutional capability to still be there, to make the decisions. I wondered whether you had -- you spent a lot of time on this subject as to whether you had some views on the -- whether the adaptive management approach that was advocated by the National Academies is something that is -- should be an appropriate strategy for this Commission to consider.

DR. GARRICK: Well, I think it very much is. I think it goes back even further than that academy study. The original academy study on rethinking high level waste had some of the same kind of elements to it that this should be done very systematically and very well-defined parts and it should be designed -- the project should be designed in such a way that the output from the previous part can affect the succeeding part.

So, I think the phased approach,

and it really depends on what we mean by phased approach or the adaptive approach is absolutely critical because this isn't a case where we have all the science we need when we start. We're developing science as we go along that is going to impact the engineering.

You need to have a project plan that accommodates that, so I'm very much supportive of an adaptive and phased approach.

MEMBER MESERVE: I'd like to ask a question, a different that does pick up on a point that Allison has made, I think, twice this morning, which was that one of the lessons perhaps we ought to learn from the foreign experience is that if we were to think of a new repository, we ought to think about a reducing environment --

DR. GARRICK: Yes.

MEMBER MESERVE: -- rather than oxidizing environment. I wondered whether the NWTRB had taken a position on that and had views on -- whether you have views on it?

DR. GARRICK: Well, I don't know whether we've taken a position on it, but I think that there's no question that what we've learned is that the Yucca Mountain site is not dry.

We all realize that the principal mobilization vehicle for waste is water, and some of the original thoughts about the dryness of Yucca Mountain were certainly determined as we got underground and we did infiltration studies to not meet the requirements of the solo of infiltration rate that the real asset for that site would be that basically there was no water.

Well, that turned out not to be the case, so yes, it certainly seems to be much easier to be thinking in terms of a reducing environment, which generally means the radio nuclides are less soluble, number one, and number two, the corrosion rates are much less, too.

MEMBER MESERVE: You mentioned

that you're doing a white paper on the DOE research relating to the long-term storage of spent fuel and I'm curious, first of all, when is that -- that would be extraordinarily valuable to us and I would be interested as to when that would be available.

Secondly, does it encompass the research that's being undertaken by EPRI and others on the specific problems with commercial fuel?

DR. GARRICK: Yes. Fortunately, we have with us today the Board member that's leading that effort, Andy Kadak. I think the answer is that we're going to try to get the paper out before the end of the year. Is that right, Andy?

DR. KADAK: Sooner than that.

DR. GARRICK: Sooner than that, and yes, I think that every effort was made from at least a literature sort of standpoint to take into account all the work that's been done, including EPRI water.

MEMBER MESERVE: You mentioned -- let me just say that you mentioned a number of reports that you are doing that bear directly on the work of this commission --

DR. GARRICK: Right.

MEMBER MESERVE: -- and it would be extraordinarily valuable that when those are -- those would be very, very valuable to us and we look forward to receiving them at the earliest time that --

DR. GARRICK: Yes.

MEMBER MESERVE: -- you could transmit them.

DR. GARRICK: Yes.

MEMBER MESERVE: Thank you.

DR. GARRICK: Thank you.

CHAIR SCOWCROFT: Phil?

MEMBER SHARP: Yes. First, I wanted to ask a substantive question and then an institutional question. On the substance, one of your conclusions was that we've learned that it's possible to meet the NRC licensing

requirement to submit an application, and I wasn't sure whether that's just we've seen it happen because they accepted it or whether there's a more serious conclusion here and that is that some of the people are disputing the question about the million year and the 10,000 standards that we've set up.

Was that conclusion that it is possible to meet those standards?

DR. GARRICK: Well, I think that I have to choose my words very carefully here because certainly the Nuclear Regulatory Commission did not reach a finding or conclusion relative to that application --

MEMBER SHARP: Right.

DR. GARRICK: -- except that it had met the requirements that they had for the application to be accepted. You can't just take an application and dump on the doorstep of the NRC and expect it to be considered.

It has to fulfill certain specific requirements, and those are not trivial.

Those are pretty demanding and so the whole point was that at least we've crossed that milestone. We know we can develop an application that meets the requirements for it being accepted for review.

MEMBER SHARP: Let me ask the institutional question and probably ought to hear from your critics, and I'm not sure there are any, but -- one of the major things we keep learning is how poorly we've done in defining the government or the institutions by which we manage this issue.

Of course, the reason this Board was established was try to answer the charges that were very prevalent at the time that this science was constantly being perverted by the political process, and so this was to try to insulate that from the process, indeed, even from the appointing process is very unusual in the federal government when the President doesn't have total latitude as to who he picks.

So, I'm just curious can you give us any insight into how you find -- are there any additional safeguards to protect the scientific inquiry needed? Are there capacity issues? Are there -- is there anything we should learn going forward about making use of this particular institution or some variation on it?

DR. GARRICK: Well, I think one of the things that you probably thought of when you've participated in the creation of the legislation behind the formation of the Board that was extremely valuable in assisting the Board in its technical evaluation was to make essentially pre-decisional and event information available to the Board.

In other words, we were -- we had access to draft material, but we didn't have to wait until these reports and all of the material became legal, or I mean, official from the standpoint of going through all the review process before we could have access to

the data information.

I think in general the Board has been rather pleased with the access it's had to the information. We didn't always get it in as timely a fashion as we would like, but we were always able to eventually get what we needed to do our job, which was a technical evaluation.

MEMBER SHARP: Can I ask just one further on that is my vague recollection is, of course, that one of the things we wanted to do also was to make impossible to be a whistle-blower institution in which internally within the DOE or external in Nevada or anywhere else, people could bring to you issues and say, "Come on, folks, look at this," or something. Has that been a part of this or can you give me any --

DR. GARRICK: Well, yes, I think it was. We instituted the same thing that you do here. We at all of our public meetings allocated time for anybody to come forward and

talk to the Board and whoever was there, and we also encouraged people to send in information and make it a part of our proceedings for that meeting if they were unable to have sufficient time to make their points at the meeting itself.

So, I think that the operational aspects of the Board and its accessibility, and the accessibility of information was one of the things that I very much enjoyed in our deliberations.

CHAIR SCOWCROFT: Thank you. Per?

MEMBER PETERSON: Dr. Garrick, I'd like to start with a comment and then follow with a question. The comment relates to the importance of having an independent scientific and technical review capability as the NWTRB --

DR. GARRICK: After the discussion yesterday about the meaning of independence, I'm not sure.

MEMBER PETERSON: I would just go

on to say that we found that in Sweden, Finland, elsewhere, successful programs have some sort of independent credible scientific technical review group that provides an independent source of information and review.

That's only possible because people like yourself are willing to give an enormous amount of time and devote enormous amount of effort and also you have a, I would say, a gifted and highly capable staff.

I'd just like to -- my comment is to just recognize your service to the nation and the deep appreciation I think we owe you for taking so much of your time to do this work because it is important to the country to have your expertise and that of the other members of NWTRB.

DR. GARRICK: Well, I very much appreciate that, and I'm sure all of the previous chairmen would appreciate that, as well, so this has been a very satisfying experience in being able to conduct the

reviews we've had and had the staff -- the quality of staff we have. It's made the job ever so much easier than it might have been otherwise.

MEMBER SHARP: If you don't mind my interrupting, I just think that's well said and well deserved, and the truth is that we are so poor in this town and elsewhere in this country of recognizing people who give genuine public service, and I think we should applaud that.

DR. GARRICK: Thank you. Thank you very much.

(Applause.)

MEMBER PETERSON: My question is you have a bullet point major advances have been made on quantifying the risk of geologic repositories that also enhance the efficiency of site characterization.

This is a very important point. As you know, we clearly have the need to fix the institutional framework which is

responsible for trying to carry us forward, and this is something that I hope Congress will take up and work on.

There will be controversy though about the question of going back to a clean slate and looking for repositories. A lot of that will, I think, be centered around skepticism about taking another who knows how long to try to do something once again.

So, I think it's important for us in laying out a reasonable time line for how site identification, selection, and ultimately licensing process might proceed to actually have some idea of how much time given the current state of knowledge, which is much deeper than what we had 20 years ago it would take to perform, say, a preliminary site characterization, that is an activity that local communities might sponsor to determine in sufficient detail the characteristics of a site that wouldn't make -- allow for an informed decision about whether or not it's

suitable for hosting a repository, including, perhaps drilling of boreholes, seismic information, other things of that nature.

In the modern world, how long might that activity take, and then subsequently, how long might the detailed site characterization take to provide, including, I guess, underground facilities, the level of information needed to license a facility.

I don't ask you to do this off the top of your head because it's important, but if you could maybe speak to that briefly, and then I think this is a question that we could benefit from NWTRB's assistance on to understand what are these time frames necessary for preliminary site characterization activities, again, sufficient in form a decision on moving forward for detailed characterization, licensing, and construction, and then that detailed characterization.

DR. GARRICK: Right. Well, first

let me say I'm very pleased that you recognize that as an important experience finding because I was -- I think it's one of the most important, and it sort of reminds me of the old carpenter rule -- you measure twice and cut once.

The analog here is characterization is the measure, and I think that one of the things that we found out in the Yucca Mountain project was that the analysis is much, much, much more than a water flow model.

This came about particularly with respect to the thermal issues that were developed and the coupled processes associated with trying to model things where there was interactions between thermal effects, chemical effects, mechanical effects, and so, I don't know that I can answer your question, but I do know that the characterization program that was invoked for Yucca Mountain was without the benefit of really the kind of hindsight we now

have as to how we would go about doing it.

I think that whatever time we spent on it, though we probably should double it, in order to specialize the information to what we're trying to measure at the site with respect to risk and performance.

That's what I'm really talking about, the best way to find out what we need to do with respect to characterization and with respect to making measurements is to try to calculate it.

Your old professor, Tom Pickford, used to say many times that the best way to learn about something is to try to calculate it, and we weren't there to try to calculate infiltration rates alone. We weren't there to try to calculate just radiation dose.

We were trying to figure out how all of these phenomena interacted with each other with respect to the figures of merit that would eventually establish whether or not this was an acceptable site.

So, I think if there's an opportunity to really streamline them the next time around, it would be to pay a lot more attention to site characterization than we did.

The reason this came about was that whenever we were reviewing the technical aspects of the total system performance assessment, one of the areas that we struggled with was trying to relay it back to the supporting evidence that was developed during the site characterization.

In many cases, we couldn't do that, and I think that's where some of the greatest benefits can accrue with respect to eventually having the construction process and the engineering process sufficient.

MEMBER PETERSON: Hopefully, life might be a little easier with the saturated site.

DR. GARRICK: Well, it might be.

MEMBER PETERSON: I guess the key

thing -- it would be very valuable to us, I think, for potentially even broken down by different geologic media and repository design options to have some idea as to what the time frames might be to perform appropriate site characterization.

DR. GARRICK: Well, I think you need to perform a performance analysis in advance. This is one thing we learned in the reactor business that was extremely valuable.

When we started doing phased risk assessments, it turned out to be enormously beneficial in terms of returns on operations and maintenance as well as design and construction.

So, I think that these are just some backup slides that we -- so, I agree with you, and I think that that's where a lot of very careful planning needs to be done -- is on the front end.

One thing I don't want to leave the impression because my geochemist friends

on the committee maybe would not like that, we're not suggesting here that you can't build a repository in an oxidizing environment.

There are ways of doing it, and I think that the issue here is more how you keep the water away from mobilizing the waste and also waste farms do become important under those conditions.

CHAIR SCOWCROFT: Did you have a question, Susan?

MEMBER EISENHOWER: I don't know whether I have a question or not. This issue of water is extremely interesting. It keeps coming up. It came up this morning before the coffee break and you mention it in your comments about Yucca Mountain.

A number of us here on this Commission just got back from Sweden and it's pretty stunning to note the water that's cascading down the sides of the tunnel there underneath the Baltic Sea.

I was wondering if you could help

us, for those of us who are not scientists on this Commission, to clarify this water issue a bit and whether it relates to permanent disposal. Is that the issue or was it -- would the water be less of an issue?

I mean, it seems to me it probably would be less of an issue if you had -- if it were an interim storage. Let me just say one other thing in terms of the time frame that Commissioner Peterson mentioned.

The thing that is stunning about the way the Swedes have themselves organized is that they have everything phased. They have an interim retrievable storage facility, and they have a special storage for low and medium level waste and they're licensing a repository at the same time, but everything seems to have a process and they do not keep used fuel at reactor sites.

They begin to move it through a process right away, so I was just wondering if you could comment on any of those issues I

just noted.

DR. GARRICK: Well, I think that the one thing that is absolutely clear to us and that we struggled with in developing the corrosion and understanding the corrosion potential is that you have to understand the chemical environment and the compatibility of that chemical environment with the waste farm that you're dealing with.

That's why -- that's one of the reasons why it may be more of a challenge than we need to be thinking in terms of one environment handling all waste farms. There may be some merit in thinking about multiple geologic disposals, but we're not sure about that.

It'd be much easier, of course, if you had one that could fit -- that could handle anything, but it may turn out to be far more efficient to be -- pay much more attention to the compatibility between the waste farm and the chemical, mechanical, and

thermal environment that it's going to be in.

CHAIR SCOWCROFT: Dr. Garrick, we thank you very much for your presentation and especially for your dedication to this very difficult issue. Thank you very much.

DR. GARRICK: Thank you very much. Pleased to be here.

CHAIR SCOWCROFT: That concludes our hearing. We now have a few minutes for subcommittee status reports and discussion within the Commission. Jonathan, I think you have a presentation to make.

MEMBER LASH: Thank you, Mr. Chairman. As I understand, you would like to hear a little more about the trip that Commissioner Eisenhower mentioned.

Five of us, Commissioner Eisenhower, Commissioner Peterson, Commissioner MacFarlane, Commissioner Bailey, and myself, went with several members of the staff on a trip to Finland and Sweden over the course of eight days.

In each case, we were visiting a country which is entering the licensing process for a deep geologic repository. The license application is being submitted by a private corporation formed by the utilities and has complete responsibility for the management and disposal of high-level radioactive waste.

In each case, the license application will be for a facility to be constructed in a not only willing, but eager, host community, that consent being expressed through local government officials.

In each case, the process seems to enjoy national support, as well. There's a national consensus that there's an obligation to dispose of waste because each country relies significantly on nuclear power for its electrical energy supply.

We met with representatives of national government, local governments, the corporate officials responsible for managing

the process and environmental and local citizen representatives, both in Helsinki and in Stockholm and also in the communities that were being considered for waste disposal.

I won't go into detail. Of course, both Finland and Sweden are much smaller, more homogeneous societies than the United States. They don't have defense waste to dispose of. They have stronger traditions of trust in national institutions, so there are significant differences, but there are also very significant lessons as both Susan and Per have mentioned earlier.

They've gotten a lot of things technically and politically right. In each case, they have a very open process. They have made it clear from the beginning that the siting process would be based on full consent of the communities involved.

They have provided significant financial support for participation both by community officials, citizens groups,

environmental groups. The corporations with responsibility for the waste have recognized that they can only move forward with community support, so they've gone to extraordinary lengths, particularly in Sweden, to listen to and respond to the concerns of the community.

In Sweden, they ended up with a competition among two communities whose officials agreed at the end that the losing community, the one that did not get the facility, would get more significant compensation for the decision than the winning community.

I have to say one other observation. We found the local officials incredibly sophisticated about the process and about the importance of encouraging opponents as well as supporters, about giving space for opponents to express their views so that they were not silenced by what seemed like very significant public support.

There had been polling that

showed, I think, almost 80 percent support in the communities, but even so, they were offering compensation to their critics to come participate in the process. I think that's part of what has created this sense of trust. So, I think we all found it an extraordinarily useful set of visits.

CHAIR SCOWCROFT: Was there any sort of a referendum? You said -- you mentioned polling. How did you get -- how did they get the sense of the community?

MEMBER LASH: The consent was expressed through local government, through the local council. I don't think in either case there was any kind of a referendum, but they had done polling to confirm what they thought was broad support.

In each case, there will be some kind of national government approval. There was a vote of Parliament in Finland and the Cabinet has to approve the license application after the nuclear authority has recommended it

in Sweden.

CHAIR SCOWCROFT: Other comments, questions, observations? Per.

MEMBER PETERSON: I'd just like to note that the trip to Sweden and Finland for me also was very helpful, and the information we gathered was very useful. The opportunities to meet with especially local elected officials, NGOs, as well as senior people in the government, particularly in regulation, allowed us to learn a lot about some of the detailed things that had been done in Sweden and Finland that have made their programs successful.

So, the lessons from this trip I think will be very helpful to the Commission in our effort to generate a set of findings and recommendations.

MEMBER LASH: I believe, John or Mary, I think the records of all of our meetings are public and posted on the website?

MR. KOTEK: They're not there yet,

but they will be.

MEMBER LASH: They will be because these were official subcommittee meetings and we tried to adhere to our principles of openness as much as possible although live broadcast proved to be difficult.

CHAIR SCOWCROFT:

MEMBER EISENHOWER: I just wanted to add, too, sort of strong impressions for me. First of all, it's absolutely right about the way they handled the opposition. It was stunning to be there at the waste management company's facility and to have them pay for opponents to the project to come in and call them all sorts of names.

I mean, it was really quite impressive, and I think therefore even in the contention at times, there seemed to be a kind of a community around that. I would say it was a very positive thing to watch and it was impressive and we have a lot to learn from that.

The second thing I wanted to note for Americans who haven't been there, do look this site up, the one in Sweden, on the internet. It's extraordinary that this repository for low-level and medium-level waste is built under the Baltic Sea.

It's quite extraordinary to go down into this tunnel and the thing that's stunning about it is when you come back up to the surface, people are sailing sailboats over this repository, and we were told there are 5,000 country houses in the area.

So, it's rather interesting in America we have the attitude that there's no isolation or no distance too far for putting facilities of this kind whereas through a rigorous public education process and the rest of it that this repository lives rather compatibly below the surface of the Baltic Sea where all kinds of recreational activity occurs on its surface. Just rather impressive, I'd say, and when I mean

impressive, I'm not saying that we could replicate these conditions here necessarily, but it certainly made an impression, didn't it?

MEMBER HAGEL: Mr. Chairman, may I ask Commissioner Eisenhower a question? In reference to paying, where did the money come from? Is that taxpayers' money? Is that fees from plants? Where does the money come from?

MEMBER EISENHOWER: If you're talking about the money for the repositories, and I'm sure that my other commissioners could comment on this, as well, they have a waste management fund.

What was rather striking about this is it is absolutely a lockbox, and when they described how this money goes in there and doesn't come out and isn't used for any other purpose except the purpose for which it was intended, there was a slight intake of breath in Americans who were listening to this presentation, but Jonathan, I'm sure, could

elaborate on this.

MEMBER LASH: I think that the company pays for participation, but there's also a government program to which groups can apply for participation funds. Is that correct? Yes.

MEMBER HAGEL: No, I'm asking about what you referenced, Susan, and the opponents came and had less than complimentary things to say about some, as you have described it.

But then you said it was stunning, I think, in your words, that they were actually paid for that. So, my question is, well, who pays for that? Where does that money come from?

MEMBER EISENHOWER: Actually, I think it's done in a more elegant way than that. It's just regarded as support for a public dialogue and they receive an annual amount. As a matter of fact, I gather from these funds that a non-governmental

organization receives an annual stipend to continue to monitor the activities of the waste management company and their activities.

It's through that annual contribution to the NGO that this opposition group participates. Now, I think there is a generalized --

MEMBER HAGEL: Are those public funds?

MEMBER EISENHOWER: They're public funds. I believe.

MEMBER PETERSON: I should maybe just jump in and note that all of the costs associated with the management of nuclear waste are paid by fees charged on electricity generation, including the cost for the regulatory agencies within the government are reimbursed from these fees.

So -- and the cost for public participation, all of it ends up in the price of electricity. If we could do that with fossil fuel waste, that would be fantastic,

but in this case in Sweden, it's all covered through the cost of electricity.

MEMBER HAGEL: So, there's no -- not taxpayer money or so-called as we would see it or --

MEMBER PETERSON: No. No.

MEMBER HAGEL: -- public money if it's as you say. Thank you.

MEMBER SHARP: Mr. Chairman, on that point, I go right to something I suggested yesterday is that we compile how we do this in the United States because I think there will be examples you will find where out of the waste fund we pay for participation of certain people in Nevada.

I don't know how these all develop; sometimes out of court fights, sometimes out of negotiations between states, but there are different techniques we've been using for multiple years and we ought to just get that record clear. Some of it's good, some of it may not work very well.

CHAIR SCOWCROFT: Other comments? If not, we will now turn to our public oral comments. We have 11 people asking to speak to us. We will allow four minutes for each presentation.

We have a system of lights here, a green, amber, and red light, and we ask you all to keep your presentations within the four minutes. First presenter is Dr. Alex Pavlak from Thales Research, if you would come to the podium, please. Thank you, Dr. Pavlak, you may proceed.

DR. PAVLAK: Good morning. My name is Alex Pavlak. I am a Ph.D. professional engineer. My expertise is systems architecture. I've had the opportunity to create the structure of unprecedented systems.

From this perspective, I wanted to offer a suggestion to the BRC. You already have a strategic goal. You're looking at nuclear power. The next step is the strategic

vision. At some point in the future, if and when nuclear power generates, say, 80 percent of our electric power, what's the concept? What's this look like?

You arrive at the strategic vision by creating scenario analysis, by thinking through the numbers associated with a single-pass Light Water Reactor with thinking through the whole system associated with a breeder reactor.

Typically, if you do a rigorous scenario development, typically one scenario tends to stand out as superior to the other options. Now, there are several reasons why the BRC should be interested in developing this strategic vision, this picture of the future.

One reason is that it is of enormous help to plenty. You don't do things that are in conflict with the vision. It allows you to set priorities and provide the efficient use of resources.

The second reason is that it avoids serious mistakes. You don't wander down avenues that turn out to be dead-end streets. You've thought through this stuff ahead of time before you do your scenario development.

The third reason is that it provides a standard for comparing alternative energy options. At some point, I think the U.S. needs to think through in some rigorous technical depth the various opportunities it has, and the BRC has an opportunity to set the standard for doing this.

My final comment is that America's nuclear future is broader than the back-end of the fuel cycle, and at some point, the scenario development ought to include the reactor so that you can come up with an estimate on cost that would allow the comparison with other energy options.

I thank you for the opportunity to comment. Any questions?

CHAIR SCOWCROFT: Thank you very much, Dr. Pavlak. Our next presenter is Brennain Lloyd of NorthWatch, and he will be followed by Linda Lewison. Mr. Lloyd? Oh, excuse me. Excuse me, Mrs. Lloyd. You may proceed.

MS. LLOYD: Thank you. My name is Brennain Lloyd, and I am here on behalf of NorthWatch where I coalition of environment and social justice organizations, our public interest organization in Northern Ontario, in Canada.

We've been very involved in the discussion of nuclear waste management in Canada since our founding in 1998, and I want to thank you for the opportunity to make some comments today as part of your proceedings.

Time is brief, so I really want to emphasize three key points. First point is that nuclear waste management is not the good-news story in Canada that I think you may have been given the impression it is through

presentations at your July disposal committee, your September full commission hearing, and yesterday by Mr. Nash.

Several problems. Key problem is the nuclear waste management organization is an industry-only organization, very different than the arms-length independent agency that was recommended at the end of a 10-year review of Atomic Energy of Canada Limited's geological disposal concept. This is a significant feeling.

The Nuclear Waste Management Organization consultation process, which you've heard described, to date, it can be characterized I think quite fairly as one of manufacturing its own consent, carefully crafting engagement activities with selected publics to arrive at a pre-determined -- what we can only surmise is a pre-determined outcome, and it's an outcome that coincides with the industry's long-standing preference, i.e., geological disposal.

It's dressed a little different. It's called a little different. It's geological disposal. It is, in essence, the same concept as failed the environmental assessment hearing which concluded in 1988.

First Nations, what you, I think, would call tribes in the United States, First Nations in Canada have not been engaged in a manner which they recognize as being either adequate or appropriate.

The technical work done by the AECL, particularly in their 2002 to 2005 study period, was very thin -- the siting process, which results as a seriously flawed process in its scope, in its sequencing, and in the substance.

The Nuclear Waste Management Organization plan, which they have titled Adopt a Faith Management, incorporates and builds upon the failures of the previous proposal, i.e., Atomic Energy of Canada Limited's geological disposal concept.

Brings us to point number two, which is with respect to geological disposal as a concept. Geological disposal has not been demonstrated to be safe or acceptable. That was the outcome of our ten-year hearing.

Atomic Energy of Canada Limited's geological disposal was, as I said, subject to the ten-year hearing -- ten-year review, 13-month hearing, and the panel conclusion referred to as the Seaborn Report found that it had not met the test set to it, i.e., was the concept demonstrated to be safe and acceptable.

It said some words around on balance, at the conceptual stage in development, but it had not been demonstrated to be safe and acceptable.

More recently, independent reviews internationally have concluded more generally that the technical case for geological disposal has not been made and there are several serious challenges which as long as

they remain unresolved mean that the safety case cannot be made.

These include things -- issues around container corrosion, potential for failed barriers, questionable modeling assumptions, as well as a lack of sufficient peer review and independent analysis. What's required is isolation, isolation of these wastes into perpetuity.

What is known now is that geological disposal as currently proposed will not achieve that isolation over the time frames required or at least at best has not been demonstrated to do to date.

Third point is the attempted decoupling of the problem of waste management, management of the current waste volumes, and the continued production of waste is illegitimate.

As long as the reactors continue to operate, the greatest radiological burden will continue to be at the reactor site

regardless of any transfer offsite of some of the older waste.

The first principle of waste management for all other waste streams should apply here, and that is reduction at source. Simply translated, that means stop making it.

Thank you, and I would welcome any questions, comments, and I have brought from written materials. I'll provide Mr. Frazier, and we'll follow with a written submission in follow-up to some of the very interesting discussions of yesterday and today. Thank you.

CHAIR SCOWCROFT: Thank you, that would be very helpful. Thank you, Ms. Lloyd. Next, Linda Lewison of NEIS Nuclear to be followed by Ellen Thomas. Ms. Lewison? Welcome.

MS. LEWISON: Hello. Thank you. My name is Linda Lewison, and I'm from Illinois, which has, as you know, more reactors and therefore more waste from

reactors than any other state.

My background is in business. I've been with national security issues for over two decades and had the pleasure of first meeting Susan Eisenhower when I served as Midwest Director of Business Executives for National Security and Susan was at the head of a national program that we both worked on.

The point has been made just now by the person who spoke before me and by other people here of the direct connection between radioactive waste and the making of it, of closing the reactors, and so if I could just put it -- the quote from the gentleman who spoke last that the best way to learn about something is to calculate it, is to just make this first of two points about solving for X.

In order to solve for X if X is the amount of radioactive waste that we are dealing with, we must put a number on it. We must calculate it, and that means it has to be a finite number and the making of it has to

stop.

The second point I want to make about -- is to suggest a new definition of what is meant by interim. We've spent a lot of time and you've spent a great deal more time thinking about what to do in the interim, and while we have agreement that we have some sort of consensus on that there will be eventually a geological repository, what we do in the interim is a major part of the discussions.

I want to suggest that the interim starts with when we put the fuel rods into the spent fuel ponds and we don't have an end to it yet, so we are living in the interim and our concern is what we do on Monday, what we do right now onsite, no matter what else may happen because that onsite piece is going to go on for at least a few years, if not a few decades until we come to some agreement about what to do next.

I want to suggest that that onsite

piece be governed by three simple guidelines. One, move the material in the safest way possible understanding that it's safer -- we're not going to ever get to safest -- that is in some kind of hardened onsite storage containers.

Number two, move it the least frequently. That is, touch it the least, move it the least amount, and number three, move it the least distance. That is, move it somewhere onsite or close to onsite, again, because of the obvious risks that have been discussed here already.

I think if we're guided by those three principles as we move it right now on Monday with the what do we do on Monday part of your planning that we will do a great deal to safeguard the public in ways that I haven't heard discussed too much yet here.

The last thing I want to say is I want to tell you a quick story about my son. My son, Age 25, who didn't vote in the last

election, asked this question. He was at a meeting in Chicago about what to do with radioactive waste.

He said, "You know, in a perfect world, why can't we just send it up to space, right? Not in my backyard. What can we do here to -- how can we get to that? Just get it out of here."

The answer was, "I can answer that question in two words. Challenger and Columbia." That is, that we are flawed human beings that we try our best and we strive so much in these meetings to do the right thing, but that we need to take into account that we are not perfect and understand our own human frailty and try and think about the risks that we take every time we deal with this material in whatever plans we make for the future. Thank you.

CHAIR SCOWCROFT: Thank you very much, Ms. Lewison. We appreciate your comments. Our next presenter is Ellen Thomas

with WILPF to be followed by Alfred Meyer. Welcome, Ms. Thomas.

MS. THOMAS: Thank you. Good morning. It's a pleasure to see all these very important, intelligent people considering such an important issue.

I'm Ellen Thomas, and I'm here representing Proposition One campaign to abolish nuclear weapons and also Women's International League for Peace and Freedom.

I just want to speak as a grandmother. There's a lot of people who can talk about technicalities, but I have to speak from my heart. I think that we are at a pivotal point in history when we can continue to invest in radioactive waste and weapons and the byproducts and end-products of the chain of nuclear industries from uranium mining to plutonium, or we can decide to shift our infrastructure and economy toward a sustainable future, retool our arms industries to mass produce solar, wind, tidal, and other

energy systems, which will free us of both fossil fuels and the dangers of nuclear power.

If we choose the nuclear chain, we will have more and more leakages, transport accidents, and new contaminations of our precious water and air.

I live in the beautiful mountains of North Carolina between Oak Ridge, Tennessee, and Savannah River. Nuclear waste trucks drive up and down I-26 four miles from my house. This concerns me.

A new nuclear power plant is proposed 40 miles away in Gaffney, South Carolina, on the very un-broad Broad River, which suffers from droughts and is used by the communities down the river for fishing and swimming and recreational use, and this concerns me.

I hear rumors which suggest that the nation's high-level nuclear waste facility could be put in the granite hills of Sandy Mush, North Carolina, a gorgeous little valley

with 100 springs per square mile rich with family farms. I posted to the BRC website a video of this place when I appealed to you.

I urge the Blue Ribbon Commission to reject Sandy Mush as the nation's high-level waste dump. I urge you to turn away from new nuclear power plants, phase out the existing plants, and store the existing waste in hardened onsite facilities until we figure out how to neutralize it so transport accidents don't spread the contamination, which is already so much worse than we should've allowed it to become.

I urge you to break the nuclear chain and forge instead a sustainable future for our grandchildren carbon-free and nuclear-free. Thank you.

CHAIR SCOWCROFT: Thank you very much, Ms. Thomas. Our next presenter is Alfred Meyer, a private citizen, to be followed by Dave Kraft. Welcome, Mr. Meyer.

MR. MEYER: Thank you very much

for this opportunity to speak to you. My name is Alfred Meyer, and I speak to you today as a private citizen. The Blue Ribbon Commission on America's nuclear future -- in considering what our nuclear future will be, I think that we can agree that there is much that is unknown.

We don't know exactly what the electricity demand will be, what technical advances or problems we may find in nuclear technology. The economics of new power plants and also maintaining the operational safety and longevity of old plants, all these things are unknown.

But there is much that is known. We do know that we have the military and industrial waste that exists presently and it has no path for disposition. We also know that major river systems and aquifers are in real and present danger; the Columbia River endangered by Hanford, the Snake River from the Idaho National Laboratory, the Savannah

River at the Savannah River site as three prime examples.

Waste is buried in leaking tanks, and it's moving towards these important water resources, nuclear waste of all levels and classes, solids, liquids, and gasses that today have no pathway for disposition. These are known.

I would contend that nuclear power is absolutely the most expensive, dangerous, and arrogant way to boil water. For the privilege of boiling water for 40 or 60 years, we leave behind the most dangerous elements known to man.

These elements endanger the human genome, the genetic material that makes us us, for millions of years to come. So, I would ask that in your report to please be sure to include two key elements. One is give us a clear plan for dealing with the waste that already exists, high-level and so-called high level waste.

Number two, I really hope that your report will include a thorough examination of the option of stopping making nuclear waste, phasing out nuclear power soon.

What are the economic, public safety, and security benefits of shutting down nuclear power plants? Compare this analysis with any plan which would continue and/or expand nuclear power. Thank you very much.

CHAIR SCOWCROFT: Thank you, Mr. Meyer. We will next hear from Dave Kraft of NEIS to be followed by Chas Jaszczak. Mr. Kraft? Welcome. The floor is yours.

MR. KRAFT: Thank you very much. I appreciate the opportunity to address you hear, and I also want to thank Commissioners Sharp and Meserve for the consideration given in Illinois when I presented as part of a panel for the subcommittee in Chicago.

I'm going to start out with a piece of information I want to share with you and then four questions that I want put your

way as you continue your deliberations.

I'm glad you brought up the report on the Sweden visit because there were some really interesting and intriguing concepts that you brought back, but as Commissioner Sharp mentioned, there are probably, and I know for a fact, U.S. examples that you can turn to for more information, and I actually cited one of those in my testimony in Chicago.

I was a member of the Illinois Citizens Advisory Group on low-level radioactive waste from 1986 to 1990, and we went through pretty much the same kind of agonizing process that you all are squirming about right now and will continue to do so.

I would urge you to go back to IDNS and gather some information and some of the records from that. It was not an easy process. It didn't come up with a facility, but we learned a lot of lessons that I think would be of value to this Commission, so I want to leave that as a resource.

Now my questions. You gave my colleagues and 30 other organizations and 167 co-signing organizations a challenge to answer questions, so I thought turnabout would be fair play, and I want to leave you with four questions that you might consider as you deliberate.

The first is your resumes don't do justice on the BRC website. The tremendous amount of knowledge and background here is phenomenal but, quite honestly, I don't really know it in-depth for all of you yet I get the impression from the website this is a highly technically oriented commission.

In fact, even the mandate is charged to look at more technical issues and on the back-end of the cycle, so it's either hard sciences or public policy is the general gist I get.

In your wisdom, you have sought the consultation of the social sciences, and I've seen that in some of the people you've

invited to present to you. One of the things I would urge you and recommend that you do is go back to the Department of Energy and perhaps the President and say perhaps we need a new tail and a new dog the next go-round.

Maybe this issue should be begun from the standpoint of the institutional problems and the social sciences and work your way in the other direction. I bring that up because if you don't do that you are right now on the precipice of falling one way or another to using the technology driver to then go and pursue the social sciences as a justifier.

That's not what you want going forward in the process. You don't want kind of a rigged game where the technology drives it and then you tweak the social science later and try and solve those problems.

So, until these are more co-equally dealt with, I think you're going to have some difficulties.

My second observation and question

gets down to the HOSS issue and what should be done on radioactive waste issues. I believe Secretary Chu gave you pretty much latitude in his opening remarks that you do have permission to look at front-end options as they modify back-end outputs.

As such, that's why we figured coming to you and saying you do have to consider non-nuclear options as well as nuclear options in the future of America's energy policy.

So, the question would be what non-nuclear technologies are you thoroughly investigating and will work on that will also minimize radioactive waste production and the problems of final solution?

The next question I would ask is will the BRC conduct a cradle-to-grave cost/benefit analysis comparing the hardened onsite storage to other back-end options such as reprocessing because unless you engage in that, you sort of rigged the game once again

and you've prejudged the issue without looking at it fully?

My final point is just a short one. In the last few days, the trade journals have revealed that in the case of a severe reactor accident, there seems to be a breakdown in agreement amongst NRC, EPA, and FEMA as to who would be responsible for mitigating the long-term consequences of that accident.

That really begs the question of is the same scenario going to unfold in the case of a radioactive waste transport accident and in the case of the long-term storage and perhaps permanent isolation of the waste.

I think that's a very serious institutional consideration that this Commission needs to consider. If the three prominent agencies dealing with reactors can't agree now, how can you possibly make meaningful recommendations to the Department of Energy unless they're in agreement?

So, I will leave it at that. If there are any questions, I would be willing to answer them, and I'll mention that I'll be posting my Chicago remarks electronically, which I've modified. Thank you very much.

CHAIR SCOWCROFT: Thank you, Mr. Kraft. We will look at your questions. Next presenter is Cash Jaszczak from Nye County, Nevada, to be followed by Keith Larson.

MR. JASZCZAK: Thank you for the opportunity to make a brief remark. You've seen us here before. You know who we are. We're the home of Yucca Mountain. That hasn't changed.

Listening for the last two -- day and a half, the Canadian presentation was especially interesting. It basically talked about a good deal of the things that are already in the framework of the Nuclear Waste Policy Act.

They're there. They're in place,

and the Nuclear Waste Policy Act is -- it has been followed up to this point, at least at some level. The safety case has been prepared in the sense of the license application.

The specific recommendation to you is would you consider allowing the NRC to complete its review of the license application then put that $500 million that they've had to do that work to good use.

This contributes to the issue of trust in the government institutions that have been part of this process. Let's not abandon those at this point, and they may be useful to you on whatever occurs and however we end up in this process. The point being is don't throw the baby out with the bath water. It's not time for that just yet.

Also in the Canadian presentation, it talked about benefits. We as Nevadans chose not to negotiate for benefits. The opportunity was there. You need to know that. Those provisions were also part of that.

Last but not least, seven of the ten Nevada counties which are affected units of local government either accept or take no exception to the reality of Yucca Mountain.

Not all Nevadans are against Yucca Mountain, and I'd offer to you that that process needs to play out and we'll live with whatever choices you or this administration or any other administration make, but we are informed the Nuclear Waste Policy Act did provide funds to allow us to have subject matter experts to be able to have an informed citizenry.

It's not unanimous by any stretch of the imagination, but it goes to all those things that Mr. Jenkins-Smith made and let the process play. Thank you very much.

CHAIR SCOWCROFT: Thank you very much, Mr. Jaszczak. We appreciate your being with us again. The next presenter is Keith Larson from the City of Caliente. He'll be followed by Dan Brown.

MR. LARSON: I want to thank you for this opportunity. I was mayor of Caliente in 1985 when Yucca Mountain was proposed and we formed a JCCIAC in our county, Joint City County Impact Alleviation Committee, and we loved acronyms.

So, anyway, what I wanted to say is that we've been engaged since 1985, and we've continued to be engaged until 2010. I thought this whole matter was going to be over in 1997, but what is it that we want out of this deal?

All we wanted was a place at the table. It's important to us. We've been living with it for over 30 years. I've raised all my children. I've got grandkids that are now in their 20s, and it's been a long time.

Whether we were for Yucca Mountain or against it, that wasn't the issue. The issue is we need to be at the table when those decisions are being made that affect our communities and our county. Thank you very

much.

CHAIR SCOWCROFT: Thank you, Mr. Larson. We appreciate your comments. Next presenter is Dan Brown from Securad --

MR. BROWN. Good morning, ladies and gentlemen --

CHAIR SCOWCROFT: -- followed by Diane D'Arrigo.

MR. BROWN: Thank you for this opportunity to make a presentation. My name is Danny Brown. I'm with Securad, Incorporated, which is a Canadian company where we're looking at building a deep geological repository in Northeastern Canada.

I'd like to make a few comments about what I've been hearing at all of these hearings. In a perfect world, we'd be able to generate energy without having a downside cost to it. Unfortunately, we're not in a perfect world.

No matter what we do, there's going to be some consequences of generating

energy, and energy's at the core of every society. Now, the world is moving forward. We've got -- Abu Dhabi is buying reactors from South Korea.

Vietnam has just announced they're going to build or have a reactor built by Hitachi of Japan. China has stated recently that they're planning going nuclear in a big way.

When someone asked a Chinese official how they could justify going nuclear with the higher cost of coal, they said, "Have you any idea what it's costing us to deal with the lung problems of our citizens?"

Anybody that's visited China is well aware of the pollution in Chinese cities. So, you know what? Yes, there's consequences and I'm seeing America losing its leadership position.

How are we going to control, and maybe you don't like using that word, I'm a Canadian; I'll get it -- I'll try and get away

with it -- how are we going to help the world make good decisions about how to minimize the risks and make the best decisions they possibly can for the environment?

How is Abu Dhabi going to dispose of spent fuel? It's not practical for them. Canada -- the NWMO is estimating it'll be $16 to $24 billion to build a repository just for Canadian fuel.

How could Abu Dhabi possibly afford that? Our view, Securad's view, is that we have to build a global repository for the whole world and situated in the best rock we can, etc. I'm not here to promote Securad today.

The public wants action. I've traveled -- I've followed this Commission around. I'm a BRC groupie, and I've talked to the public. When we went out to Hanford, I drove across the country and I talked to the voters. Virtually everybody wants to go nuclear as quickly as we can and they can't

understand why we're not moving more quickly.

Now, they're operating from an uninformed base. They don't understand that nuclear is the most regulated industry in America, but they want results. They've made the decision that they -- it's better to go green with nuclear power than it is to have fossil fuels.

They want to get off foreign fuels. They want to deal with the terrorist threat, and they just can't understand why we're delaying. As a Canadian, I want to see American leadership. The world is benefitted with American leadership, and I'd like to see you reassert it. We've done well with it in the past.

So, I've got a quick to-do list. One, we need you to set the terminology for the nuclear industry. We don't know -- I've heard people talking about casks and canisters and just using the word waste. I asked an NRC commissioner at a hearing in Washington here

why is there no terminology?

Shouldn't the NRC set a terminology? He said, "No." He said, "That's not our job." He said, "Maybe the media will do it." I said, "Yes, the media did do it. They called it waste, and it's hurt us for 40 years." Okay?

It's not waste. It's used fuel. It's like a Duracell battery where you've used it one time, you've used three percent of the available energy, and it's potential future energy. It's not cost effective now to try and recover it, but we should store it for 50 years in a monitored, retrievable storage facility deep underground and be able to go back when the technology and the cost -- and it's more cost effective and when we have the technology to reprocess.

We desperately need the loan guarantees made more business-friendly. I have no commercial interest in that. I want that very clear, but if you want this industry

to move forward, we're trying to get investment for our company.

Investors don't want to hear of the projects that are going to take ten years to get a return on investment. They need the assistance of the government to provide additional security for investment.

Basically, that's it, and I appreciate your time. Thank you very much.

CHAIR SCOWCROFT: Thank you very much, Mr. Brown, for your comments. Our next presenter is Diane D'Arrigo of NIRS to be followed by Jay Marx.

MS. D'ARRIGO: Yes, I'm Diane D'Arrigo. I'm the reactive waste project director at Nuclear Information and Resource Service. You want trust. You have my complete trust. I completely trust that this body and anybody that you recommend be created will advocate and promote the illusion that there is a solution to an unsolvable nuclear waste problem.

I also expect that -- well, I -- that's a frustration, but I believe that that's a reality. As far as gaining public trust, if there's no limit on the amount of waste that's being produced and if there is no sincere effort to have a goal at least of isolating the waste from the environment, whatever agency or committee is set up will not have public confidence.

You can't convince people to accept unnecessary serious risks unless you deny the level of the risks. I have stated more than once to this committee that you need to substantively address, and I hope that you will in the final report, the failed reprocessing activity that took place in this country, the only commercial reprocessing, to address the current problems at that site at Rust Valley, and what needs to be done to protect the Great Lakes from that threat to the water supply before entertaining new reprocessing.

I don't before that -- I mean, I hope that the Committee will do these things.

CHAIR SCOWCROFT: Thank you very much, Ms. D'Arrigo. Our final speaker is Jay Marx from Proposition One. The floor is yours.

MR. MARX: Thanks very much. My name is Jay Marx. Proposition One is for nuclear disarmament and economic conversion to a sustainable future.

The best indicator of the U.S. government's attitude towards our nuclear future is the charge and purview of this Blue Ribbon Commission by restricting this comprehensive review of our nuclear future -- of our nuclear policy to the back end of the fuel cycle.

The President and the Secretary of Energy have ensured that the most important questions of our nuclear future do not get asked let alone answered. After all, by the time we wrestle with the questions of what do

we do with this nuclear waste that we're generating, we've already accepted that we must generate evermore toxic and radioactive for tens and thousands, hundreds of thousands of years this waste. Indeed, billions of years.

Uranium-238 is radioactive for 4.5 billion years. That's about the life of our planet. For our own selfish purposes, then we do this.

At a fundamental level, how dare we when there are clear, viable other options, sustainable options, that are available to us? And there most certainly are. Where do we get off insisting to future generations that we must leave this poisonous legacy whose security we can never guarantee, whose toxic legacy will last for all practical purposes in our short lifetimes forever?

Of course, we do not fault this Commission for fulfilling your charge. Your work here cannot be easy, and I do not envy

you to figure out how to clean up and control an essentially infinite mess.

I thank you for your time and your service and more for engaging the public, actually engaging the public as something that too rarely happens in our democracy, especially with regards to all issues nuclear. It's not your fault that you've been asked to answer the wrong questions.

I know you will, however, report to the Secretary of Energy, and he will eventually report to the President and perhaps it all will eventually sift out to the Congress and to the people.

I hope you don't mind taking this opportunity to speak up the ladder as it were and ask some of the questions that by rights should have been asked well before the nuclear horse is out of the barn or the waste out of the barrel or the missile out of the silo.

I reference nuclear weapons because, of course, our modern nuclear energy

program only exists because of nuclear weapons, because of our efforts in the Manhattan Project.

Further, we have to acknowledge that as long as we are making nuclear power, we are continuously creating more nuclear proliferation risk. That is inescapable. Plutonium does not exist in nature anymore.

It cannot be mined except from the waste of uranium fission that nuclear energy creates. So, from an administration that is apparently working so hard to prevent nuclear proliferation everywhere else on the planet, it seems, to say the least, in Congress that we would pursue an energy policy for ourselves that entails a perpetual proliferation risk no matter how we sugarcoat or minimize or most ideal vitrify that risk. Plutonium, put it under glass.

Why does the U.S. government insist on supporting this industry? Who really benefits? The current players. Does

the public benefit? Do the rate payers in Florida benefit for paying for future nuclear reactors, paying extra money that -- Florida, that has so much sun, rate payers there need to pay more?

I understand my time is up. Last word about cost/benefit analyses and opportunity costs. I hope the Commission really hears and acts on the gentlemen Mr. Kraft's earlier comment that a cradle to grave analysis of the back end of the nuclear cycle should and must really ask what containment really costs us.

A billion dollars can buy 300 megawatts, give or take, of wind energy. Maybe something similar on the line for solar. How many billions of dollars does one nuclear power plant cost, let alone the billions to save and contain and try to contain the waste?

So, when we think about America's nuclear future, please let's think about the best way to contain nuclear waste, of course

not to create it. Thank you.

CHAIR SCOWCROFT: Thank you, Mr. Marx. That concludes this session of the Commission. We stand adjourned.

(Whereupon, the foregoing matter was concluded at 11:54 a.m.)

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C E R T I F I C A T E

This is to certify that the foregoing transcript

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Before: n/a

Date: 11-16-10

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was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

Neal R. Gross

Court Reporter