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Before the Committee on Appropriations

Energy and Water Development Appropriations

Fiscal Year 2009

110*th* CONGRESS, SECOND SESSION

H.R. 7324/S. 3258

DEPARTMENT OF DEFENSE—CIVIL
DEPARTMENT OF ENERGY
DEPARTMENT OF THE INTERIOR
NONDEPARTMENTAL WITNESSES

Energy and Water Development Appropriations, 2009 (H.R. 7324/S. 3258)

S. HRG. 110–840

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

ON

H.R. 7324/S. 3258

AN ACT MAKING APPROPRIATIONS FOR ENERGY AND WATER DEVELOPMENT FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 2009, AND FOR OTHER PURPOSES

Department of Defense—Civil
Department of Energy
Department of the Interior
Nondepartmental Witnesses

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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

WEDNESDAY, MARCH 5, 2008

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:30 a.m., in room SD–124, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Domenici, Craig, Bond, and Allard.

DEPARTMENT OF ENERGY

OFFICE OF NUCLEAR ENERGY

STATEMENT OF HON. DENNIS R. SPURGEON, ASSISTANT SECRETARY FOR NUCLEAR ENERGY

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. I'm going to call the hearing to order this morning. I thank all of you for being here. We're here to take testimony from officials at the Department of Energy on three program offices within the Department of Energy that oversee aspects of the Government's Energy, Research, Development, Demonstration, and Deployment Programs. I have great interest in these issues, and I look forward to hearing from the three witnesses today.

I want to mention that just this morning, starting at 8 o'clock until 9 o'clock, I have spent an hour on the subject of the continued use of our coal resources in this country related to the issue of global warming. So I've spent a fair amount of time this morning on this issue of coal and global warming. One of the keys of that, of course, is embodied in the budget requests and the research and development that are done in the fossil energy account. I'm going to ask Mr. Slutz about that today.

I do want to point out that with respect to the fossil energy account recommended by the President, a substantial portion of that increase in the fossil energy account is for the Strategic Petroleum Reserve. I want to make a comment about that in a moment.

We've been joined by Senator Domenici. I wanted to mention this is the first of a series of hearings that we will do with respect to the programs in the Department of Energy, and I wanted to recognize at the start of these hearings the long service of Senator Domenici. I'm not doing this early because I'm anxious for his re-

tirement, but the fact is this is his last year working on these accounts, and he's done that for a long, long period of time.

He's served on the Appropriations Committee since 1983 and been either a chairman or ranking member of this committee for the past 13 years, and he has been a real champion for a lot of issues, including energy issues. I just wanted to say to him that he's been a significant contributor to all of the work of this committee, and I'm pleased to have him as a ranking member. I recognize he will retire at the end of this year, but I did want to make a comment about that at the front end of the series of hearings we will have.

Last year and this year and in future years, we will work closely on these issues on both sides of the aisle. Senator Domenici and I worked closely last year to try to figure out how to put a bill together.

I do want to mention that last year, for example, in the Senate, we were $1.9 billion above the administration's request for this subcommittee. As you know, we had to cut back some of that because there was a $22 billion difference between the Congress and the President. We had to come down nearly the entire $22 billion on the domestic accounts, and it wasn't easy to do. But we did it and still tried to preserve what we could of the priorities.

I want to say that the requests for the three Department of Energy offices before us today are about $2.69 billion of the Department's $25 billion fiscal year 2009 request. The Department has asked for some increases for the Nuclear and the Fossil Energy Programs, and it has essentially asked for level funding for the Office of Electricity and Energy Reliability.

Let me come back to this issue of Strategic Petroleum Reserve. I'm a fan of the Strategic Petroleum Reserve, but I think there's a time to fill it and a time to pause. A substantial portion of the increase in fossil energy is for the Strategic Petroleum Reserve. A proposition of the DOE's request is to expand to 1½ billion barrels of oil in the SPR.

We are now on the current course at about 96.8–97 percent filled with the current goal in the Strategic Petroleum Reserve. I am very concerned that we are continuing to put oil underground when oil's trading at $103 a barrel. Taking oil from the Gulf of Mexico as a royalty in kind and now putting it underground takes oil out of the supply and puts upward pressure on gas prices.

I think it's exactly the wrong thing to do, and I have introduced legislation to try to stop that. My legislation would take a pause for only 1 year—a pause unless, during that period, oil comes back below $75 a barrel. The pause would then no longer be in effect. This fossil energy account is so important because it's where we're going to need to do our research for coal, carbon capture and so on.

In order to continue to use our coal resources, we need to invest a lot of money. This includes what used to be the Clean Coal Technology Program and other things. We need to invest a lot of money if we're going to continue to use our coal resources because the emission of carbon. We'll need to find a way to capture and sequester it, and I don't see enough money requested here, especially when we've got a third of a billion dollars off chasing this SPR thing right now and oil's at $100 a barrel.

I don't see enough money in this account being focused on what we should be dealing with in order to continue to use our coal resources. Coal contributes about half of all of the electricity that we use in this country. Even with the climate change legislation, we're going to continue to use coal. The question isn't whether; it's how. We're going to have to capture carbon, but we need to prove the technology through the demonstration and the commercial application of it. So, we're going to need more investments there, in my judgment.

Having said that, I want to just show three charts, and then I'm going to call on the ranking member, Senator Domenici, and then also Senator Bond.

The three charts I want to show are these. These are the four places we are now sticking oil underground, 60 to 70,000 barrels a day at the moment. It's going to go to at least 120,000 barrels a day in the second half of this year if the administration fills it to capacity. Those are the four locations. This second chart shows the 1½ billion barrel target.

I don't think we should fill SPR at any cost. I think we ought to take a pause at the moment. The third point in the final chart is: Does it make sense to be putting oil underground when you've got tanks aboveground that need more supply in order to put downward pressure on price? Reducing supply increases price. That's just a fact, and our Federal Government should not be doing that.

Senator Domenici and I were at a hearing yesterday, and the EIA indicated that it increases price. They estimate a nickel a gallon. I think it's probably more than that, but nonetheless this is a policy choice that we should address, and I hope to address it in the chairman's mark this year.

Having said all of that, I have some questions for the witnesses after they have testified, but I want to call on the ranking member, Senator Domenici.

OPENING STATEMENT OF SENATOR PETE V. DOMENICI

Senator DOMENICI. Well, first, Mr. Chairman, I want to thank you for your nice words, and you served with me on this subcommittee long enough to know how much it has been a part of my life, because I have used this subcommittee, as I see it, to foster nuclear—the development of nuclear power in the United States and to cause the renaissance that is occurring.

Much of the things we did came from this subcommittee, and some of the various people that worked on this subcommittee are nuclear experts out there in America promoting nuclear power.

Obviously I want to just generally state a few things and then put my statement in the record. First, the big issue remaining in the nuclear power itinerary is to move with as much dispatch as possible to get an American program started for reprocessing or recycling, whichever one calls it, the waste that comes out of our power plants. It's being done in Europe. The United States has let it pass us by, and let me say to my friend here on my left who's a proponent of getting things done in this area of energy it's almost incredible to me that we have put off recycling for such a long time.

The Secretary in front of us there, Secretary Spurgeon, he came here with the notion of getting on with this job in the nuclear area,

and I'm not sure that we have yet put the glass on this and said that here's how we're going to do it, because I'm not sure that everybody that has authority is moving in the same direction, and we've got to find out whether we're going to do that or not.

If we're not going to move in the same direction, I've got other things to do this year. If we are, then I'll work my hands till there's nothing left to see if I can't get in place an American program for recycling. It is ghastly that we're doing what we're doing, and I know you're working on this. We may have different ideas as to how the Government ought to go about doing it, but I just want everybody to know I'm not a fan of waiting around for GNEP and I don't think you are either. That's a giant—you call it an "umbrella." I don't know what it is, but, you know, it's too big, takes too long, it's going to do too many things that we can't wait for. And so under it or on top of it, we've got to use the authorities that came with the other program that we have ourselves put in the law, AFCI, which supersedes and takes the place of GNEP, and that we ought to see what AFCI, Alternative Fuel Cycle Initiative—is that it?

Mr. SPURGEON. Advanced Fuel Cycle Initiative.

Senator DOMENICI. Advanced Fuel. That's a very important concept and we funded it. We funded it—whenever we funded GNEP, we funded it, and we've got to see what you're doing with that today.

I want to also say I don't have time for a hearing like this to go through the details of the President's budget, but I would like to know how his budget stacks up for the funding of the laboratories now, this year versus where we ended up this year. I don't know if that's any of your business, but we'll ask the question and see that the Department answers it so that we know because we have our version of what it says.

I want to say to all of you, the three of you, you're doing a great job, all things considered. I want to say for everyone to hear that under the leadership of the current Secretary, Mr. Sam Bodman, this department has come into its own. It is a true, powerful department. It is one that I'm proud to say is the United States Department of Energy.

We walk in there and we know you're in an energy department. You're not in a department that won't talk about nuclear. You're there, nuclear is on the way. It's a department that considers all aspects of energy and does a great job with it. And you, sir, Mr. Spurgeon in particular, having taken the job late, left a good job to take it, you're doing terrific. Sorry you lost Clay Sell. I'm sure everybody is, but you've got to get on without him and for the next year get something done beyond study. Get something where some of these programs turn into action.

I yield now and thank the chairman very much.

Senator DORGAN. Senator Domenici, thank you very much. Senator Bond?

STATEMENT OF SENATOR CHRISTOPHER S. BOND

Senator BOND. Thank you very much, Mr. Chairman, for holding this hearing on the Department's budget, and I join with you very

strongly in saluting our distinguished ranking member for his years of farsighted leadership in the energy field.

I can tell you, Senator Domenici, your colleagues are very proud of your work. We're going to miss you. There's going to be a big hole to fill, but I think that you will leave us with a vision that you laid out today that will inspire us for the future.

Today, I'm here, Mr. Slutz, to express my profound dismay and disappointment over your Department's attempt to abandon the FutureGen Near-Zero-Emission Integrated Coal Power Plant by chopping up the program into three smaller projects focusing only on carbon capture and sequestration technology or CCS.

Energy's action on FutureGen calls into question the veracity of the Department's statements to Congress, the Department's reliability as a partner, the Department's credibility as an advocate, and the Department's judgment as an agency.

As we all know, President Bush announced FutureGen in 2003 as a public-private partnership to build a first-of-its-kind coal-fueled near-zero-emission power plant. FutureGen would provide a full-scale coal gasification technology, called IGCC that generates power and captures nearly all air pollution, working together with carbon capture technology that allows for carbon collection and sequestration.

This would be historic because IGCC is not yet proven affordable. Carbon capture and sequestration technology, called CCS, for power plants is not proven at all, and neither has been proven working together at a full-scale affordable and reliable facility.

FutureGen would enable researchers and engineers to demonstrate affordable clean coal technology, ensuring its reliability, compatibility, and solve production problems that arise only when technologies are tested working together and at full scale.

This is vital work because while we must do more with clean energy sources, specifically nuclear, including wind, solar, biomass, energy efficiency, each is expensive, some are controversial, and together they are overwhelmingly insufficient to meet our energy needs now and in the long-term future.

Entire regions of the country, such as my Midwest, the mountain west, and south, depend upon coal to meet our current energy needs. Abandoning coal would place far too much demand on replacement energy sources, raising energy prices even further, and threatening the products and jobs that depend upon affordable energy from coal.

FutureGen involves what many say is needed: an international partnership with governments, power producers, coal providers, and technology companies. FutureGen has that with 13 industrial partners doing business on six continents, including China. One of the best things that the administration has done for climate change questions is to develop the Asia-Pacific Partnership that will allow the transfer of our technology, once we demonstrate it, to India, to China, and to other countries.

What are we going to transfer if we haven't demonstrated it and don't know whether it works?

We all believe the Department when the Department of Energy said in 2004 that "FutureGen's integration of concepts and components are a key to providing technical and operational viability. In-

tegration issues between coal conversion systems, power systems, and carbon separation and sequestration systems can only be addressed by a large-scale integrated facility operation."

We all believed DOE when DOE issued a nearly 2,000-page environmental impact statement selecting DOE's preferred alternative to be providing financial assistance to the original FutureGen project. We all believed DOE when Secretary Bodman sent a letter this past November 30, supporting site selection by the end of the year. And now we all find it hard to believe that DOE has left FutureGen at the altar, choosing instead three younger cheaper women. Maybe that's not the best metaphor, because I support complementary efforts to develop CCS technology.

The Department's suggestion would be fine, if it were in addition to the integrated test plan, but the Department's reason for restructuring ring hollow. FutureGen's costs are the very reason we need Government help to work out technology barriers and get costs down.

The assertion that coal gasification is a proven technology obviating the need to fund a full power plant and its carbon collection system together is disproved by the Department's own statement I just read. It confirmed that testing the technology together at full scale is the only way to prove its affordability and reliability.

The future is in applying carbon capture and storage to IGCC plants, so we need an integrated plant to prove that future possible and affordable technologies can be implemented.

Mr. Chairman and ranking member, it's up to us to be strong leaders on clean coal technology. Others are not going to do it for us. Many would saddle us with massively expensive carbon reductions and will not care if clean coal technologies are not ready when those requirements kick in. We need more funding for clean coal technology and clean energy, and an additional few tens of millions of dollars here and there on these projects will not protect our families from the hundreds of billions, hundreds of billions of dollars in energy tax costs from carbon caps they would face under a cap-and-trade system.

If that is implemented before this is demonstrated, there is going to be devastation in many areas of the country and significant economic harm and harm to the environment. I urge the administration to return to the negotiating table and work out a revised FutureGen agreement at Mattoon. Industry is waiting in good faith for a good faith negotiating partner.

I also would urge this committee to expand its leadership role. We've already—you've already done wonderful work in support of clean energy and coal, but even greater efforts are needed. We must fund an expanded FutureGen and expanded clean coal technology. Our clean energy future depends upon it.

Senator DORGAN. Senator Bond, thank you very much. Senator Bond, I will be announcing a FutureGen hearing. We are working on setting a date for that hearing. I'm going to ask Secretary Bodman to come.

Obviously the administration has announced a decision. The decision, of course, is a fairly significant decision on a program that has been a much-heralded program, and I think it would be valuable for us to hear from the Secretary and from several other wit-

nesses. I'll be working on setting a date for that. I should be able to announce that very soon in terms of the date, but we will have a FutureGen hearing in the very near future.

Senator Craig.

STATEMENT OF SENATOR LARRY CRAIG

Senator CRAIG. Well, thank you, Mr. Chairman. I'll be brief. I simply cannot match the Senator from Missouri. That was absolute eloquence.

Senator BOND. Thank you.

Senator CRAIG. And I mean that most sincerely. I think all of us on this committee and certainly the authorizing committee recognized the critical necessity to get the technology behind coal and to move it. We simply must do that if we can continue to expect it to be what it ought to be.

But Dennis, to you, welcome to the committee, and I want to say at the outset how much I've enjoyed working with you over the last while, and I want to congratulate you on a job well done in reestablishing DOE's commitment to nuclear R&D, not unlike some of the thoughts that Senator Domenici has had.

The NE budget for 2009 is over $1 billion. I remember when a Secretary of Energy was quietly coming up to me and saying, I've lost my nuclear portfolio, it's down at the White House, and you can expect the budget to be zeroed out. And that wasn't long ago.

So, there's been a dramatic turnaround. Programs like NP 2010, to assist new reactor build, as well NGNP and, of course, we still clearly see the need for a global nuclear energy partnership with GNEP as we move this whole issue forward.

You've heard from me, you've heard from my colleague in the House, Mike Simpson say that we need to invest in our Nation's R&D infrastructure to support these programs as outlined in the National Academy of Science's report last year.

As the custodian of the INL, you know the state of the lab's infrastructure, and so I guess my message to you is let's fix it this year. I think that's tremendously important.

A couple of suggestions: Transfer the clean-up liability on the lab's side to the clean-up side, freeing up infrastructure funding; increase the annual budget request at the INL, infrastructure request from about $104 to $150 million a year. I think all of that would go a long ways toward assuring that lead nuclear lab the kind of facility it will need to meet the requirements the DOE will place on it in the future and that our Nation is going to place on it.

Mr. Kolevar, a job well done, enhancing the reliability and security of our Nation's electrical infrastructure and working with our lab in doing that. We have some excellent projects going on out there that, I think, because of the uniqueness of the lab and the way its campus is configurated and isolated, we've been able to offer some valuable expertise as relates to the grid, how we manage it against terrorist opportunity, I guess is one way of saying it.

Mr. Slutz, I'll not deal with—quite with the passion that Senator Bond has, but I think that both the chairman and I will discuss SPR and the inventory. Both Senator Dorgan and I believe that

there is another inventory that needs to be done besides simply filling up the salt domes, and that's a modern inventory of the OCS.

America needs to know its reserves and its resources, and they're currently being denied by those who are simply fearful, even though the technology of today would suggest that at appropriate times those reserves might well be necessary and reachable in an environmentally sound way.

Certainly in my remaining tenure here, I'm going to push that issue and push it very hard. I think it is wrong to deny our country that knowledge and we need to modernize that issue with the OCS.

Mr. Chairman, thank you much.

Senator DORGAN. Senator Craig, thank you very much.

The subcommittee has received a statement from Senator Cochran which we will insert into the record.

[The statement follows:]

PREPARED STATEMENT OF SENATOR THAD COCHRAN

Chairman Dorgan and Ranking Member Domenici, thank you for hosting this hearing today. I thank the representatives from the Department of Energy for being here this morning, as well.

Energy issues continue to dominate our Nation's agenda. It is the responsibility of all of us here to find ways to keep up with the world's ever-expanding electricity demands while at the same time increasing energy capacity and security here at home.

One way in which we can expand our power capacity is to expand the use of nuclear energy in America. I am pleased that the request for Nuclear Energy is increased from last year, and I hope we can fund these efforts at the highest level possible.

Additionally, it is crucial that we realize the important role fossil energy resources continue to play in meeting America's demands for energy. Our abundance of coal has always been the main source of power in our country, and it is crucial that we find new ways to make coal cleaner to use.

Finally, I would like to speak about the importance of the Strategic Petroleum Reserve in securing a stockpile of oil that might be tapped in case of emergency. I am pleased that Mississippi was chosen by the Department of Energy as the preferred location for expansion of the Reserve, and I hope that despite Chairman Dorgan's misgivings about filling the Reserve while oil prices are high, we might still fund the necessary infrastructure for expansion. As evidenced when fuel supplies were interrupted after Hurricane Katrina, the United States must have ample resources of oil should a disruption in supply occur again.

I appreciate each of you being here to present your budgets, and I look forward to hearing your testimonies. Thank you.

Senator DORGAN. We will now recognize our witnesses for statements.

Mr. Spurgeon, we're going to call on you first, and let me say that I've enjoyed working with you. I agree with Senator Domenici. You are a very solid advocate for the programs under your jurisdiction, and I thank you for being here. You may proceed.

Let me just say to all three of you, your complete formal statements are made a part of the permanent record, and we would ask that you summarize your remarks.

STATEMENT OF HON. DENNIS R. SPURGEON

Mr. SPURGEON. Thank you, Mr. Chairman. Chairman Dorgan, Ranking Member Domenici, and members of the subcommittee, it is a pleasure to be here today to discuss the fiscal year 2009 budget request for the Department of Energy's Office of Nuclear Energy.

Our Nation's strength and prosperity is built on our security and the availability of reliable sources of energy. A cornerstone to these goals of continued economic growth and a sustainable energy future is nuclear power.

The Office of Nuclear Energy's budget request supports the near-term expansion of safe, reliable, carbon-free nuclear power and the development of advanced nuclear technologies now and into the future.

It is significant to note that this administration has increased its funding request for nuclear energy every year, and in total, the fiscal year 2009 request represents a 330 percent increase in funding for nuclear energy since President Bush took office 7 years ago.

We can take some pride in this increase, but from a historical perspective, our total budget request for 2009 is less in absolute dollars than the resources we were devoting to nuclear energy the last time I served in government, more than 30 years ago in the Ford administration.

In constant dollars, today's budget is about one-third of the budget we prepared in 1976. In fiscal year 2009, a total of $1.4 billion is requested for nuclear energy activities, including $487 million for the Mixed Oxide Fuel Fabrication Facility.

I would now like to take just a moment to highlight our program areas and their corresponding budget requests. In fiscal year 2009, the President's budget requests $241.6 million for Nuclear Power 2010, to support industry cost-shared near-term technology development and regulatory demonstration activities focused on enabling an industry decision to build a new nuclear power plant by 2010.

To this end, the program will continue to support industry interactions with the Nuclear Regulatory Commission on new plant license applications as well as first-of-a-kind design finalization for standardized reactor designs.

The request also supports the issuance of conditional agreements for standby support in fiscal 2009.

This budget request also includes $301.5 million for the Advanced Fuel Cycle Initiative in support of the Global Nuclear Energy Partnership. In fiscal 2009, the request supports research and development on fuel cycle technologies that will support the economic and sustained production of nuclear energy while minimizing waste and satisfying requirements for a controlled, more proliferation-resistant nuclear materials management system.

The request also supports ongoing international activities to establish a framework for ensuring a reliable international fuel supply and the availability of grid-appropriate reactors.

Additionally, this budget requests $70 million for the Generation IV Program. This request supports critical research and development to achieve design goals that make the Next Generation nuclear plant licensable, sustainable, and economic. The Generation IV request also supports component and materials aging and degradation R&D that will provide the basis for supporting the extension of the current operating license period for existing nuclear reactors and will also enable the design of advanced reactor plants with longer operating lifespans.

A total of $16.6 million is requested for the Nuclear Hydrogen Initiative to support research and development on enabling technologies, nuclear-based hydrogen production technologies, and technologies that will apply heat from Generation IV nuclear energy systems to produce hydrogen.

Finally, $222 million is requested to maintain and operate the Department's unique nuclear facilities and infrastructure at Idaho National Laboratory, Los Alamos National Laboratory, and Oak Ridge National Laboratory. Included in the fiscal year 2009 requests under Other Defense Activities is $487 million for activities associated with the continued construction of the Mixed Oxide Fuel Fabrication Facility and $78 million for sitewide safeguards and security activities at the Idaho National Laboratory.

I would also like to note the fiscal year 2009 budget request continues our commitment to fostering the expansion of nuclear engineering programs at our universities. We have committed to designating 20 percent of funds appropriated to our R&D programs for work to be performed at universities at the level set forth in the President's budget. Twenty percent represents almost $77 million for this work.

PREPARED STATEMENT

Mr. Chairman, this concludes my opening statement. I would be pleased to answer any questions.

Thank you.

Senator DORGAN. Secretary Spurgeon, thank you very much for your testimony.

[The statement follows:]

PREPARED STATEMENT OF HON. DENNIS R. SPURGEON

Chairman Dorgan, Ranking Member Domenici, and members of the subcommittee, it is a pleasure to be here today to discuss the President's fiscal year 2009 budget request for the Department of Energy's (DOE) Office of Nuclear Energy.

Our Nation's strength and prosperity is built on our security and the availability of reliable sources of energy. The President's $25 billion fiscal year 2009 budget request for the Department aggressively addresses the growing demand for affordable, clean, and reliable energy and helps preserve our national security by working to further our energy security. A cornerstone to the goals of continued economic growth and a sustainable energy future is nuclear power. The Office of Nuclear Energy's budget request ambitiously supports the near-term expansion of safe, reliable and carbon-free nuclear power and the development of advanced nuclear technologies now and into the future. It is significant to note that this administration has increased its funding request for nuclear energy in every year, and in total, the fiscal year 2009 request represents a 330 percent increase in funding for nuclear energy since President Bush took office 7 years ago. In fiscal year 2009, a total of $1.4 billion is requested for nuclear energy activities including $487 million for the Mixed Oxide Fuel Fabrication Facility.

The President's commitment to nuclear power stems from its role as the only viable near-term option for producing significant amounts of emissions-free, baseload electricity. The expansion of nuclear power will play a key role in our decisions to find viable solutions to address the challenges posed by greenhouse gas emissions, climate change, and energy security while promoting a vibrant economy.

Today, 104 nuclear reactors generate nearly 20 percent of America's electricity and account for nearly 70 percent of electricity produced from non-emitting sources. Last month, the Nuclear Energy Institute reported that U.S. reactors produced 807 billion kilowatt hours of electricity in 2007—enough to power more than 72 million homes for a year. That total surpasses the previous record high of 788.5 billion kilowatt hours in 2004. However, for nuclear power to maintain its role in our energy

supply, it must grow. To sustain nuclear power's current 20 percent share, 40 to 45 new reactors must be built by 2030.

Worldwide, 31 countries operate 439 reactors totaling 372 GWe of electricity capacity. Thirty-four new nuclear power plants are under construction worldwide, and when completed, will add an additional 28 GWe of new electricity. This new construction is taking place or being considered in every major region in the world including Africa, Asia and the Indian subcontinent, Europe, the Middle East, South America, and North America.

We have recently seen projections that anticipate 55 total countries will operate 630 reactors totaling approximately 630 GWe by 2030. Potentially, a total of 86 countries could have nuclear reactors by 2050. Internationally, nuclear power is moving forward at a rapid pace with each month seemingly bringing new, significant announcements.

Nuclear power's ongoing expansion around the world requires us to address the used fuel and proliferation challenges that confront the global use of nuclear energy. To ensure that the United States plays a significant role in global nuclear energy policy, we must foster a robust domestic nuclear research and development program that maintains a cutting-edge nuclear technology infrastructure, and encourage international actions that support reliable nuclear fuel services as a viable option for countries that may otherwise consider the development and deployment of enrichment and reprocessing technologies. To meet these challenges, the President initiated the Global Nuclear Energy Partnership (GNEP). The domestic component of GNEP promotes the accelerated development and deployment of advanced fuel cycle technologies, while the international component encourages cooperation among States that share the common vision of the necessity of the expansion of nuclear energy for peaceful purposes worldwide in a safe and secure manner.

We have made marked progress in every one of our program areas, but much remains to be done. Our fiscal year 2009 budget request moves us in the right direction, allowing the Department and the Office of Nuclear Energy to take the lead in spurring the nuclear renaissance in the United States. I would now like to take the time to highlight our program areas and their corresponding budget requests.

NUCLEAR POWER 2010

A key component of our work and one of our most successful programs at the Department of Energy is the Nuclear Power 2010 program or NP 2010. This program was initiated by President Bush in 2002 and has produced significant results toward its goal of reducing the technical, regulatory, and institutional barriers to the deployment of new nuclear power plants. DOE and the President have increased our commitment to cross the finish line by nearly doubling its 2009 budget, calling on Congress to provide $241.6 million for NP 2010 to help ensure this important program can complete its work.

NP 2010 supports industry through cost-sharing near-term technology development and regulatory demonstration activities focused on enabling an industry decision to build a new nuclear plant by 2010.

Of the six Construction and Operation License (COL) applications that have been submitted to the Nuclear Regulatory Commission (NRC), five COL applications have been officially accepted for review by the NRC. And of these five, two applications—TVA's application for two Westinghouse AP1000 reactors at the Bellefonte site in Alabama, and Dominion Energy's application for a General Electric-Hitachi Economic Simplified Boiling Water Reactor at the North Anna site in Virginia—were developed through the NP 2010 cost-share program. In total, the NRC expects to receive 20 COL applications for 31 new reactors by 17 different utility companies. Of these 20 COL applications, 8 will reference either the Bellefonte or North Anna license applications. This simplification in the licensing process is expected to reduce the license application and review time these reference COLAs take by up to 50 percent.

Three early site permits have been approved for Exelon's Clinton site in Illinois, Entergy's Grand Gulf site in Mississippi, and the North Anna site, all a part of the NP 2010 cost share program, and a fourth ESP permit is pending. In addition, two new reactor design certifications have been approved by the NRC, the ABWR and the AP1000, and DOE is continuing with on-going first-of-a-kind design finalization activities for the standardized AP1000 and ESBWR designs, including: preparation of engineering analyses and calculations, design criteria documents, and total cost and schedule estimates necessary for an industry purchase of a new nuclear plant.

The NP 2010 program will continue to develop generic application preparation guidance for 15 COL applications expected in 2008 to help resolve regulatory issues that could potentially delay or derail NRC approval.

ADVANCED FUEL CYCLE INITIATIVE AND GNEP

President Bush announced the Global Nuclear Energy Partnership (GNEP) as part of his Advanced Energy Initiative in February 2006. The Advanced Fuel Cycle Initiative (AFCI) is the domestic technology development and deployment component of GNEP. The AFCI program aims to develop and demonstrate advanced fuel cycle technologies for recycling used reactor fuel to develop an integrated used fuel recycling plan, and support on-going research efforts with the goal of reducing the amount of material that needs disposal in a geologic repository and maximizing our use of energy resources.

In effort to further this important work, our budget request includes $301.5 million in fiscal year 2009 funding for AFCI. This request supports research and development activities that will advance the economic and sustained production of nuclear energy while reducing waste and satisfying requirements for a controlled nuclear materials management system that helps strengthen the nuclear nonproliferation regime. The request also supports on-going international activities to establish a framework for ensuring reliable international fuel services and the availability of grid-appropriate reactors, and the continued utilization of industry for schedule, cost, and technology developments for eventual recycling facility deployment.

Long-term goals of AFCI/GNEP include the partitioning of used fuel and recycling of long-lived radioactive isotopes for destruction through transmutation in liquid metal-cooled fast neutron spectrum reactors for actinide consumption and nuclear resource sustainability

AFCI/GNEP funding also provides support for a large number of universities involved in fuel cycle research and development, which both ensures that the United States has the intellectual capital needed to sustain our nuclear fuel cycle for the future and provides the important research needed for today's fuel cycle activities. Recycling used nuclear fuel rather than permanently disposing of it in a repository would result not only in utilizing more of the energy, but would also reduce the amount of high-level waste that needs disposal in a repository, thereby greatly enhancing the potential capacity of any geological repository. This increased efficiency in the fuel supply could ensure that even with the expansion of nuclear energy, the potential capacity of any geological repository would be greatly enhanced.

GENERATION IV

The Generation IV program is focused on very high temperature reactor technologies for use in a Next Generation Nuclear Power Plant (NGNP) to produce electricity, process heat, and hydrogen. Generation IV also is readying technologies that will further improve the economics and safety performance of existing Light-Water Reactor and advanced Generation IV reactor concepts.

The fiscal year 2009 budget request includes $70 million for the Generation IV program. The Energy Policy Act of 2005 (EPACT) authorized the Department to create a two-phased NGNP Project at the Idaho National Laboratory (INL). The Department is presently engaged in Phase I of the EPACT-defined scope of work, which includes: developing a licensing strategy, selecting and validating the appropriate hydrogen production technology, conducting enabling research and development for the reactor system, determining whether it is appropriate to combine electricity generation and hydrogen production in a single prototype nuclear reactor and plant, and establishing key design parameters. Phase I will continue until 2011, at which time the Department will evaluate the need for continuing into the design and construction activities called for in Phase II.

Additionally, this request supports component and material aging and degradation research and development that will provide the basis for extending the operating license period for existing nuclear reactors beyond 60 years, and will also enable the design of advanced reactor concept plants with longer operating life spans.

HYDROGEN INITIATIVE

Nuclear energy has the potential to produce large quantities of hydrogen efficiently without producing greenhouse gases and could play a significant role in hydrogen production for transportation and industrial sectors. Considerable progress in hydrogen combustion engines and fuel cells is bringing hydrogen-powered transportation close to reality. The goal of the Nuclear Hydrogen Initiative (NHI) is to demonstrate hydrogen production technology at increasingly larger scales through the use of nuclear energy that would be technically and economically suited for commercial deployment in concert with a nuclear power plant.

A total of $16.6 million has been requested for the NHI to continue hydrogen production systems operation and testing, evaluation of process improvements, and as-

sessment of long-term process stability, operability, and component durability. Furthermore, results from the integrated laboratory-scale experiments will be analyzed to identify cost drivers with an end goal of supporting a hydrogen technology selection by 2011.

NUCLEAR FACILITIES

The Department of Energy supports nuclear science and technology through one of the world's most comprehensive research infrastructures. The Office of Nuclear Energy has requested $222 million to maintain and operate infrastructure at Idaho National Laboratory (INL), Los Alamos National Laboratory (LANL), Brookhaven National Laboratory (BNL), and Oak Ridge National Laboratory (ORNL). A total of $104.7 million is dedicated to Idaho National Laboratory's facilities management. INL conducts science and technology research across a wide range of disciplines, INL's core missions include: development of advanced, next generation fuel cycle and reactor technologies; promotion of nuclear technology education, and applying technical skills to enhance our Nation's security.

Additionally, $38.7 million is requested to maintain a wide range of nuclear and radiological facilities and their associated infrastructures in an operational, safe, secure, and environmentally compliant manner at LANL, BNL, and ORNL. This infrastructure supports national priorities, including the provision of radioisotope power systems for national security uses and space exploration.

OTHER DEFENSE ACTIVITIES

Included in the Office of Nuclear Energy fiscal year 2009 request, under Other Defensive activities, is $487 million for activities associated with the continued construction of the Mixed Oxide Fuel Fabrication Facility and $78.8 million for site-wide safeguards and security activities at the Idaho National Laboratory to protect the assets and infrastructure from theft, diversion, sabotage, espionage, unauthorized access, compromise, and other hostile acts that may cause unacceptable adverse impacts on national security, program continuity, or the health and safety of employees, the public, or the environment.

UNIVERSITY FUNDING

Our fiscal year 2009 budget request continues our commitment to fostering the expansion of nuclear engineering programs at our universities and research institutions. Specifically, the budget request for the Office of Nuclear Energy explicitly states that we "will continue to support R&D activities at universities and research institutions through competitive awards focused on advancing nuclear energy technologies," and we have committed to "designate 20 percent of funds appropriated to its R&D programs for work to be performed at university and research institutions." These funds will support basic research and mission-specific applied R&D activities, as well as human capitol development activities, such as fellowships and infrastructure and equipment upgrades for university-based research reactors and laboratories. At the level set forth in the President's budget request for fiscal year 2009, 20 percent provides almost $77 million for this work. This commitment of 20 percent of appropriated funds will serve as a catalyst for success in achieving the objectives of the President's American Competitiveness Initiative and the America COMPETES Act.

This concludes my prepared statement. I would be pleased to answer any questions you may have.

Senator DORGAN. I want to recognize Secretary Kolevar. The Office of Electricity is an important office, and we appreciate the work you are doing. I was pleased to be the first person to announce your confirmation when you were in North Dakota for a meeting with a number of interests in August 2007, but thank you very much for your work, Mr. Secretary.

Why don't you proceed?

OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY

STATEMENT OF HON. KEVIN M. KOLEVAR, ASSISTANT SECRETARY FOR ELECTRICITY DELIVERY AND ENERGY RELIABILITY

Mr. KOLEVAR. Thank you, Mr. Chairman. Mr. Chairman and Ranking Member Domenici, members of the committee, thank you for the opportunity to testify on the President's fiscal year 2009 Budget Request for the Office of Electricity Delivery and Energy Reliability.

Our office's mission is to lead national efforts to modernize the electric delivery system, enhance the security and reliability of America's energy infrastructure, and facilitate recovery from disruptions to energy supply.

These functions are vital to the Department of Energy's strategic goal of protecting our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally responsible energy.

The President's budget requests $134 million for OE, a 17 percent increase from the fiscal year 2008 request. This includes $100.2 million for research and development activities, $14.1 million for operations and analysis activities, and $19.7 million for program direction.

Today, the availability of and access to electricity is something that can be easy to take for granted. And while more than a few people cannot describe what it is or where it comes from, electricity is vital to nearly every aspect of our lives, from powering our electronics and heating our homes to supporting transportation, finance, food, and water systems.

The Energy Information Administration has estimated that by the year 2030, U.S. electricity consumption will be almost 35 percent higher than it was in 2009. This indicates a growing economy but it also promises a significant amount of new demand on the electricity infrastructure, an infrastructure that is already stressed and aging. This means that we need to focus our attention on reliability.

Climate change is also affecting electric industry investments. Uncertainty in climate change legislation and policy is limiting investment in generation from fossil fuels, coal in particular, and is stimulating investment in renewables, such as wind. However, intermittent resources, such as renewables, require energy storage or other balancing technologies, advanced communications, and sophisticated modeling to maximize penetration without affecting the reliability and efficiency of our electric system.

OE's fiscal year 2009 budget request reflects a commitment to ensuring this reliability by supporting the research of breakthrough technologies, such as those associated with the Smart Grid and energy storage. With $5 million dedicated solely to Smart Grid development, a $6.6 million increase in the 2009 request for energy storage, and more than $88 million dedicated to other R&D work, the President's request reaffirms the effort to ensure increased reliability through research and development.

Modernizing the grid through technical innovation, however, represents just one side of the effort needed to tackle electricity reliability problems. Building the elaborate network of wires and other

facilities needed to deliver energy to consumers reliably and safely is perhaps one of our greatest challenges. This is especially true since renewable energy promises to become a substantial generation source.

Since sources of renewable energy are often found in remote locations, we simply have to develop the capacity to deliver it to load centers. Basically, if we want to use more renewable energy, we need more wires.

Accordingly, in 2009, the office will continue work to implement the major electricity infrastructure provisions of the Energy Policy Act of 2005. Consistent with the law, we will produce the second national transmission congestion study by August of next year. We will begin scoping for the designation of energy transport corridors in the eastern United States, and we will implement the Department's responsibilities to coordinate Federal authorizations for the siting of transmission facilities.

However, energy security and reliability will not be solved solely through the modernization and expansion of our energy infrastructure. We also need to ensure energy delivery by keeping it secure and responding quickly when it is disrupted.

In fiscal year 2009, we will work to identify systemwide vulnerabilities in power and fuels at key domestic and select foreign energy sector assets and develop plans to secure and reconstitute those assets. We will help to develop tools and mitigation solutions to help energy sector owners and operators improve resiliency and implement best and effective practices and provide solutions to State and local governments to address energy supply and infrastructure challenges and to exercise those plans.

PREPARED STATEMENT

I believe our work in OE is vital to the Nation's energy health and the increase in the President's request reflects this. Federal investment in the research, development, and deployment of new technology, combined with innovative policies and infrastructure investment, is essential to improving grid performance and ensuring our energy security, economic competitiveness, and environmental well-being.

This concludes my statement, Mr. Chairman. I look forward to answering your and the committee's questions.

[The statement follows:]

PREPARED STATEMENT OF HON. KEVIN M. KOLEVAR

Mr. Chairman and members of the committee, thank you for this opportunity to testify on the President's fiscal year 2009 budget request for the Office of Electricity Delivery and Energy Reliability.

The mission of the Office of Electricity Delivery and Energy Reliability (OE) is to lead national efforts to modernize the electricity delivery system, enhance the security and reliability of America's energy infrastructure, and facilitate recovery from disruptions to energy supply. These functions are vital to the Department of Energy's (DOE) strategic goal of protecting our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally responsible energy.

The President's fiscal year 2009 budget includes $134 million for OE in fiscal year 2009, which is almost a 17 percent increase from the fiscal year 2008 request. This includes $100.2 million for Research and Development activities, $14.1 million for Operations and Analysis activities, and $19.7 million for Program Direction. My tes-

timony on the administration's fiscal year 2009 budget request reflects a comparison to the administration's fiscal year 2008 budget request.

Today, the availability and access to electricity is something that most Americans take for granted. Most people cannot describe what it is or where it comes from. Yet, it is vital to nearly every aspect of our lives from powering our electronics and heating our homes to supporting transportation, finance, food and water systems, and national security.

The Energy Information Administration has estimated that by the year 2030, U.S. electricity consumption will be almost 35 percent higher than it was in 2009. This indicates a growing economy, but it also promises a significant amount of new demand on the electricity infrastructure—an infrastructure that is already stressed and aging. This means that we need to focus our attention on reliability.

Climate change is also affecting electric industry investments. The uncertainty in climate change legislation and policies is limiting investment in generation from fossil fuels and is stimulating investment in renewables such as wind. However intermittent resources such as renewables require energy storage or other balancing technologies, advanced communications and sophisticated modeling to maximize penetration without affecting the reliability and efficiency of our electric system.

One of the Department's strategies for reducing our dependence on foreign oil is increased electrification by transitioning to electric vehicles also known as plug-in hybrids. Plug-in hybrids could provide a great opportunity if we begin now to enable smart grid features such as enhanced intelligence and control.

Title 13 and section 641 of the Energy Security and Independence Act of 2007 highlights the need for the development of a modernized grid. Title 13 addresses the need for a Smart Grid, which is a transmission and distribution network modernized with the latest digital and information technologies for enhanced operational monitoring, control, and intelligence.

OE's fiscal year 2009 budget request also reflects a commitment to ensuring reliability by supporting research of breakthrough technologies such as those associated with a Smart Grid and Energy Storage. With $5 million dedicated solely to Smart Grid development, a $6.6 million increase in the fiscal year 2009 request for Energy Storage, and more than $88 million dedicated to other R&D work, the President's fiscal year 2009 budget request reaffirms the effort to ensure increased reliability through R&D.

Modernizing the grid through technical innovation, however, represents just one side of the effort needed to tackle electricity reliability problems. Building the elaborate network of wires and other facilities needed to deliver energy to consumers reliably and safely is perhaps one of our greatest challenges today. This is especially true since renewable energy promises to become a substantial generation source. Since sources of renewable energy are often found in remote locations, we simply have to develop the capability to deliver it to load centers. Basically, if we want to use more renewable energy, we need more wires.

However, energy security and reliability will not be solved by focusing solely on expanding our modernization and expansion of our energy infrastructure. We also need to ensure energy delivery by keeping it secure and responding quickly when it is disrupted. DOE is the lead agency when Federal response is required for temporary disruptions in energy supply to ensure a reliable and secure electricity infrastructure for every American. We will use fiscal year 2009 funds to apply technical expertise to ensure the security, resiliency and survivability of key energy assets and critical energy infrastructure at home and abroad.

The reliability and energy security effort is both multifaceted and necessary, and the President's request reflects this.

RESEARCH AND DEVELOPMENT

Our High Temperature Superconductivity activities continue to support second generation wire development as well as research on dielectrics, cryogenics, and cable systems. This activity is being refocused to address a near-term critical need within the electric system to not only increase current carrying capacity, but also to relieve overburdened cables elsewhere in the local grid. The superconductivity industry in the United States is now at the critical stage of moving from small business development to becoming a part of our manufacturing base.

Enhanced security for control systems is critical to the development of a reliable and resilient modern grid. The Visualization and Controls Research & Development activity focuses on improving our ability to measure and address the vulnerabilities of controls systems, detect cyber intrusion, implement protective measures and response strategies, and sustain cyber security improvements over time.

This activity is also developing the next generation system control and data acquisition (SCADA) system that features GPS-synchronized grid monitoring, secure data communications, custom visualization and operator cueing, and advanced control algorithms. Advanced visualization and control systems will allow operators to detect disturbances and take corrective action before problems cascade into widespread outages. The need to improve electric power control systems security is well-recognized by both the private and public sectors.

The Energy Storage and Power Electronics activities propose an increase of $6.6 million in fiscal year 2009. This will support the development of new and improved energy storage devices and systems at utility scale, which will be incorporated in DOE's Basic Energy Science basic research results. We will also work to achieve substantial improvements in seeking lifetime, reliability, energy density, and cost of energy storage devices. Through this, highly leveraged prototype testing and utility demonstration projects will be expanded with State energy office participation focusing on areas of greatest utility need. The increase will also serve to focus on enhanced research in Power Electronics to improve material and device properties needed for transmission-level applications.

Large scale, megawatt-level electricity storage systems, or multiple, smaller distributed storage systems, could significantly reduce transmission system congestion, manage peak loads, make renewable electricity sources more dispatchable, and increase the reliability of the overall electric grid.

The Renewable and Distributed Systems Integration activities will allocate $5 million in fiscal year 2009 to develop and demonstrate Smart Grid technologies for an integrated and intelligent electric transmission and distribution network. $28.3 million will be used to demonstrate distributed energy systems as a resource to decrease peak electric load demand, increase asset utilization, and defer electric system upgrades. These funds will also be used to develop renewable energy grid integration technologies to facilitate increased deployment of renewables and other clean energy sources.

PERMITTING, SITING, AND ANALYSIS

With hopes of creating a more robust transmission system, our fiscal year 2009 budget request asks for $6.5 million for the Permitting, Siting and Analysis office. This is an $804,000 increase from the fiscal year 2008 budget request, and it will help to implement major electricity infrastructure provisions such as section 368 of EPACT and section 216(h) of the Federal Power Act. Further, work will be done to provide technical assistance to State electricity regulatory agencies and to electric utilities as they implement their energy efficiency initiatives.

In fiscal year 2009, we will also be working to issue the second national transmission congestion study. In this process, we will be consulting with States and other interested parties on congestion metrics and data, and analyzing current historical congestion by region. Before the study is released, we will present draft conclusions of data analysis for public review and input.

The implementation of section 368 of EPACT requires the designation of rights-of-way corridors for the transport of oil, natural gas, hydrogen, and electricity on Federal lands in the 11 contiguous western States. An interagency team, with DOE as the lead agency, conducted public scoping meetings concerning the designation of corridors in each of the 11 contiguous western States. We have published a draft Programmatic Environmental Impact Statement for the designation of the energy transport corridors, solicited public comments, and conducted 15 public meetings, and the final PEIS is expected to be published in fiscal year 2008. We are preparing to begin scoping for the designation of energy transport corridors in the eastern States, Alaska, and Hawaii. The EIS for the remaining designations is expected before the end of fiscal year 2009.

DOE is preparing regulations to implement its responsibilities under the new section 216(h) of the Federal Power Act to coordinate with eight other Federal agencies to prepare initial calendars, with milestones and deadlines for the Federal authorizations and related reviews required for the siting of transmission facilities. DOE will maintain a public website that will contain a complete record of Federal authorizations and related environmental reviews and will work closely with the lead Federal NEPA agency to encourage complete and expedited Federal reviews.

INFRASTRUCTURE SECURITY AND ENERGY RESTORATION

The President has designated the Department of Energy as the Lead Sector Specific Agency responsible for facilitating the protection of the Nation's critical energy infrastructure. The Office of Infrastructure Security and Energy Restoration (ISER) in the operations and analysis subprogram is responsible for coordinating and car-

rying out the Department's obligations to support the Department of Homeland Security in this important national initiative. The fiscal year 2009 request is for $7.6 million in funding for Infrastructure Security and Energy Restoration within the operations and analysis subprogram, which is a $1.8 million increase from the fiscal year 2008 request.

In fiscal year 2009, ISER will work to identify system-wide vulnerabilities in power, fuels and other key energy sector assets and develop plans to secure and reconstitute those assets. We will help to develop tools and mitigation solutions to help energy sector owners and operators improve resiliency and implement best and effective practices, and provide solutions to State and local governments to address energy supply and infrastructure challenges. Further, we will continue to conduct vulnerability assessments of key domestic and selected foreign energy facilities in close collaboration with appropriate interagency and industry partners. And through the initialization of selected pilot projects, we will work to exercise the integration of regional, State and local energy resiliency and emergency response preparedness.

We help to facilitate energy restoration efforts at the State and local level through cooperation and partnerships with local utility providers in support of the National Response Framework. In fiscal year 2009, we will work to create detailed Concept of Operations Plans for energy response utilizing an Integrated Planning System.

CONCLUSION

As you have heard, our work in OE is vital to our Nation's energy health and the increase in the President's request reflects this. Through our research and development of technologies such as power electronics, high temperature superconductivity, and energy storage, we will work to lower costs, increase efficiency, and also directly enhance the viability of clean energy resources by addressing issues such as intermittency, controllability, and environmental impact.

Federal investment in the research, development, and deployment of new technology combined with innovative policies and infrastructure investment, is essential to improving grid performance and ensuring our energy security, economic competitiveness, and environmental well-being.

This concludes my statement, Mr. Chairman. I look forward to answering any questions you and your colleagues may have.

Senator DORGAN. Secretary Kolevar, I thank you very much.

Mr. Slutz, you are the Acting Assistant Secretary, I believe, and we appreciate very much your being here today to describe your programs, and as I indicated in my opening statement, I'm going to ask a number of questions about the fossil energy accounts, but why don't you proceed? We will then have the panel ask questions of the three witnesses.

OFFICE OF FOSSIL ENERGY

STATEMENT OF JAMES SLUTZ, ACTING PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR FOSSIL ENERGY

Mr. SLUTZ. Mr. Chairman, members of the committee, it's a pleasure for me to appear before you today to present the Office of Fossil Energy's proposed fiscal year 2009 budget.

Fossil Energy's budget request of $1.127 billion for fiscal year 2009 is one of the largest Fossil Energy requests made by this administration. These funds will allow FE to fulfill its mission to create public benefits to supply enhancing U.S. economic, environmental, and energy security.

Achieving this mission means developing technological capabilities that can dramatically reduce carbon emissions to achieve near-zero atmospheric emission power production, thereby meeting the President's priority of expanding our climate change options with higher efficiency power plants to reduce carbon dioxide emissions, the near-zero emissions power plants, known as FutureGen, that link high efficiency with carbon sequestration.

Fossil Energy is also responsible for the management and operation of the Nation's petroleum reserves, most notably the Strategic Petroleum Reserve, which provides strategic and economic security against disruptions in oil supplies with an emergency stockpile of crude oil.

More specifically, the proposed fiscal year 2009 coal budget request of $648 million focuses on technology for allowing the United States to maintain its technological lead in coal use in a way that will not raise climate concerns. This is the largest budget request for coal research and development and demonstration in over 25 years.

The budget focuses on advancing the technology aimed at reducing costs and enhancing the efficiency of power plants with carbon capture. It also focuses on the science and technology to assure the safe and effective long-term geologic storage of carbon dioxide.

The budget includes $406 million for coal R&D, including in-house research and development, $85 million for the Clean Coal Power Initiative, and $156 million for the New Approach to the FutureGen Program. The fiscal year 2009 request demonstrates the administration's continuing commitment to domestically produced energy from coal.

The $344 million in the fiscal year 2009 budget request for the Strategic Petroleum Reserve, an 84 percent increase over fiscal year 2008, will allow for expansion of facilities at two existing storage sites and begin the development of a new site in fiscal year 2009. This expansion is in accordance with the provision in EPACT for an expansion of reserve capacity from 750 million to 1 billion barrels of oil and, with the President's recommendation and pending legislation, to further increase the reserve's capacity to 1.5 billion barrels of oil.

Fossil Energy research and development is directed at electric power generation from coal——

Senator DORGAN. Secretary Slutz, could you hold a moment?

Senator DOMENICI. You mentioned how much was being spent on coal R&D and you talked about how it was a good program.

Where do we do most of the research that we're talking about and who's the head of the research to try to make the change to coal so it's more usable?

Mr. SLUTZ. We have a coal program here that's headed by Dr. Victor Der at headquarters, but then that program is implemented through the National Energy Technology Laboratory and Carl Bauer is the director of the National Energy Technology Laboratory.

Senator DOMENICI. And where is that laboratory?

Mr. SLUTZ. That laboratory is located in Pittsburgh and Morgantown, co-located with other facilities in Tulsa and Albany, Oregon.

Senator DOMENICI. Mr. Chairman, thank you, sir.

Senator DORGAN. You may proceed.

Mr. SLUTZ. Fossil Energy research and development is directed at electric power generation from coal, our most abundant and lowest cost domestic fossil fuel.

This research supports many presidential initiatives and priorities, including the Coal Research Initiative, Hydrogen Fuel Initiative, Climate Change Technology Program, and FutureGen.

I'll highlight a few of the R&D program components, beginning with FutureGen. FutureGen promotes advanced full-scale integration of integrated gasification compliance cycle and carbon capture and storage technology to produce electric power from coal with near-zero atmospheric emissions.

FutureGen is being restructured in a way that accelerates the commercial use of near-zero emissions technology. The new approach proposes multiple commercial-scale demonstration power plants in place of the original plan's single R&D facilities. Each plant would produce electricity and sequester an estimated annual 1 million metric tons of carbon dioxide.

FutureGen receives almost $82 million funding increase over last year in the 2009 budget proposal.

The Clean Coal Power Initiative, or CCPI, is a cooperative cost-share program between the government and industry to demonstrate advanced coal-based power generation technologies. The budget request of $85 million for CCPI in fiscal year 2009 will complete the third round of the project solicitations, proposed evaluations, and project selections of advanced technology systems that capture carbon dioxide for sequestration for beneficial reuse.

The fiscal year 2009 budget request of $149 million for carbon sequestration, one of the key components of our program, is a significant increase over the fiscal year 2008.

Senator DOMENICI. Would you say that again? I missed the last portion of that.

Mr. SLUTZ. Our 2009 budget request just for carbon sequestration, the carbon storage component, is $149 million. That's an increase of $30 million over the $119 million provided in fiscal year 2008.

Senator DOMENICI. Okay.

Mr. SLUTZ. The increase should help develop economical ways to separate and permanently sequester greenhouse gas emissions from the combustion of fossil fuels.

Consistent with recent budget requests, the petroleum, which is oil technology and natural gas technologies research and development programs are being proposed for termination in 2009.

The fiscal year 2009 budget request of $344 million for the Strategic Petroleum Reserve would continue preparations for doubling the current 727-million-barrel capacity and increasing the drawdown capability from 4.4 million barrels per day to more than 6 million barrels per day. Increasing the capacity required—requires expanding two existing sites and adding one new site.

That concludes a brief overview of Fossil Energy's wide-ranging R&D and petroleum reserve management responsibilities.

PREPARED STATEMENT

I'd like to emphasize, by reevaluating, refining and refocusing our programs and funding the most cost-effective and beneficial projects, the fiscal year 2009 budget submission meets the Nation's critical needs for energy, environment, and national security.

Mr. Chairman, that concludes my prepared statement, and I'm happy to answer any questions.

[The statement follows:]

PREPARED STATEMENT OF JAMES SLUTZ

Mr. Chairman, members of the committee, it is a pleasure for me to appear before you today to present the Office of Fossil Energy's (FE) proposed budget for fiscal year 2009.

FE's budget request of $1.127 billion for fiscal year 2009 is one of the largest FE requests made by this administration. These funds will allow FE to fulfill its mission: to create public benefits by enhancing U.S. economic, environmental, and energy security.

Achieving this mission means developing technological capabilities that can dramatically reduce carbon emissions to achieve near-zero atmospheric emissions power production, thereby meeting the President's priority of expanding our climate change options with higher-efficiency power plants to reduce carbon dioxide and other emissions, including through FutureGen demonstration plants.

FE is also responsible for the management and operation of the Nation's petroleum reserves, most notably the Strategic Petroleum Reserve, which provides strategic and economic security against disruptions in oil supplies with an emergency stockpile of crude oil.

More specifically, the proposed fiscal year 2009 coal budget request of $648 million focuses on technology allowing the United States to maintain its technological lead in coal use in a way that addresses climate concerns. This is the largest budget request for coal research development and demonstration in over 25 years and leverages a nearly $1 billion investment in Clean Coal Technology.

The budget includes $406.5 million for Coal R&D including in-house R&D; $85 million for the Clean Coal Power Initiative and $156 million for a new approach to the FutureGen program.

The fiscal year 2009 request demonstrates the administration's continuing commitment to domestically produced energy from coal. Combined with the required private sector cost sharing contribution as directed by the Energy Policy Act of 2005 (EPACT), this budget will bring the total public and private investment in coal technology leveraged by FE to nearly $1 billion. In addition, the Federal Government provides support to advance coal technologies through tax incentives for clean coal plants, and through loan guarantees to be allocated to various types of coal power and other gasification projects.

The $344 million fiscal year 2009 budget request for the Strategic Petroleum Reserve, an 84 percent increase over fiscal year 2008 approved funding, will allow for expansion activities at two existing storage sites and the development of a new site in fiscal year 2009. This expansion is in accordance with the provision in EPACT for an expansion of reserve capacity from 727 million to 1 billion barrels of oil, and with the president's recommendation to further increase the reserve's capacity to 1.5 billion barrels of oil.

FOSSIL ENERGY RESEARCH AND DEVELOPMENT

I will begin the detailed presentation of our proposed budget with the work of Fossil Energy Research and Development (FERD), which is directed at electric power generation from coal, our most abundant and lowest cost domestic fossil fuel. Coal today accounts for nearly one-quarter of all the energy—and about half the electricity—consumed in the United States.

FERD supports many Presidential initiatives and priorities including the Coal Research Initiative, Hydrogen Fuel Initiative, and FutureGen. FERD also supports the Climate Change Technology Program, which is a priority for the Department. The components of the FERD program begin with FutureGen.

FUTUREGEN

FutureGen promotes advanced, full-scale integration of integrated gasification combined cycle (IGCC) and carbon capture and storage technology to produce electric power from coal while capturing and sequestering carbon dioxide (CO_2), resulting in near-zero atmospheric emissions coal energy systems. FERD is restructuring FutureGen in a way that accelerates the commercial use of carbon capture and storage technologies.

The new approach proposes multiple 300–600 Megawatt (MW) commercial-scale demonstration clean coal power plants—as opposed to a single, 275 MW R&D facility—each producing electricity and capturing and safely sequestering at least an estimated annual 1 million metric tons of CO_2 from each. FutureGen receives an $81.7 million funding increase from fiscal year 2008 in the fiscal year 2009 budget proposal.

CLEAN COAL POWER INITIATIVE

The Clean Coal Power Initiative (CCPI) is a cooperative, cost-shared program between the Government and industry to demonstrate advanced coal-based power generation technologies. CCPI is now focused on projects to help accelerate development and deployment of coal technologies that could economically capture carbon dioxide, including increasing the efficiency and reliability of carbon capture technologies. CCPI allows the Nation's power generators, equipment manufacturers, and coal producers to help identify the most critical barriers to coal use and the most promising advanced technologies to use coal cleanly, affordably, and with higher efficiencies that reduce carbon intensity.

The budget request of $85 million for CCPI in fiscal year 2009 will complete the third round of project solicitations, proposal evaluations, and project selections of advanced technology systems that capture carbon dioxide for sequestration or beneficial reuse.

SEQUESTRATION

The fiscal year 2009 budget request of $149 million for carbon sequestration, one of the key components of the Fuel and Power Systems program, is an increase of $30 million over the $119 million provided in fiscal year 2008.

The increase should help develop economical ways to separate and permanently store (sequester) greenhouse gas emissions from the combustion of fossil fuels. The technologies will help existing and future fossil fuel power generating facilities by reducing the cost of electricity impacts and also providing protocols for carbon capture and storage demonstrations to capture, transport, store, and monitor the CO_2 injected in geologic formations.

The increase will support site selection and characterization, regulatory permits, community outreach, and completion of site operation plans for large-scale, geologic, carbon storage tests. It will also fund large-scale injections and remaining infrastructure development. The additional funding also permits work on capture projects and initiates an effort to prepare for and augment the monitoring, measurement and verification being conducted in the Phase III tests.

HYDROGEN

The budget request of $10 million in fiscal year 2009 for hydrogen from coal—a clean fuel for future advanced power technologies such as fuel cells and transportation systems—is down nearly $15 million from fiscal year 2008. The decrease is due to the elimination of integrated coal-biomass processing for carbon emissions research (which is generally advanced through the gasification program), elimination of substitute natural gas and coal-to-liquids production research (which are mature industries and not the high-return investment that FE focuses on), and a right-sizing of the effort level for early engineering and design studies on hydrogen production modules in near-zero emission coal plants.

GASIFICATION TECHNOLOGY

The Integrated Gasification Combined Cycle (IGCC) budget request for fiscal year 2009 is $69 million, a $15.5 million increase over fiscal year 2008. The IGCC program develops advanced gasification-based technologies aimed at reducing the cost of coal-based IGCC plants, improving thermal efficiency, and achieving near-zero atmospheric emissions of all pollutants. These technologies will be an integral part of the carbon capture and storage demonstration projects.

FUEL CELLS

Flexible fuel cell systems that can operate in central coal-based power systems and with applications for electric utility, industrial and commercial/residential markets, receive a funding request of $60 million in fiscal year 2009—an increase over the fiscal year 2008 appropriation of $55.5 million. This activity enables the generation of highly efficient, cost-effective electricity from domestic coal with near-zero atmospheric emissions of carbon and air pollutants in central station applications. The technology also provides the technology base to permit grid-independent distributed generation applications.

OIL AND NATURAL GAS TECHNOLOGY

Consistent with the budget requests for fiscal years 2006, 2007 and 2008, the Petroleum-Oil Technology and Natural Gas Technologies research and development programs are being terminated in fiscal year 2009.

The Ultra-Deepwater and Unconventional Gas and Other Petroleum Research Fund was created by the Energy Policy Act of 2005 (Public Law 109–58) as a mandatory program beginning in fiscal year 2007. The program is funded from mandatory Federal revenues from oil and gas leases. Consistent with the fiscal year 2007 and 2008 budget requests, the fiscal year 2009 budget proposes to repeal the program through a legislative proposal.

STRATEGIC PETROLEUM RESERVE

The Strategic Petroleum Reserve (SPR) exists to ensure America's readiness to respond to severe energy supply disruptions. The Energy Policy Act of 2005 directs DOE to fill the SPR to its authorized 1 billion barrel capacity as expeditiously as practicable. Additionally the President has proposed expanding the Reserve's capacity to 1.5 billion barrels.

The fiscal year 2009 budget request of $344 million would continue preparations for doubling the current 727 million barrel capacity up to 1.5 billion barrels and increasing the drawdown capability from 4.4 million barrels per day (MMB/day) to more than 6 MMB/day. The administration strongly believes that this expansion is necessary to protect the economic and energy security of the Nation, given the increased risk of disruption that is now apparent in the global oil market. Increasing the inventory to 1 billion barrels requires expanding two existing sites and adding one new site.

The fiscal year 2009 budget request reflects completion of land acquisition activities for the Richton, Mississippi site in fiscal year 2008 and the addition of expansion activities at the two existing sites and the new site in fiscal year 2009.

NORTHEAST HOME HEATING OIL RESERVE

The fiscal year 2009 budget request of $9.8 million will fund continuing operation of the Reserve and the leasing of commercial storage space.

The President directed DOE in 2000 to establish a Northeast heating oil reserve which is capable of assuring a short-term supplement to private home heating oil supplies during times of very low inventories or in the event of significant threats to immediate energy supplies. The 2 million barrel reserve protects the Northeast against a supply disruption for up to 10 days, the time required for ships to carry heating oil from the Gulf of Mexico to New York Harbor.

NAVAL PETROLEUM AND OIL SHALE RESERVES

The fiscal year 2009 budget request of $19.1 million is slightly less than the fiscal year 2008 request of $20.3 million. The decrease is due to the completion of the Risk Assessment and Corrective Action Studies to determine the cleanup requirements of the Elk Hills site (NPR–1) and reductions in operating and facility maintenance costs at NPR–3.

The Naval Petroleum and Oil Shale Reserve (NPOSR) mission is to complete environmental remediation activities and determine the equity finalization of NPR–1 and to operate NPR–3 until its economic limit is reached, while maintaining the Rocky Mountain Oil Field Test Center as a field demonstration facility. Because the NPOSR no longer served the national defense purpose envisioned in the early 1900s, the National Defense Authorization Act for Fiscal Year 1996 (Public Law 104–106) required the sale of the Government's interest in Naval Petroleum Reserve 1 (NPR–1).

To comply with this requirement, the Elk Hills field in California was sold to Occidental Petroleum Corporation in 1998, two of the Naval Oil Shale Reserves (NOSR–1 and NOSR–3) were transferred to the Department of the Interior's (DOI) Bureau of Land Management, and the NOSR–2 site was returned to the Northern Ute Indian Tribe.

The Energy Policy Act of 2005 transferred administrative jurisdiction and environmental remediation of Naval Petroleum Reserve 2 (NPR–2) in California to the Department of the Interior. DOE retains the Naval Petroleum Reserve 3 (NPR–3) in Wyoming (Teapot Dome field). Environmental remediation is performed on those facilities which no longer have value to either of the missions.

MEETING THE NATION'S CRITICAL ENERGY NEEDS

In conclusion, I'd like to emphasize that the Office of Fossil Energy's programs are designed to promote the cost-effective development of energy systems and practices that will provide current and future generations with energy that is clean, efficient, reasonably priced, and reliable. Our focus is on supporting the President's top priorities for energy security, clean air, climate change, and coal research. By re-

evaluating, refining and refocusing our programs and funding the most cost-effective and beneficial projects, the fiscal year 2009 budget submission is designed to help meet the Nation's needs for energy, environmental and national security.

Mr. Chairman, and members of the committee, this completes my prepared statement. I would be happy to answer any questions you may have at this time.

POWER OUTAGE IN FLORIDA

Senator DORGAN. Mr. Slutz, thank you very much.

Mr. Kolevar, as you know, the recent power outage in south Florida disrupted normal life for more than 1 million people for a number of hours. The news reports that I read said the system worked as it was supposed to, shutting down transformers and power units, including two nuclear power sites, and then I read later that it was a human error.

So, how is it the system worked as it was supposed to work? I mean tell me about what has happened there.

Mr. KOLEVAR. The system did work as it was designed. It was human error. The individual took down protective relays at a substation during maintenance, attempted to put the relay back online without reengaging the protective systems and caused a short and a voltage drop within the system that affected Turkey Point and, subsequent to Turkey Point's going offline, other generation units.

And the system is designed to try and limit the cascading effects of a drop in voltage and certainly the drop of generation. The drop in generation, 4,000 megawatts, was felt all the way through the system. Operators in New York could see that something had happened. They didn't know what it was, but they could see that something had happened.

The reason I make that point is because that, while they could see it as far north as New York and probably farther north into Canada, the system was able to contain that outage, localize it, and Florida Power and Light did an impressive job of getting service back on to all of their customers in about a 3- or 4-hour time frame.

STRATEGIC PETROLEUM RESERVE

Senator DORGAN. Mr. Slutz, in the Office of Fossil Energy, there's about a $200 million increase in the fiscal year 2008 enacted versus the administration's 2009 request. It appears to me that about $160 million of that is for the expansion of the Strategic Petroleum Reserve. Is that correct?

Isn't a substantial portion of your increase for the increased request for the SPR?

Mr. SLUTZ. Correct. About—yes.

Senator DORGAN. Yes. And you heard me describe why I support SPR. I've always supported saving and creating an energy security blanket here with Strategic Petroleum Reserve, but I just think it is nuts at about $100 a barrel to be sticking that oil underground and taking it out of supply. And so, to the extent the chairman has the votes on this subcommittee, I intend in the chairman's mark to stop this on the first day of the next fiscal year. My hope is that I'll be able to stop it earlier than that on the floor of the Senate by adding it to another piece of legislation.

We shouldn't be putting 60,000 or 70,000 barrels a day today underground, and we shouldn't increase that to 120,000 barrels a day

in the second half of this year. So, I just want you to know that, to say that we have a substantial increase in the Office of Fossil Energy, when I understand most of that increase is in the SPR, building facilities and so on is deceiving. My major concern is in the fossil R&D accounts because half of this electricity comes from coal, and if we're going to be able to use coal in the future, we need to have expanded carbon capture and carbon sequestration activities. That's going to require a lot of effort and a lot of resources.

FOSSIL BUDGET PRIORITIES

Mr. Slutz, when you talk about increasing the request for carbon sequestration by $30 million, I've got to tell you that's a drip as opposed to a stream that's needed for us because there's an urgency for action.

We need to figure out how do we capture and how do we sequester carbon in order to continue to use coal. I've had some really interesting people come in to talk to me. There is a Texas demonstration project where they are turning the effluents from that plant into chloride, hydrogen, and baking soda, and the CO_2 from the plant is embedded in the baking soda, and they put it in the landfill. That's interesting to me.

I'm going to go see a location within the next couple of weeks where they're taking the CO_2 and feeding a contiguous algae pond, because algae lives on wastewater and CO_2. They not only consume the CO_2 with algae, but then they process the algae for a super fuel. So, you destroy the CO_2, and you produce diesel as a result.

So, a lot of interesting things going on, but in response to Senator Domenici's question, I think Carl Bauer is an extraordinary resource for us. He's running a great operation over there, but we need to do a lot of projects, both in research and demonstration and deployment of technologies. However, in my judgment, to take most of the increase in your Office of Fossil Energy and direct it into SPR doesn't make a lot of sense to me.

We need to be directing that, in my judgment, into fossil R&D so that we can use our coal resources in the future in a way that captures the carbon and doesn't contribute to global warming. Your response?

Mr. SLUTZ. Well, I think there are two key components that are significant. The Coal Program does have significant increases. That was a—the $648 million that is focused, proposed for coal research and development, is more than 25 percent—I think it's a 25 percent increase and that includes——

Senator DORGAN. That includes FutureGen?

Mr. SLUTZ. Yes, yes. When you look at the Coal Program and break it down, there are both key demonstration projects, which include FutureGen and the CCPI Program, and then other very important research aspects. And there's about 400—I think $400 million in the research programs and then—well, $156 million for FutureGen and $85 million for CCPI, and the $156 million for FutureGen is about—I think I mentioned it was an $80 some million increase from previous budgets.

So, there is significant increase in coal. There is an increase—we're proposing about a $171 million in the SPR budget for developing new facilities. All but $13 million of that $175 million is tar-

geted at increasing from 750 million to the 1 billion level which is what was authorized by EPACT.

There's only $13 million of that $171 million that is targeted for the 1 billion to 1.5, and that is for some initial environmental impact statement work and some of the analytical work needed on site selection. So, just kind of put that in the frame of reference that it is incremental steps that are being proposed for that.

Senator DORGAN. I understand that, but resources are scarce. In fact, as we give discretion to the Department with respect to this process, then we must use them wisely, I mean, if you were going to plan a journey with your car some day, and you say here's the road I'm taking and then somebody says, well, but there's a bridge out halfway through that trip. You say, well, it doesn't matter, I'm just going to take this road. But when we come to the bridge, we'll just drop off the bridge. This is your SPR policy.

That wouldn't be very smart, and it's not very smart for us to say here's the road we're taking with respect to SPR. No matter the consequences, no matter the circumstances, no matter the price of oil, we're still going to stick it underground.

I mean, my point is I think there's a need for a pause, a 1-year pause with a price-cap issue, and I'm going to work on that.

I don't know whether you have described, as Mr. Spurgeon has described, a 330 percent increase in his accounts in 7 years. He smiled broadly as he said it, and I'm sure he feels very good about it.

Have we had a 330 percent increase in the funding for clean coal technology and the fossil accounts in the last 7 years?

Mr. SLUTZ. I can't answer that question. I mean, I don't know the percent increase that we've had or what we had.

Senator DORGAN. I'm not diminishing Mr. Spurgeon's dramatic success, much of which should be attributed to my colleague to the left here, but——

Senator DOMENICI. Well, I don't have anything to do with running the Government.

Senator DORGAN. No, but, look, we've not been blind here. We understand what's been going on.

Senator DOMENICI. I thought it was a great priority to get nuclear power plants on board and there are.

Senator DORGAN. We have others that want to ask questions, and I want to recognize Senator Domenici, but I just want to say this.

CARBON SEQUESTRATION

There isn't a ghost of a chance of us being successful in our fossil programs unless we understand that to continue to use coal in the future, given what's coming at us and the debate on global climate change legislation, unless we decide this is urgent. It's going to require significant increases in research and also especially in development, because you've got to get the commercial-scale development applications to understand what technology works and at what cost. Both are very important.

So, as we work on this in this subcommittee, we're going to try to find a way to recalculate some of this and make bigger investments and bolder investments because we've got to continue to use

coal, but we have to do it in a manner that doesn't injure our environment.

We're not going to have a future without coal. The question is what kind of a future are we going to have with coal when we describe conditions of capture and sequestration? I'm a real believer that technology can solve some of these problems, but technology isn't inexpensive, and so, Mr. Slutz, I'm hoping that the next time you come, you'll be able to smile as Mr. Spurgeon has about what we might be able to do to increase the accounts that you can't ask for because you've got to be here supporting the President's request. You know and I know that, if we do what I think we should do to your accounts, you would be very appreciative.

Would you agree to that?

Mr. SLUTZ. I will agree that managing coal requires us to solve the carbon sequestration issue, and it is a huge challenge that we need to solve.

Senator DORGAN. Diplomatically said. Thank you. Senator Domenici.

Senator DOMENICI. Well, Mr. Chairman and members of the executive branch here in front of us, let me say, regardless of what my emphasis has been, along with others, like Senator Craig, in the field of nuclear and I'm trying to get a nuclear renaissance going, there's no doubt in my mind that the chairman has properly expressed the situation in the United States in terms of our future, and coal is an American—just the backbone of America's ability to solve the problem of having to import our energy needs.

In my opinion, it would be a good thing and maybe we could do this. We have been spending money on coal research and it not all comes to you. Some goes to the Department of the Interior, and I think it would be good if we asked the administration to submit to us the amount of money that's been spent on coal, clean coal research, and let "clean coal" be a generic term for any kind of research that's been done on coal to make it more usable and friendly to American ambient air standards and the like.

I'd like to see how much we've spent in the last 10 years, if you could ask them to tell us, and then if there are other departments that spend it, you could tell us who they are and we could ask them.

Senator DORGAN. Mr. Slutz, would you submit that to our committee?

Mr. SLUTZ. Yes. Yes, sir.

[The information follows:]

CLEAN COAL FUNDING

The Department of Energy has invested $3.4 billion in clean coal research over the last 10 years to dramatically reduce coal power plant emissions (including CO_2) and significantly improve efficiency, thereby reducing carbon emissions. While funding is not readily available, other Government agencies that invest in clean coal include the National Science Foundation, the Department of Interior and the U.S. Geological Survey.

CARBON SEQUESTRATION CONTINUES

Senator DOMENICI. What worries me is we've been—every year since I've been around doing my work on this subcommittee, we

hear about the additions that are made to research on clean coal. The new addition has been CO_2.

First we had clean coal and we weren't trying to get CO_2 out of it because climate wasn't a part of the issue. We were trying to clean it to meet the standard so we could use it in our utility. Now we've added to the research the burden of cleaning it and removing and making CO_2, the removal stick.

It seems to me that is a question to ask you and maybe you can get your experts to tell us. Has the fact that we are asking our researchers to find a way to remove and stabilize the removed CO_2 made the research job of cleaning up our coal more difficult and are we ignoring clean coal and putting more effort on clean coal and carbon sequestration? Do you understand my concern?

Mr. SLUTZ. As we focus on CO_2, we're missing some of the other aspects.

Senator DOMENICI. Making it more difficult. If we broke through and had clean coal, that'd be one thing. That'd be a pretty giant step. We've tried that for years. At least the utility companies and America would say we could burn that coal.

If we say research clean coal and carbon sequestration, we might be making the clean coal more difficult to achieve and we may be taking more time to get it done, and I think I'd like an answer from some of your experts as to what we're doing with our money in that regard.

NATURAL GAS AND COAL RESOURCES

It is very important. Right now the utilities of America are in an absolute dilemma, and that's your business and that's your business. You know they can't start a new powerplant, right? What they're all going to do is go to natural gas, right?

Mr. KOLEVAR. Yes, sir.

Senator DOMENICI. There's no question. They're going to be pushed up against the wall and they're going to eventually say whatever the cost, we have no other alternative. We're going to natural gas.

Mr. Kolevar, you don't think that's good policy for America, do you?

Mr. KOLEVAR. No, sir, it's not.

Senator DOMENICI. And then how about you in your research? You don't think that's good for America, do you?

Mr. SPURGEON. No, sir.

Mr. SLUTZ. I think its good policy. I think there's a role for each of those fuels. There's going to be a role for both natural gas and for clean coal. There's—it's not an if—it's not an either/or.

Senator DOMENICI. Sure.

Mr. SLUTZ. It's clearly both.

Senator DOMENICI. But if you ignore cleaning up the coal or make it take 10 years longer, your utilities can't sit by and wait. They're going to add capacity. You just described the capacity add-ons that are predicted by Caruso over there at—that does a great job. His predictions are probably as accurate as any, and he says they're going to have to add great capacity, right?

Mr. SLUTZ. Yes, sir.

Senator DOMENICI. Thirty-five—what does he say?

Mr. KOLEVAR. About 35 percent by 2030.

Senator DOMENICI. Do you know what the utilities are saying they're going to do to meet the requirement? We have nuclear coming along, but it's by nature pretty slow.

Mr. KOLEVAR. I think it's fair to say that a lot of utilities are not quite sure how they're going to get there.

Senator DOMENICI. That's correct.

Mr. KOLEVAR. But we are seeing the cancellation of planned coal units now, and much of that new generation coming online is going to be natural gas and that will make us more reliant on foreign sources of gas.

Senator DOMENICI. And you know what natural gas is worth now. Remember when we started, Larry? Now it's up to nine. When we started, look at here. It's nine-plus, and then they're going to have to use it, even though it's in short supply.

I have a number of questions, but I'm just going to get you on this, Bond and others, that keep attacking you. Are you feeling all right? Are you holding up under the barrage?

FUTUREGEN

Mr. SLUTZ. Thanks, Senator. Yes, we are—I'm holding up. We're holding up. It was not an easy decision to make the decision on FutureGen, I can tell you, and we're working through that. We're working through it with our various industry partners. And let me just add one, which I think is—and we'll have much more in the next few days to come out, but after we made the announcement, we immediately released a request for information.

We requested those comments come in by Monday, March 3. I was able to determine yesterday we received over 50 comments, which is very significant for that type of technical request for information.

I don't want to get ahead of myself because we need to analyze those comments, but I'm very optimistic that we have a path forward with this restructure of FutureGen that gets these projects out quicker in a full-scale commercial environment, and we're seeing a lot of interest by utilities because they see this as key to being able to use coal, and we're hearing a lot of excitement out there.

So, we need to work through these comments. We're going to be working over the next month with some structured outreach programs with industry. And we anticipate coming out with a funding opportunity announcement very soon, and we'll be working very closely with Congress as well on this.

Senator DOMENICI. Well, you've got to be smart on what you're going to do at the next go-around because you had the areas that were committed to this and perceived to have won, and now if you have a new program and there in some way it's made difficult for them to be participants, this issue will go on for years. And so my advice is to work with these companies that were part of your proposal before, and I'm sure you're going to do that.

Mr. SLUTZ. Yes. Yes, sir.

NUCLEAR ENERGY

Senator DOMENICI. Now let me talk about nuclear just for a little bit. Mr. Spurgeon, you're going to leave this Government when the President's term's up, I assume, or close thereto.

Mr. SPURGEON. Yes, sir.

Senator DOMENICI. First, I want to say together it would appear to me that your short term in this office will be evidenced by enormous positive success in the direction of nuclear power being used again in large quantities by America and certainly much more in the world than it ever has been, and we may be a player, whereas before we were doomed.

We may, in my opinion, be back at it producing engineers that are experts, et cetera, and we may be interested in nuclear power at every level.

Am I stating it halfway right?

Mr. SPURGEON. Yes, sir.

Senator DOMENICI. Now, since we've got nuclear power and got a lot of companies ready to go, there must be some things that are problematic about the future of nuclear power, and I might ask you in a minute to tell us a few, if you have them, but it seems to me that the overhang that is really big is, even though it's not as big a problem in my mind now as it was 10 years ago, but the problem of what are we going to do with the waste is the only thing that stands in the way of maximum acceptance of nuclear power.

You know that, right?

Mr. SPURGEON. Yes, sir.

Senator DOMENICI. That's the only thing people that know what they're talking about say and then it's accepted by the masses that, well, something's wrong, we don't have the waste control. We're doing darn well. We could stay a long time without a new repository because of the way things are right now.

But are we going to find a way, a direction to move ahead so that we are assured of the next step which would be a reprocessing, a recycling plant in America? Is that going to be set before you and Mr. Bodman leave office or not or do you know?

Mr. SPURGEON. I certainly hope so, sir. The future is always hard to predict, but we have all the ingredients in place that should allow that to happen, and that's not taking away anything from our long-term R&D efforts which will eventually get us to the point in advanced reactors and advanced systems that we need to get to and will get to some time later in this century.

But the key to the revival of nuclear energy is making concrete progress, and I don't mean that as a pun, but "concrete" meaning real things getting built.

Senator DOMENICI. You bet.

Mr. SPURGEON. That's our next step with respect to nuclear reactors in this country. We have the systems in place. We have some of the support mechanisms in place, but we need to push it over the goal line. Therein you'll see the emphasis in our 2010 program in this year's budget because it's the new reactors that are going to be the pole that gets the flywheel turning.

SPENT FUEL RECYCLING

But for the sustainability of nuclear energy long term—because we don't just need the 30 or so plants that are on the drawing boards in one stage or another today; we need more than 300 if we're going to have any chance of meeting some of our carbon goals in the near term. And so to do that then, we've got to solve that second of the two basic questions that have been out there for nuclear energy since the 40 years I've been in this business, which is, is it safe and what are you going to do with the waste?

I think we have basically answered the question through good, solid, reliable operation of our nuclear plants that it is safe. We've got that second one to answer, but I think we can do that by looking at the entire back end of the fuel cycle as a unit.

We need to look at used fuel and what is the best way and an integrated way of managing used fuel? Because through recycling, you can make the repository challenge much easier. You can put a much more stable waste form into the repository, making it such that it's easier to license, easier to——

Senator DOMENICI. What is the objection? What is the objection to recycling?

Mr. SPURGEON. It is something that goes back a long time. When this business started in the late 1960s and early 1970s, the whole policy was that the fuel coming out of a lightwater reactor would be recycled back into a lightwater reactor and the solidified, vitrified high-level waste would go into a repository, and at that point in time it was a salt mine that we were looking at for that kind of a repository. And that was our plan and that was moving forward, and that's when nuclear energy was going to provide a large share of our electric energy—projected to provide a large share of our electrical energy generation requirement.

In 1977, President Carter indefinitely deferred reprocessing in this country. Now President Reagan did reverse that in 1981, but by 1981 nuclear energy was kind of on the downslide and there was no basic economic or business imperative for us to move forward with recycling.

Senator DOMENICI. Yes, sir.

Mr. SPURGEON. But we're now getting back to where we're now seeing that curve again turn upward and where we do need a substantial amount of new nuclear power, and to do that, we are now relooking at, through the Advanced Fuel Cycle Initiative and other programs, the ability to recycle fuel.

I don't think—I'm sorry. I'll be quiet.

Senator DORGAN. Let me just mention, though, that I think it requires a longer discussion. The reprocessing decision in 1978 had to do with nonproliferation concerns. Valid or not, one might agree or disagree, this is also part of a concern about nonproliferation. So that's the origin of that, right?

Mr. SPURGEON. No question, sir.

Senator DORGAN. Okay.

Mr. SPURGEON. Actually, I was there. I mean, I was one of the people that were doing the report.

Senator DOMENICI. Well, just a minute because I ran out of time and you gave a long answer and that's sufficient. You've explained it.

I want to say this. President Carter did stop this by executive order, and he said it was based upon the desire of the United States that there not be the proliferation that this would add to the atmosphere and that if we didn't do it, others would not do it since we were a leader that the world followed. The problem is that was a mistake and they didn't sit by and say we'll skip reprocessing, we'll do something else. They reprocessed and we did not, and now we're in a position of deciding whether we should or not. And the chairman is correct, that President that did it had a good reason. The problem is that the reason didn't turn out to be right, and it's many, many years since the decision and Europe, led by France, is recycling. And that's one of the giant, giant concerns that we must confront, and I don't know whether we're ready to confront it. I am, but I don't know whether others are.

Thank you, Mr. Chairman.

Senator DORGAN. Senator Domenici, the reason I interrupted is only to say that the issue of reprocessing is not a technical issue. I mean, the decision wasn't made on a technical basis. It was made on a broader basis, and one might or might not feel it's time to revisit that.

I think the issue of reprocessing requires a discussion about the kinds of things Senator Domenici has just described and the kinds of things others would describe about reprocessing. That was my only point.

Senator Craig.

Senator DOMENICI. That was fine.

Senator CRAIG. Thank you very much, Mr. Chairman. I'll become a little more parochial. These are extremely valuable discussions, and I would suggest, as it relates to FutureGen and clean coal technology, I think the utility industry is ready to participate in phenomenally aggressive ways in partnerships to provide substantial resources.

One of the things, if I have any disappointment in this administration, is we've not crossed that line of partnerships that I think we must if we're going to bring the resources to bear on the urgency that you hear this committee speak of when we speak about technology and the future and the need.

Senator DOMENICI. You're right.

Senator CRAIG. We still think we have to fund everything out of the hip pocket of the taxpayer, and those relationships are to come and they must come. Whether it's building an NGNP or whether it's FutureGen, they have to be targeted, they have to build consensus, but there's phenomenal resource out there waiting.

I had the president of a major utility the other day tell me that they could meet the targets of a cap-and-trade in a reasonable fashion given the running room and the technology and the partnerships and the relationships with the Federal Government. But you all three understand, as we all four up here do, we have three people vying for the presidency today that hold nearly the same position on climate change and a scheme of cap-and-trade that nobody yet can figure out. And if that were to become policy today, the fuel

switching we talk about would go on and distort the marketplace in ways that are awfully hard to perceive because utilities would be forced to move in the direction they must move to build their base loads, the clean coal technology not being in place and certainly the nuclear backlog and the building of infrastructure there and capability that's obviously under way. That's a frustration to all of us, or certainly it is to this senator. It may not be to others.

ADVANCED TEST REACTOR

But, Dennis, last April, DOE designated the Advanced Test Reactor, ATR, as a national user facility. ATR is a unique test reactor that the university research community and the commercial nuclear industry can use to perform critical tests.

Up until now, only the lab and the Navy have had access to the ATR. Now the fiscal year 2009 DOE budget only includes $2.5 million for this activity.

Do you consider this to be enough funding and what more could be done with additional funding?

Mr. SPURGEON. I think it's a good start, sir. You're pointing out something that I consider to be a major accomplishment of moving the ATR into the marketplace, if you will, because it has a tremendous amount of untapped capabilities that can be used. And so, starting this summer, as you know, we are going to be having researchers from universities that are going to be starting to take advantage of that very unique facility.

So, is it a start? Is it an acceptable start? I believe so. I'm hoping that this will take off and grow, and we will continue this program because it's—it can be a great example of how we can take and make full use of our national assets, especially the ATR, which, while it's been around for quite awhile, it's a very young 30-year-old plant.

Senator CRAIG. Well, we'll watch it very closely because it is that nexus of partnership that I think ATR may assist us in doing, increasing those relationships with the private sector and the university communities that are going to be tremendously important.

ENVIRONMENTAL MANAGEMENT

When the Secretary testified before the Energy Committee, I asked him to respond to the Idaho delegation's repeated request to transfer clean-up liability from the lab to the clean-up contractor. The fiscal year 2009 budget did not provide funding for these clean-up activities in either of the NE or EM budgets.

Are you planning to fund these clean-up activities through NE? That would be the one question. What impact will this have on the R&D activities, like NGNP and GNEP, on the lab's infrastructure—and the lab's infrastructure?

Mr. SPURGEON. Obviously any clean-up activity that is done at Idaho, however the budget funds end up getting requested, would be managed through the EM contractor. Nuclear Energy is not in the business of doing clean-up. My office is not in the business of managing clean-up, but it all goes through the Idaho Operations Office.

Consequently, the issue here is more of how do we get adequate funds to manage the overall national clean-up activity that is ongo-

ing and that needs to continue? From my personal perspective, I'm in the business of building things. I'm not in the business of taking things apart. There's another organization within the Department that does that.

Senator CRAIG. Okay. Am I out of time, Mr. Chairman?

Senator DORGAN. Close.

OUTER CONTINENTAL SHELF RESOURCES

Senator CRAIG. Close. One last question then to you, Mr. Slutz, last year I included $10 million to perform an inventory analysis of domestic oil reserves in the Outer Continental Shelf, in the Energy and Water Appropriations bill.

What are your thoughts on investing in this type of analysis to establish once and for all the Nation's oil reserves to be used at a time of need?

And I say this because what we're looking at today is old knowledge, and yet we know that when incentivized, we went into the deep waters of the gulf and we applied today's technology and found phenomenal oil and oil reserves, and I am just amazed that we have decided to put a blindfold on because of the politics involved that are old, they're not the new politics that ought to be fitted to the new technologies. And I'm going to make a run at that again. I'm going to work awfully hard on it to see if we can't break through the mental fog out there of knowing where our country is as it relates to our reserves.

Senator DOMENICI. What is that, Senator, you're going to work on, the inventory?

Senator CRAIG. Ten million dollars to build the inventory.

Senator DOMENICI. We did it. You put it in and then they took it out, and we had to take it out in conference.

Senator CRAIG. I know we did it and——

Senator DOMENICI. It's not law yet.

Senator CRAIG [continuing]. My effort is to do it again.

Senator DOMENICI. Right. I got you. I didn't understand.

Senator CRAIG. Your thoughts, sir?

Mr. SLUTZ. Well, let me just tie it back in, I think broader, when you look at it from an oil and gas reserve assessment, technology assessment, it's actually something that, as a nation and the world, that we actually do need to do periodically.

It is probably—and I'll reference a study I was personally very involved in, was the National Petroleum Council Study that was titled "Facing the Hard Truth" when it was issued. And one of the key findings from that study, which was actually a study of studies and projections that are out there, was that it was something not just the United States but globally we needed to have a better understanding of our resource base and that it was time to really update that, and I think there's some real good information in that piece of work on how to get started under that.

And, of course, almost every projection in the world, I think, all except one major projection, relies on the United States Geological Survey and their reserve assessment. So, I think the United States has always shown leadership in reserve assessment. I think it is a critical issue, not just to know what we have in the offshore and Outer Continental Shelf but also, as we look more toward uncon-

ventional resources, past reserve assessments have not—because of new technology developments over the last probably 15 years, some of those past assessments don't actually take into account a lot of—for instance, what is the real opportunity with oil shale and some of those things?

So, yes, I think there is some opportunity there for us to better understand this.

Senator DORGAN. Mr. Slutz, thank you very much. I do want to mention that we put the inventory in our bill last year, and I supported that. But it properly belongs with the Interior Appropriations Subcommittee.

Mr. SLUTZ. Right.

Senator DORGAN. Both of us are on Interior, I believe. That's probably where we'll want to put it.

Mr. SLUTZ. I was giving you the general technology answer.

Senator DORGAN. I understand. I also want to make a point that the administration has zeroed out the ultra-deep and unconventional oil and gas drilling research. We added back the money in the past, but for the second year in a row, the administration zeroed that out. I think is a very big mistake because there are resources there that we need to further research and develop technologies so that we can find them.

PREPARED STATEMENT

Let me call on Senator Allard.

Senator ALLARD. Thank you, Mr. Chairman. I would like to have my statement made a part of the record, if I might.

Senator DORGAN. Without objection.

[The statement follows:]

PREPARED STATEMENT OF SENATOR WAYNE ALLARD

Mr. Chairman, thank you for holding this hearing today. I think it appropriate that we are hearing from, not only the offices responsible for dealing with electricity production, but also the Office of Delivery and Reliability. And as we are all aware, no amount of electricity does us any good if we cannot get it to where it is needed.

No one can argue that we are dangerously reliant on foreign sources of energy. We must decrease our reliance on foreign sources of energy by diversifying our energy sources and increasing conservation. I have long felt that a balanced energy portfolio which takes no technology off of the table is what is best for this Nation.

For this reason I am a strong supporter of nuclear energy. Nuclear generation facilities produce vast and reliable quantities of electricity. I am pleased with the recent movement toward increasing our nuclear capacity, which has been the result of the Energy Policy Act passed in 2005. I am hopeful that we can continue this progress.

In the area of fossil energy production, technological advancements have made the use of coal cleaner and more efficient than ever before. In the United States, and in the State of Colorado, we have vast amounts of domestic resources from traditional oil, coal and gas resources to unconventional sources such as oil shale. I firmly believe that we can and must continue to use these resources responsibly.

I look forward to working with the committee to ensure that research and development in all fields of energy technology are funded in a manner that is responsible, but sufficient to ensure that the development and implementation of new technologies continues.

Again, Mr. Chairman, thank you for holding this hearing. And thank you to all of the witnesses for being present.

SPENT FUEL RECYCLING

Senator ALLARD. Thank you, Mr. Chairman. My approach on our energy crisis is that we need to have a balanced approach. We can't take any energy source off the table right now, and I think that's critical. That's a position that I think is good for the country, happens to be good for the State of Colorado because we have lots of natural gas, we have lots of clean coal, we have lots of sources for renewable energies, and we have a lot of the technology to develop some of this.

The question that I have is when we're talking about nuclear energy, what is being done to—that you're familiar with—to push the recycling of nuclear energy?

I visited the recycling nuclear energy plants in Sellafield in England. I've been to France and visited those recycling units there, and anybody that hasn't been to those areas, I think they ought to spend the time to go there because it's American technology that they've taken to the European community, and I know that we're working on what we call a MOX plus, which means when we recycle, we end up with a byproduct that is more difficult to convert to a nuclear weapon of some type.

Would you comment on that recycling part on nuclear energy, please?

Mr. SPURGEON. From the budgetary standpoint, that's found in the Advanced Fuel Cycle Initiative, which is looking to develop the technologies which will allow us on a long-term basis to proceed forward with advanced recycling and also with advanced reactors that would then be used to recycle the material into.

On a near-term basis, we are looking at, well, what can we do to make the fuel cycle more proliferation resistant, that is, so that you don't separate out pure plutonium? I don't happen to call it MOX plus, but on the other hand your description of it is accurate. And that is something that we are looking at.

We look at that as the—I personally look at that as the next incremental step along the way toward the ultimate goal of long-term fast reactor recycle, but what that also does, as Senator Domenici was commenting on just a moment ago, it gets us to the point where we can have an easier solution than just disposing of used fuel directly in a repository, an easier solution to the disposition of high-level waste because the product of a recycle facility is a vitrified glass form that is easier to dispose of and gives us many more alternatives as to how we dispose of that material.

Senator ALLARD. Reduces the waste stream.

Mr. SPURGEON. It does reduce the waste stream. It reduces toxicity, but more importantly, if you just dispose of a spent fuel element, then you need to be able, because you don't know but what you might want to use that material and that resource that's still contained in there at some later time, it needs to be recoverable or retrievable. That defines a harder problem for a repository than if you're disposing of a glass log and it just needs to go in there and be safe for the time frame that needs to be maintained geologically stable.

CLEAN COAL RESEARCH

Senator ALLARD. Thank you for that. I also think that we have to continue to rely on working on our traditional energy sources. Mentioned was coal. Colorado has a source of clean coal because it's hard, has high mercury levels. You go further east, you have soft coal with lower mercury levels.

What is being done in clean coal technology to look at how we can easily remove mercury from coal? Is anything being done there?

Mr. SLUTZ. In the past, we have had programs that focused strictly on clean coal and particularly mercury, and that was in our Innovations to Existing Plants Program.

Now, what we've done is we are proposing in 2009—we actually proposed no funding in 2008 because much of that work had been done, and in 2009, we're proposing money in the Innovations to Existing Plants but that again is focused on the carbon capture piece of it and it's capturing carbon from the existing coal fleet, is where that line is moving to.

So, we are—in the past, we have done work on mercury, but now we're moving more toward carbon capture.

Senator ALLARD. Now, what I'm hearing on this carbon capture, some of this you're talking about disposing of the carbon in one way or another.

Just sitting here listening to your discussion, I know that we make carbon compounds that are very light and extremely strong. Is there a possibility of taking those carbon compounds that you have left over from your coal utilization, and converting those into a commercial product like these carbon compounds where they're extremely light and extremely hard? And they're actually using them. Taking these synthetics and actually making them part of the fuselage of planes and whatnot because of their lightness and durability. Is there anything being done on that?

Mr. SLUTZ. I think there's been past work being done on other ways to store it, other than sequestration, but right now, we're focused on sequestration. And I'll tell you part of the challenge——

Senator ALLARD. Is there a future in that?

Mr. SLUTZ. Well, part of the challenge is the scale. And if I could just give you a sense of that——

Senator ALLARD. If you would.

Mr. SLUTZ. If you captured all the carbon from all the power—the coal-burning powerplants in the United States and then you compressed it so it was a liquid, like it was, it's called super-critical, so it's like a liquid. You would have to manage 50 million barrels a day of that liquid. That's 2½ times our current oil-handling capability.

So, from a scale—it's not that I'm not saying it doesn't—I don't know the answer to whether it does and we can look into that from a standpoint of giving a technical answer of the possibility of that, but the part of the challenge is the amount of carbon dioxide we could deal with.

Senator ALLARD. Well, I see that, is this liquid carbon dioxide or is this——

Mr. SLUTZ. When you move it, you compress it.

Senator ALLARD. Is this frozen carbon dioxide what you're dealing with in the end?

Mr. SLUTZ. No, it's actually—carbon dioxide is a gas when you compress it.

Senator ALLARD. Right. And then it——

Mr. SLUTZ. And then it becomes like a liquid.

Senator ALLARD [continuing]. Becomes a liquid and then a solid.

Mr. SLUTZ. Yes.

Senator ALLARD. Yes. But when you—carbon sequestration. I mean, if you take the oxygen out, you've got carbon?

Mr. SLUTZ. Right. But CO_2 is you inject it for sequestration.

Senator ALLARD. Okay, all right. So, you inject the CO_2 for sequestration. My point is there a carbon compound that's left over in the process?

Mr. SLUTZ. In——

Senator ALLARD. Not really?

Mr. SLUTZ. Not really.

Senator ALLARD. Not really. So, when we combine this with soda, soda ash, for example, what is happening? I mean, why are we combining it with soda ash? Is this a way of disposing of the carbon, CO_2?

Mr. SLUTZ. I would have to get back with you on that. I'm not sure of the answer to that question.

Senator ALLARD. I'm trying to get an understanding here of the disposal cycle as we go through the sequestration.

Mr. SLUTZ. Oh, sequestration. You're actually inject—what you're doing is you're injecting the CO_2 into a deep underground saline aquifer, so it stays in that—because of the geologic pressure, it stays in that super-critical liquid.

Senator ALLARD. CO_2.

Mr. SLUTZ. CO_2, yes.

Senator ALLARD. Okay.

Mr. SLUTZ. Now——

Senator ALLARD. No attempt has been made to take these byproducts and put them to a useful purpose, is what I'm trying to get to.

Mr. SLUTZ. In the past, I think there's been some limited work in that.

Senator ALLARD. Yes. But do you think that there—we should be doing something like that?

Mr. SLUTZ. I don't know what the—I'm not sure what the potential is on that.

Senator ALLARD. I think we ought to look at that. I mean, we always have a disposal problem, but we need to look at, you know, how you recycle this stuff, and if there's the technology there to put it to some useful purpose, I think we ought to look at that.

Mr. SLUTZ. There is one area that we see a significant—it's still not done on a full scale, but using CO_2 for enhanced oil recovery is one very likely possibility and an early possibility for finding an alternate use for CO_2. As it's injected into the oil reservoir, it increases oil production. It's done—there are some—at Permian Base in west Texas, significant enhanced oil recovery is done by using CO_2. So, yes, that's probably one of the largest reuse opportunities in enhanced oil recovery.

Senator ALLARD. I see my time has expired. Thank you.

Senator DOMENICI. Excuse me, Mr. Chairman. Might I comment?

Senator DORGAN. Senator Domenici?

Senator DOMENICI. I might say Senator and Mr. Secretary, this injection that you speak of has been done for—that's a pretty old use of carbon dioxide, and it was not done for the purpose of leaving CO_2 underground. Nobody was trying to remove CO_2. We didn't know it was a problem. It was a good way to fill the underground veins of oil and push the oil up. So, we find out now that maybe that's a way to get CO_2 out of circulation, and it does quite well.

I might say to the Senator, one of the most interesting things happened in testimony yesterday from Mr. Caruso from the Energy Information Agency. When we passed the CAFE standard for automobiles, Mr. Caruso just told us yesterday how much carbon dioxide we saved, will save by 2030 because of the forced change in the size of automobiles and et cetera.

We're going to save 5 billion tons just by that law and its implementation among the car owners of America. So, we're not going to get rid of carbon dioxide only by——

Senator ALLARD. Well, you need to have CO_2 if you're going to have plant life on this world.

Senator DOMENICI. Yes. But what I'm saying is there's lots of ways we're going to reduce it. That's one. We didn't even have to do anything except pass a bill to change the model of cars and you cut 5 billion tons in that.

I've told the chairman that I had to leave, Secretaries, and I want to thank all of you and especially you, Mr. Spurgeon. We'll be working hard with you for the next 10 months to see that we can come up with some more good things before you leave.

Thank you, Mr. Chairman.

ADDITIONAL COMMITTEE QUESTIONS

Senator DORGAN. Senator Domenici, thank you very much. At this time I would ask the committee members to please submit any additional questions they have for the witnesses for the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO HON. DENNIS R. SPURGEON

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Question. The difference between the Department's fiscal year 2008 request and fiscal year 2009 request for the Advanced Fuel Cycle Initiative (formerly GNEP) is down roughly $100 million. Clearly this will result in significant change in the research objectives of this program. Can you please explain to the subcommittee how the Department has modified the scope of this program and what are the near term technology goals for this program?

Answer. The reduced funding between the fiscal year 2008 budget and fiscal year 2009 budget for AFCI, which is the domestic technology research and development component of GNEP, results from, among other considerations, a planned reduction in R&D resulting from industry feedback to date showing that prior R&D scope might be greater than required to meet industry needs. In fiscal year 2008 the Department solicited input from industry to determine whether the near-term technology and deployment goals of GNEP could be met using commercially available technologies. This interaction indicated that the initial deployment of spent nuclear fuel recycling technologies could utilize technologies already in use on an industrial

scale in Europe and Asia, with modifications to ensure pure plutonium is not separated.

Question. The fiscal year 2008 Energy and Water bill directed the Department to develop a strategy to address the spent fuel inventories at the closed civilian nuclear facilities in New England and the West Coast. These sites, which have no ongoing nuclear operations, are simply long term storage facilities for spent nuclear fuel. What is the Department doing to implement this Congressional direction and what are the options currently under consideration?

Answer. The fiscal year 2008 Report language requested the Department of Energy (DOE) develop a plan for accepting spent nuclear fuel currently stored at decommissioned reactors at either an existing Federal site, at one or more existing reactor sites, or at a competitively-selected interim storage site (including those sites that volunteered to host Global Nuclear Energy Partnership facilities). The Department is currently evaluating pertinent information and preparing a report in response to this request.

Question. As I noted in my opening remarks, the MOX fuel fabrication facility has not received adequate funding and the Department will be forced to rebaseline the program to establish a new budget and schedule for this project. Can you please inform the subcommittee of the impacts of Congressional cuts to the MOX program and how much taxpayers will pay as result of these cuts? What will this do in terms of delaying our goal of eliminating excess plutonium from the U.S. weapons stockpile?

Answer. DOE is currently analyzing the MOX cost and schedule impacts that will result from the $217 million funding reduction to the MOX project (this reduction includes $100 million cut from the budget request, the rescission of $115 million and a $2 million reduction in Other Project Costs) in the 2008 Consolidated Appropriations Act. It is premature to speculate on the impacts of these changes until this analysis is completed. However, we expect that the funding reductions could increase the total project cost of the currently validated baseline for the MOX facility, delay the facility construction and operations schedule, and ultimately, delay our goal of eliminating plutonium that has been declared excess to U.S. defense needs.

Question. Last year, as part of the Energy and Water bill, Congress directed the Department to make investments in our national labs instead of pursuing a brand new consolidated fuel technology center. The labs support a wide variety of nuclear research ranging from nuclear weapons to medical isotopes, but the infrastructure at these facilities are aging and require new investments to sustain the scientific capability. Do you agree that we need to continue to invest in our scientific infrastructure and how does the fiscal year 2009 budget request support this goal?

Answer. The Department of Energy (DOE) strongly believes that investment in our scientific infrastructure is critical to successful accomplishment of our mission. The fiscal year 2009 budget supports this goal, and DOE will continue to support and maintain our facilities and equipment so that research and development (R&D) of nuclear energy technology can be conducted with the best available laboratory assets.

DOE is actively reviewing existing facilities to determine how they can be used in the near term to develop and demonstrate the technologies we envision for the Global Nuclear Energy Partnership (GNEP) such as advanced fuel separations, transmutation fuel fabrication, improved waste forms, and integrated safeguards. Potential new GNEP facilities are being evaluated to inform policy decisions and understand the environmental impacts associated with them. It is important to have facilities that can perform integrated testing at an engineering scale to enable the United States to become a leader in advanced fuel cycle R&D.

The fiscal year 2009 budget request supports funding for establishment of the Materials Test Station (MTS) at the Los Alamos Neutron Science Center (LANSCE). This work, conducted in parallel with NNSA's LANSCE-Refurbishment, will establish an advanced-fast-reactor-fuel test capability in a currently unused target station at LANSCE. The budget request also supports infrastructure investment at the Idaho National Laboratory, DOE's lead laboratory for nuclear energy R&D. It also supports the continuation of an effort initiated this year to characterize the full compliment of nuclear facilities and capabilities that will provide data to inform future decision making. One goal of this effort is to help assure needed nuclear facilities are maintained without regard for their location or ownership. This is an ambitious undertaking, but I feel it is critically important to understand our infrastructure requirements and to target future investments according to a well-researched plan.

Question. NRC Licensing of New Nuclear Plants.—It seems to me that the most successful NE program has been the NP 2010 program, which is a joint DOE/Industry cost share program to design and prepare a standard license for NRC review. It occurs to me that many of the new facilities being supported by DOE research

such as the Next Generation Nuclear Power Plant and the spent fuel recycling facilities must at some point address the NRC licensing requirements and safety standards. What is your office doing to respond to the inevitable NRC licensing requirements for these facilities?

Answer. The Energy Policy Act of 2005 (EPAct), requires the Secretary of Energy and the Chairman of the U.S. Nuclear Regulatory Commission (NRC) to jointly submit to Congress a licensing strategy for the Next Generation Nuclear Plant (NGNP), by August 8, 2008. EPAct also directs the U.S. Department of Energy (DOE) to develop the NGNP prototype for commercialization and directs NRC to license the prototype. DOE and NRC staff have worked closely together to jointly develop a comprehensive strategy for licensing the NGNP. This report was completed and submitted on August 13, 2008. This strategy identifies NRC policies considerations, procedures, analytical tools, and methods expected to be needed to establish a gas reactor safety review infrastructure.

DOE envisions that spent fuel recycling facilities will be designed, constructed, and operated by commercial entities under NRC regulation. In July 2007, DOE established a Memorandum of Understanding (MOU) with NRC that provides for increased cooperation between DOE and NRC to allow NRC staff to become more educated on technologies and engineering aspects of potential nuclear fuel recycling facilities. NRC is participating in meetings, observing testing, touring DOE facilities, and reviewing industry deliverables provided to DOE. NRC staff members are considering regulatory framework issues associated with licensing and regulating a nuclear fuel recycling facility.

Question. Later today, the Energy Committee will receive testimony on the status of the domestic nuclear fuel cycle and how various trade agreements and the "Eurodif" decision will impact the our domestic energy security. (I am sure you are fully aware that the United States is over 80 percent dependent on foreign uranium enrichment today.) Do you have any concerns about the viability of a domestic mining, enrichment and conversion industry to keep pace with expected growth in nuclear plants?

Answer. The Department of Energy (DOE) agrees that the United States is very dependent on foreign sources of uranium, conversion, and enrichment to meet its domestic nuclear fuel needs. Over the past several years, DOE has observed encouraging signs that higher prices for uranium have spurred interest in domestic uranium exploration which will lead to increased uranium production, that the U.S. conversion industry is increasing its annual output, and that the United States will increase its domestic uranium enrichment capacity. Louisiana Energy Services and USEC Inc. have received licenses from the Nuclear Regulatory Commission to build and operate new enrichment plants in the United States. AREVA NC and GE Hitachi have also announced plans to build new enrichment plants in the United States. The Department is working with these private enrichers by assisting these companies in complying with U.S. laws and regulations regarding the protection of proliferation-sensitive enrichment technology. Additionally, the fiscal year 2008 appropriations legislation authorizes DOE to issue up to $2 billion in loan guarantees for advanced nuclear facilities for the "front-end" of the nuclear fuel cycle.

Question. Based on the trade history of the Russian Government do you have any concerns regarding the ability of U.S. nuclear fuel industry to be competitive with their Russian counterparts?

Answer. The U.S. enrichment industry is in a transitional phase and is beginning to plan and construct newer, more efficient enrichment plants. The Department of Energy (DOE) is concerned that unlimited sales of foreign enrichment at less than fair value prices in the United States could pose a threat to the viability of plans for constructing and expanding modern enrichment technologies in the United States. DOE is currently working with other U.S. departments and agencies on a number of options to address this issue.

On December 21, 2007, DOE, the Departments of State, Commerce, and Defense jointly sent a letter to Senators McConnell and Bunning and Representative Whitfield expressing the administration's views regarding H.R. 4929 and a companion bill S. 2531 that would amend the Tariff Act of 1930 to make clear that all imports of low enriched uranium (LEU) are subject to coverage under the antidumping law without regard to the nature of the transactions pursuant to which LEU is imported.

Question. USEC recently announced that the cost of the American Centrifuge Plant is going to increase from $2 billion to $3.5 billion. This plant is being counted on to replace the existing gaseous diffusion plant and provide a much needed source of domestic uranium enrichment. This technology was provided to USEC by the U.S. Government at no cost. Can you tell me what the state of this project is and whether or not you believe this facility will be commercially viable?

Answer. While the Department of Energy (DOE) granted USEC, Inc. (USEC) a nonexclusive patent license to DOE-developed centrifuge technology at no initial cost in 2006, the license contains substantial royalty payments once commercialization at USEC's American Centrifuge Plant (ACP) is at a certain level, with royalty payments capped at $100 million. It should be noted that the cost of developing and deploying centrifuge technology and constructing the ACP is being borne by USEC, and not the Federal Government. The Government provided access to USEC to the existing centrifuge facilities at Portsmouth for the purpose of deployment of advanced enrichment technology in a commercial plant under a lease amendment, executed in 2006. USEC has spent an estimated $540 million of its own funds to advance the centrifuge technology, a highly classified technology the Government still owns. In the next year, USEC plans to spend an additional $1 billion on research, deployment, and construction of the ACP. These funds have in part been used to support research into centrifuge technology by the Oak Ridge National Laboratory (ORNL) and to upgrade and modernize DOE-owned centrifuge facilities at the former Gaseous Diffusion Plants (GDPs) in Portsmouth, Ohio, and Oak Ridge, Tennessee under a Cooperative Research and Develop Agreement (CRADA) executed in 2002. Under the CRADA, USEC retains rights to inventions USEC makes during the work; however, the Government retains a license for Government use and a right to negotiate for commercial rights. Any inventions made by ORNL employees under the CRADA work are owned by DOE.

Retaining the domestic capability to enrich uranium is vital to the Nation's energy security and national security. USEC has demonstrated in a lead test cascade that the American Centrifuge is capable of producing the level of enrichment required by its customers and has increased machine performance beyond initial objectives. These developments suggest that USEC has advanced the American Centrifuge sufficiently to build and operate a commercially viable full-scale enrichment production facility. DOE's Office of Nuclear Energy continues to closely monitor the progress of development and deployment of the American Centrifuge and to assure that the Department's rights and options are protected.

Question. What will happen to this Government technology if USEC fails to commercialize the project technology?

Answer. A number of actions are possible. As noted above, the technology license is nonexclusive. If USEC fails to commercialize the technology, the technology will remain available for license to another entity by DOE. Additionally, under the 2006 lease of the gas centrifuge facilities at Portsmouth with DOE, the lease can be terminated and rights to USEC's background technology and new technology can be assumed by the Government should certain commercialization failures occur. Similar provisions regarding the assumption of technology are contained in a DOE–USEC 2002 Memorandum of Understanding.

Question. Your office has been working on a strategy to sell excess uranium inventories, the largest amount of material contained in the depleted uranium tails still stored at Paducah and Portsmouth enrichment facilities. I understand that the plan will propose to sell up to 10 percent of total annual market to avoid undermining the market prices. When will this plan be available for review and what does the Department propose to do with the proceeds of these sales?

Answer. The Secretary of Energy recently released a Policy Statement on the Management of the Department of Energy's (DOE) Excess Uranium Inventory. This statement provides the framework within which DOE will make decisions concerning future use and disposition of its inventory. During the coming year, DOE will continue its ongoing program for down-blending excess highly enriched uranium into low enriched uranium (LEU), evaluate the benefits of enriching a portion of its excess natural uranium into LEU, and complete an analysis on enriching and/or selling some of its excess depleted uranium. Specific transactions are expected to flow from these analyses.

As stated in the Policy Statement on Management of the Department's Excess Uranium Inventory, in the absence of otherwise applicable statutory authority, the Department currently may not retain any money it receives from the sale of uranium and use that money for Departmental programs, but rather must treat any such proceeds as receipts subject to the Miscellaneous Receipts Act.

Question. Mr. Spurgeon, your budget proposes to spend $20 million this year and $100 million over the next 5 years to develop "grid appropriate reactors". It is my understanding that these small reactors are intended to be sent to countries with "limited nuclear experience" (fiscal year 2009 budget justification). Everything I have learned about nuclear power over my 36 years in the Senate is that economies of scale are critical to making these zero-emission facilities economic. Before the Department commits $100 million of taxpayer resources, I would be very interested in your explanation of the business case for this project.

Answer. Economy of scale (EOS) is an important factor when optimizing the cost of electricity from any power source, but it is not the only factor to consider in a decision to deploy nuclear power. More than half of the developing countries interested in pursuing nuclear power have physical and/or financial constraints that preclude them from considering large plants. Factors such as grid capacity and stability, availability of investment capital, and concerns for total project risk will likely limit these countries to consider plants with electrical capacities less than 500–600 MW and total construction cost less than $1 billion. Because the cost of power from alternative energy sources in many of these countries is 5–10 times higher than for the United States, the modest EOS penalty on the cost of electricity from a smaller-sized nuclear power plant is of less concern than the total project cost.

Detailed analyses by the IAEA have shown that the EOS penalty can be reduced (by about 85–90 percent from a large reactor) by several other factors associated with smaller plants, including: common systems shared among a group of reactors; more rapid "learning" during fabrication; phased construction of multiple small units, allowing revenues from initial plants to offset capital outlays of follow-on plants; reduced interest costs due to shorter construction times and lower capital outlays; economic efficiencies gained by better matching of the energy supply and demand rates; and simplifications in the plant design enabled by their smaller size. Given all these factors, it is likely a small reactor will be extremely competitive with other energy forms in the local economy of a developing country.

The introduction of nuclear energy brings other benefits that favor its introduction even if economics favor a less expensive alternative. The need to be technically competent to safely regulate and operate nuclear technology requires a significant amount of infrastructure development that will enable significant spin-off benefits. For example, once a competent nuclear regulator and radiation protections are in place, the country can pursue nuclear medicine. Once nuclear certified welders, electricians and mechanics are available, they can also fill other skilled occupations. Engineering and science based academic curricula will produce technical talent for other sectors in the economy. In short, introduction of nuclear energy will act as a fulcrum to raise the technological competence of an entire nation, with substantial benefits. For example, the Republic of Korea's first reactor was purchased as a turnkey project from Westinghouse. An element of the deal was training the welders to perform portions of the construction. After completion of the reactor these highly-trained, skilled welders became available to expand ROK's shipbuilding industry, which is now a world leader.

Question. On Saturday, the Washington Post reported that the United States and Russia have initialed but not signed a "123 Agreement" on nuclear cooperation. However, without final signatures and Senate approval, there are limits on our ability too cooperate with Russia on civilian nuclear research and trade. Can you explain how this will impact your GNEP program?

Answer. Work with Russia under the Global Nuclear Energy Partnership (GNEP) has not been impacted by the lack of a 123 Agreement with Russia. We continue to interface with Russia on issues concerning GNEP. However, without a 123 Agreement, GNEP research and development (R&D) collaboration with Russia will be delayed. This will limit our access to Russia's experience and facilities, both of which could reduce the cost and time to develop the technologies required to close the fuel cycle. GNEP could develop the technologies without the assistance of Russia or other international partners, but the time, effort, and cost will be greater.

Integration of foreign experience into the U.S. advanced fuel cycle R&D program significantly declined in the 1980s and 1990s, which accelerated our loss of expertise and nuclear infrastructure. The United States now lacks many of the facilities needed for GNEP. We have no commercial-scale separations plant, no engineering-scale separations or transmutation fuel fabrication capability, no operating sodium fast reactor, etc. Meanwhile, Russia, France, Japan, and others have made significant progress in developing technology and related infrastructure. Collaboration with GNEP R&D partners is necessary, at least until the United States has rebuilt the required domestic infrastructure. Collaboration with Russia will give the United States access to a significant number of research laboratories that have relevant expertise. During the last 9 years, we gained significant access to Russian experts and facilities, allowing us to rebuild our capabilities by integrating their most recent results.

Question. Will the lack of an agreement limit U.S. commercial entities from selling natural uranium or fuel services to Russia?

Answer. Section 123 Agreements for Cooperation act in conjunction with other nonproliferation tools, particularly the Non-Proliferation Treaty, to establish the legal framework for significant nuclear cooperation with other countries. While the lack of such an agreement will prevent the United States from exporting natural

uranium to Russia, a wide range of cooperative activities with Russia may still go forward. The United States and Russia drafted a report, entitled Joint Working Group on the Development of a Bilateral Action Plan to Enhance Global and Bilateral Nuclear Energy Cooperation that details principal areas of cooperation as well as short-term cooperative focus areas. The report establishes measures that will promote sustainable and safe nuclear energy use and expansion, in the United States, Russian Federation, and worldwide while strengthening nuclear nonproliferation and effectively addressing waste management. Specifically, it outlines national strategies in nuclear power; identifies the common bases for U.S.-Russian cooperation in advanced reactors, exportable small and medium reactors, nuclear fuel cycle technologies, and nonproliferation; and defines a plan for cooperation.

Question. In the fiscal year 2006 Energy and Water bill, Congress provided $20 million and directed the Department to work with interested communities to support site development plans for a recycling plant, advanced fuel fabrication facility and an advanced reactor. What is the status of this effort and what is the Department doing to support these sites and provide technical support? What is the status of the Programmatic Environmental Impact Statement? What are the next steps for these communities?

Answer. The Site Characterization Reports conducted by 11 commercial and public consortia are the product of the $10,458,242 in grant awards made on January 30, 2007. Recipients had 90-days to complete these studies and submitted the reports to DOE on May 1, 2007. Information generated from these reports, coupled with existing site information, provide a variety of data relating to both DOE and non-DOE sites, including: site and nearby land uses; demographics; ecological and habitat assessment; threatened or endangered species; historical, archaeological and cultural resources; geology and seismology; weather and climate; and regulatory and permitting requirements. The Site Characterization Reports were made available to the public, and reviewed by DOE as part of the National Environmental Policy Act (NEPA) process and used in preparing the draft Programmatic Environmental Impact Statement (PEIS). DOE met with the associated communities last fall to identify key community issues related to GNEP that included the need to educate the public about the program.

The Department received more than 14,000 comment documents during the scoping period for the GNEP PEIS. Evaluation of these comments resulted in consideration of several alternative nuclear fuel cycles and technologies.

DOE is working to clarify the impact of GNEP technical and policy decisions on the local communities. Communications with potentially affected communities will continue throughout the NEPA process.

Question. The Department has significantly increased its support for this program. While the two reference reactor designs continue to develop better fidelity in the project details, costs continue to increase and reactor vendors are now concerned that the original agreement to cost share $1.1 billion will not be sufficient to provide the total cost for the Standard Design. What are the Department's plans to address the potential shortfall?

Answer. The fiscal year 2009 congressional budget request is based on an increase in the licensing demonstration project from an initial total estimate of $1.1 billion to $1.45 billion ($727 million in Federal cost share). This increase is required to address increases in regulatory related costs and design standardization costs.

The Department of Energy's (DOE) cost share primarily supports the development and implementation of the "untested" regulatory process for the combined Construction and Operating License (COL) applications for two new nuclear plants. Since the 2005 Baseline estimates were prepared, Nuclear Power 2010 (NP 2010) has evolved from a "demonstration" program to become the centerpiece of two Design Centered Working Groups (DCWG) on which COL applications for 10 or more plants (most are twin units) depend for success. It also supports the completion of the first-of-a-kind engineering for two reactor designs. The designs must have sufficient engineering design details to provide power companies reliable cost and schedule information they need to make plant orders. A number of the utilities participating in NP 2010 also need this information to support regulatory approvals at the State level via their Public Utility Commissions (PUC).

Additional funding related to increases in regulatory-related costs primarily supports the evolving Nuclear Regulatory Commission (NRC) licensing process (significant revisions to NRC rules/requirements, responses to NRC requests for information, etc.) and escalating NRC review fees. Additional funding related to increased standardization supports the industry's effort to extend the level of design detail required for increased standardization for procurement, operation, and maintenance of the plants. This level of design detail would provide specifications of equipment and components. DOE believes this degree of standardization is critical to ensuring

the past inefficiencies of our existing commercial nuclear fleet are not repeated. Without additional funding, there is a high risk that the aggressive operational dates (approximately 2015) for the first units of the two standard designs may not be met.

QUESTIONS SUBMITTED TO HON. KEVIN M. KOLEVAR

QUESTION SUBMITTED BY SENATOR BYRON L. DORGAN

Question. I am pleased that the President has proposed to double the Energy Storage and Power Electronics account in your budget. It still seems to me that this number ($13.4 million) is far too low to adequately address our needs to develop commercial scale energy storage capabilities which are critical to placing renewable energy onto the grid. Do you believe that $13 million is enough to allow you to accomplish what needs to be done in this area? What other technical challenges would your office focus on with additional funding, and how would these technologies facilitate integration of renewable energy onto the grid?

Answer. The President's budget request of $13.4 million for the Office of Electricity Delivery and Energy Reliability adequately funds Energy Storage and Power Electronics to further storage technology as an important component of the modern electrical grid. The request focuses on critical areas of concern. The fiscal year 2009 Congressional request will continue to demonstrate utility scale storage technologies (cost-shared, pre-commercial projects) and initiate a partnership with the Office of Science specifically investigating the use of nano-materials for advanced storage electrodes and new high voltage electrolytes.

Additional technical challenges include developing new storage technologies with improved cost effectiveness, safety, and reliability. Applied research would include new engineered materials and ionic liquids to increase energy density of storage systems. Additional systems research would focus on scaling up existing technologies into megawatt devices suitable for grid applications. Energy storage systems will advance the penetration of renewables by helping to eliminate integration concerns such as short term variations and ramping problems, and allow energy management by dispatching renewable energy.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Question. Part of DOE's mission is to promote America's energy security through reliable, clean and affordable energy. I understand that EPA plans to propose a revised rule before the end of the year governing cooling water intake structures at existing power plants as a result of a recent 2nd Circuit Court decision. The central question before the agency is what should be deemed the best technology available (BTA) to minimize the adverse environmental impacts that might result from cooling water intake structures. The Court has directed the agency to clarify why cooling towers or their performance equivalent, were not deemed BTA. I understand that approximately 40 percent of the Nation's existing generation will be directly and materially affected by this rulemaking. Has DOE examined the short and long term energy reliability and security impacts of designating cooling towers as BTA for existing generation facilities and does DOE believe they would be significant?

Answer. The Department has not prepared a study on the specific issue of electricity reliability impacts of a cooling tower mandate, but has studied the energy penalties that would occur if existing steam generators were required to replace existing "once-through" cooling systems with recirculating cooling tower systems. This October 2002 report is titled the Energy Penalty Analysis of Possible Cooling Water Intake Structure Requirements on Existing Coal-Fired Power Plants (see attached). The Department agrees that a new Clean Water Act rule requiring cooling towers for existing steam generation units could have implications on the adequacy and reliability of electricity supplies in the near and mid-term. Moreover, the effect of such a rule could be significant if combined with other retrofit mandates that may be required of existing generators under, for example, the Clean Air Act. The Department participated in an interagency review of EPA's original rule under E.O. 12866 and will do so again when the new rule is submitted to the Office of Management and Budget for review.

Question. Could DOE do an analysis of the potential impacts for this committee, including the impacts on electricity reliability on a regional basis, and provide preliminary results as early as May so that these results could be meaningfully considered in the EPA rulemaking?

Answer. DOE will prepare an expedited analysis of the potential impacts of a "cooling tower" rule on electricity supply and reliability in order to provide the committee with preliminary results. In addition, the Office of Electricity Delivery and Energy Reliability will conduct a more thorough analysis of the issues facing the existing steam generation fleet, with a goal of completing that study in the fall of this year. We have asked EPA and the Federal Energy Regulatory Commission to cooperate with the Department on these studies, particularly with respect to the electricity reliability analysis.

QUESTIONS SUBMITTED TO JAMES SLUTZ

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

Question. We see news around the country about proposed coal-fueled power plants being canceled or postponed almost every week due to rising construction costs, the uncertainty of future regulations on carbon emissions, and much more. The Office of Fossil Energy has a longstanding relationship of working with industry in the various clean coal programs. The next round for the Clean Coal Power Initiative (CCPI) is slated to focus on carbon capture and storage and other beneficial uses of CO_2. What do you propose to do to get new coal plants built so we can continue to utilize our abundant domestic coal resources?

Answer. The Department of Energy's Clean Coal efforts begin with Research and Development (R&D) to advance technologies serving as building blocks for affordable, near-zero atmospheric emissions coal plants. These technologies, such as advanced turbines, gasifiers, fuel cells, and carbon capture and storage technologies are then integrated and demonstrated at commercial scale through the Clean Coal Power Initiative (CCPI). In parallel to CCPI, large volume carbon sequestration tests will demonstrate the technical viability of geologic CO_2 injection at commercial scale. FutureGen is restructured to focus on accelerating the commercial experience with the integration of carbon capture into advanced plants including Integrated Gasification Combined Cycle (IGCC). These early commercial demonstrations will help accelerate deployment of carbon capture and storage by addressing technical, siting, permitting and regulatory issues. Loan Guarantees and Tax Credits may help accelerate commercial deployment of advanced technologies through financial incentives and mitigation of some risk.

Question. When will the Department release the CCPI Round III Solicitation? Is the redirection of the FutureGen program hindering the release?

Answer. The CCPI Round III Draft Funding Opportunity Announcement (FOA) was released on October 3, 2007. The redirection of the FutureGen program did not hinder its release. A Public Workshop was held on November 1, 2007, to answer questions and receive public input on the Draft FOA. The public comment period was held open until November 23, 2007. The Department is currently revising the FOA based on public input to ensure that it is best suited to meet the needs of both the public and the Department. The Department is planning to release the Announcement this fiscal year, with project selections taking place in fiscal year 2009.

Question. How much does the Department believe will be available for this next solicitation?

Answer. The Department currently expects to have $224 million available for CCPI Round III, which includes an anticipated $85 million in fiscal year 2009 funding.

Question. In the Clean Coal Power Initiative Rounds I and II, in 2003 and 2004 respectively, the Department made more than $300 million available. Is the Department still planning to go ahead even though this $300 million threshold may not be met?

Answer. Yes, the Department plans to issue the CCPI Round III in fiscal year 2008. The Department has received a significant amount of interest from industry in CCPI Round III. Over 80 participants from industry attended the CCPI Round III Public Workshop, and they identified numerous projects that will be seeking to participate in CCPI Round III. The Department believes that meaningful projects can be selected. Delays of an additional 6 to 9 months would be required to wait for fiscal year 2010 funds to become available.

Question. Why is the Department planning on combining the funding for the CCPI and FutureGen programs (as indicated in the fiscal year 2009 budget request) and how does the Department propose to go forward with both?

Answer. In the fiscal year 2009 budget request, funding for the CCPI and FutureGen programs has been requested as separate line items. The Department plans to move forward with both CCPI and FutureGen by issuing a separate Fund-

ing Opportunity Announcement (FOA) for each program. Each FOA will outline the specific requirements of each program, allowing potential applicants to determine which program is the best fit for their technology and business model.

Question. The carbon sequestration program has grown significantly in the last few years and the regional partnership program has been well received by many stakeholders. Four of the seven Regional Carbon Sequestration Partnerships have been funded to conduct large-scale demonstrations. The Departments budget request for fiscal year 2009 is $149 million. Does the Department plan to fund remaining three partnerships with this funding in the coming year? If not, why not?

Answer. DOE has made awards for five large-scale tests to four of the Regional Carbon Sequestration Partnerships (RCSP) for Phase III Large Volume Sequestration Testing. DOE is developing a peer-reviewed plan to be completed this spring that will identify the scientific and engineering test parameters to guide design and selection of large-scale tests. Items to be addressed include: rate of injection, duration of injection, and number and phasing of tests. The remaining proposed Phase III projects will be evaluated in the context of this plan. The evaluation process requires: (1) finalizing the technical scope of the projects by means of an independent study by an international group of experts; (2) undertaking a scientific evaluation; and (3) performing a cost analysis of the proposed projects to ensure the project costs are adequate prior to award. The estimated time frame for evaluating the remaining awards is the summer of fiscal year 2008.

Question. Are these funds sufficient enough to conduct the large scale carbon sequestration demonstrations in every region of this country to insure carbon sequestration is a valid option from coal-fired power plants and other facilities?

Answer. There are sufficient funds in the fiscal year 2009 budget request to conduct the pre-injection activities and initiate some preliminary injection activities for the large scale carbon storage demonstrations. These demonstrations will require funding beyond fiscal year 2009 for remaining CO_2 injection and post-injection monitoring activities.

Question. The administration has asked Congress for funding in fiscal year 2009 to expand the SPR to the 1.5 billion level. This will require a national commitment through 2029 to get to that level under the Bush administration's plan. Has the Department done an estimate of how much it would cost to construct the facilities and fill oil to the 1.5 billion barrel level?

Answer. The Department has not finalized its expansion plan, nor selected the sites for the expansion of the SPR from 1.0 billion to 1.5 billion barrels. DOE has requested $13.5 million in fiscal year 2009 to prepare its expansion plans and complete a NEPA environmental review. However, assuming the development of 2 additional new salt dome storage sites of 250 million barrels in the gulf coast, the total estimated construction cost for the expansion of the SPR from 1.0 billion to 1.5 billion barrels, is estimated in the order of $6.5 billion.

Question. What is the cost of developing the Richton, MS site and expanding the Bayou Choctaw, LA and Bill Hill, TX sites to reach the 1 billion barrel level?

Answer. The total estimated construction cost for the expansion of the SPR from its current capacity of 727 million barrels to 1 billion barrels, is estimated at $5.1 billion. This is based on conceptual design estimates which were prepared in 2006.

Question. How does the administration respond to its policy efforts to put the SPR fill on autopilot without consideration of cost and at the same time? Are there not better ways that we can invest our resources this year? Over time?

Answer. It is the policy of this administration to expand and fill the Strategic Petroleum Reserves in a manner that is both consistent and deliberate in order to maximize the energy security of the United States. The costs associated with this endeavor are important and they are carefully considered at every step.

Question. I have also noted that there is approximately $585 million in the SPR account from the sale of oil after Hurricane Katrina. Does the Department plan to issue more RIK contracts later this year or seek to directly purchase oil for the SPR with this $585 million regardless of the price of oil or offers made in a solicitation for direct purchase?

Answer. The fiscal year 2009 budget states "In fiscal year 2008 DOE will use available balances for the purchase of additional SPR oil, and will continue to fill using Federal royalty oil until 727 MMB is achieved in fiscal year 2009." The administration's objective is to complete the fill of the SPR to 727 million barrels before the end of calendar year 2008 by using the $584 million in available balances from the Hurricane Katrina oil sale for direct purchases and continuing the modest transfer of royalty oil from the Department of the Interior.

The Strategic Petroleum Reserve has undertaken a market analysis in accordance with the Procedures for the Acquisition of Petroleum for the Strategic Petroleum Re-

serve (10 CFR 626) to assure that the planned oil acquisition will not stress the market.

Question. The Energy Policy Act of 2005 provides guidance to expand the Strategic Petroleum Reserve (SPR) to the level of 1 billion barrels but only "without incurring excessive cost or appreciably affecting the price of petroleum products to consumers." The Department has said it conducts market analysis the impacts of filling the SPR and the price of petroleum and did so before the recent RIK contracts. Can you provide more detail about how the Department performs this analysis? Was the analysis peer-reviewed by the EIA, other agencies or independent experts? Is the analysis available to the public?

Answer. Prior to engaging in activities to acquire crude oil for the Strategic Petroleum Reserve, the Office of Petroleum Reserves conducts an assessment of market conditions to evaluate the potential for impacts on crude oil markets. A number of market indicators are examined in these assessments including stock levels, spot and futures prices, market fundaments, and energy security policy. The most recent market assessment was conducted in February 2008 and is currently being reviewed by Department officials and was informally peer reviewed by staff at the Energy Information Administration. However, EIA was not asked to comment on or evaluate the policy recommendations contained within the document. These assessments are not published on the internet, but they have been transmitted to the Congress.

Question. Does the Department believe there is a price threshold for not continuing the RIK transfer?

Answer. It is difficult to assign such a threshold without consider other contemporaneous market conditions. However, in the past the Department of Energy has suspended or delayed its fill activities in response to major petroleum market events and would do so again should the need arise. When acquiring petroleum, whether by purchase or royalty transfer, DOE will seek to balance the objectives of assuring adequate security and minimizing impact to the petroleum market. To this end, DOE will consider various factors that may be affecting market fundamentals and the geopolitical climate. DOE decisions on crude oil acquisition will take into consideration the current level of inventories, import dependency, the international and domestic production levels, oil acquisition by other stockpiling entities, the security value of additional storage, incipient disruptions of supply or refining capability, market volatility, the demand and supply elasticity, petroleum logistics, and any other considerations that may be pertinent. Monetary policy, the rate of economic growth, specific domestic market segments, and foreign policy considerations will also be evaluated. The timing of DOE entry into the market, its sustained presence, and the quantities sought will all be sensitive to these factors and their impact on U.S. energy security.

Question. Secretary Bodman stated to me and other Senators in a letter dated Jan. 8, 2008, that one of the reasons to increase the capacity of the SPR is that it only contains 57 days of import protection. However, Department's own website said that the United States has 118 days of public and private strategic stocks for import protection. The requirement to meet U.S. treaty obligations with the International Energy Agency (IEA) is for 90 days of import protection. Why is the Department telling U.S. policy makers that we need to fill the SPR for import protection and telling the international community that we are currently meeting our treaty obligations for import protection?

Answer. Under the Agreement on an International Energy Program (the Charter of the IEA), member countries are permitted to meet their required 90 day stockholding obligations through both public and private stocks. The United States currently relies on U.S. industry stocks to make up a significant portion (one-third) of its obligation.

Question. The fiscal year 2009 budget once again proposes to eliminate all oil and natural gas R&D programs. Ninety-four percent of this funding goes to small, independent producers that do not sufficient funding to conduct R&D of their own. The fiscal year 2009 budget request also proposes to eliminate $50 million in direct spending for ultra-deepwater offshore and unconventional onshore natural gas exploration technologies that would go largely to smaller independent oil and gas producers.

Small, independent, domestic producers and universities are the primary beneficiaries of Federal oil and gas R&D funding. Contrary to the administration's views, "Big Oil" does not have an interest in these programs. I am particularly concerned about the impacts of the cuts on the education of our next generation of energy professionals. Why is this administration being so shortsighted by decreasing funding to programs that are so vital to the Nation's future energy security and domestic energy production?

Answer. Oil and gas are mature industries and both have every incentive, particularly at today's prices, to enhance production and continue research and development of technologies on their own. There is no need for taxpayers to subsidize oil companies in these efforts. Although independent operators may not have the resources to fund technology development directly, the service industry that supplies them with equipment funds significant development of applicable technologies. The Department expects the service industry to continue to provide technological innovations for use by major and independent producers.

Question. Why is the administration turning its back on potential long-range solutions to declining domestic gas production?

Answer. DOE is supportive of efforts to increase the availability of domestic sources of natural gas. DOE supports the prompt construction of an Alaska natural gas transportation system to deliver gas from the North Slope of Alaska to the lower-48 States. Alaska's North Slope gas resources are estimated at 35 trillion cubic feet (TCF) discovered and 100 TCF potential. Industry has estimated the cost at more than $25 billion to build a 4.5 billion cubic feet per day (bcfd) pipeline with expansion capacity to 5.6 bcfd. To support such a project, the Department is authorized under section 116 of the Alaska Natural Gas Pipeline Act (ANGPA) to issue loan guarantees up to $18 billion, indexed for inflation according to the Consumer Price Index from October 13, 2004, to a qualified infrastructure project or, in the case of a qualified liquefied natural gas project, up to $2 billion of principal.

Question. A significant research project within the Natural Gas program is Methane Hydrates. If only 1 percent can be rendered economic, it would double the Nation's supply of natural gas. Why would the Department turn its back on this huge potential resource?

Answer. The administration does not support spending Department of Energy funds for research and development (R&D) on safety or production of methane hydrates, given the economic incentives industry has to pursue this R&D on its own. This is consistent with its position that oil and gas are mature industries and both have every incentive, particularly at today's prices, to enhance production and continue research and development of technologies on their own. There is no need for taxpayers to subsidize oil and gas companies in these efforts. However, several other Government agencies are supporting methane hydrate research where it fits their missions, including the U.S. Geological Survey (USGS), the Bureau of Land Management (BLM), and Minerals Management Service (MMS) within the Department of the Interior; the National Oceanic and Atmospheric Administration (NOAA); the National Science Foundation; and the Naval Research Laboratory.

Question. In the fiscal year 2008 Omnibus legislation, Congress requested that the Department begin the development of coal/biomass to liquids technologies with funding in the Fuels subaccount. Why is the Department's Coal Fuels request only focused on hydrogen from fossil fuels?

Answer. The Fossil Energy Coal Fuels Research Development and Demonstration (RD&D) Program was identified as a participant in the Hydrogen Fuel Initiative at the beginning of the Department's Hydrogen Program. Therefore, the focus on hydrogen from coal is the principal activity proposed in the Coal Fuels Program for fiscal year 2009, as the Coal-to-Liquid Fuels Technology Program had successfully achieved its RD&D goals for turning synthesis gas into liquid fuels, and these technologies can be commercialized by the private sector. The fiscal year 2009 budget includes development of technology for co-feeding and gasifying coal/biomass for electricity generation application. As with much of DOE's gasification program, DOE's fiscal year 2009 coal/biomass research targets electricity generation applications, but could also be used by the private sector for other applications, such as production of transportation fuels.

Question. Why does the Department not support this coal-biomass technology opportunity?

Answer. Consistent with the fiscal year 2008 appropriated funding, the Department has prepared, and will soon release, a Coal and Biomass to Liquid Fuels Funding Opportunity Announcement. This announcement will request applications for research and development proposals specifically limited to liquid hydrocarbon fuels from coal/biomass mixtures.

Coal-biomass to liquids technology involves two major steps: First, the coal-biomass feedstock must be turned into a synthesis gas. Second, the synthesis gas must be turned into liquid fuel. The first step, gasification of coal-biomass, is not mature and therefore continues to receive funding in the fiscal year 2009 budget. As with much of DOE's gasification program, DOE's fiscal year 2009 coal/biomass research targets electricity generation applications, but could also be used by the private sector for other applications, such as production of transportation fuels. The second step, turning synthesis gas into liquid fuel is mature and therefore is not supported

in the fiscal year 2009 budget. The Coal-to-Liquid Fuels Technology Program had successfully achieved its RD&D goals for turning synthesis gas into liquid fuels, and these technologies can be commercialized by the private sector.

Question. Congress also directed that the Department address energy/water technology issues in the fiscal year 2008 Omnibus legislation. This includes a research program to help develop tools that thermoelectric power plants can apply to better manage the critical link between water and fossil energy extraction and utilization is vital. The Department only supported CO_2 capture at existing facilities in its fiscal year 2009 budget request for the Innovations for Existing Plants program. Why does the Department not support the availability of funding for technologies to reduce water usage and consumption, while minimizing impacts on water quality?

Answer. Many of the technologies for reducing water use are mature and subject to incremental improvement that the private sector has the incentives and capability to undertake on its own. Improved water associated with transformational technologies is supported in the fiscal year 2009 budget request. Integrated Gasification Combined Cycle (IGCC) technology supported by the Gasification program uses significantly less water than the conventional Pulverized Coal (PC) technology. The focus of the Innovations for Existing Plants Program (IEP), will be on the continued research and development of advanced carbon capture technologies applicable to new and existing coal-fired power plants. The IEP program will develop technologies to separate and permanently store CO_2 that can be economically and effectively employed on pulverized coal power plants. As noted in the fiscal year 2009 budget request, the Department will also conduct research on optimizing power plant water use as it relates to CO_2 capture efficiency and optimization.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Question. As I noted in my opening statement, the Department has shifted its strategy from a single 275 Megawatt facility toward multiple commercial demonstrations of carbon capture and sequestration applied to an IGCC facility. I am concerned that this strategy will take years to develop before we have any serious results from these demonstration efforts. What is the Department doing to accelerate this important research and what other near term efforts is the Department undertaking to support carbon capture and sequestration research?

Answer. Our commitments to the program goals of FutureGen are unchanged—to make near-zero atmospheric emission coal power plants a viable technology solution to address energy security and climate change concerns.

The Department is refocusing its investment on multiple, commercial demonstrations of Carbon Capture and Storage (CCS) technology integrated with Integrated Gasification Combined Cycle (IGCC) systems or other advanced technology coal power plants. The difference is that under the restructured program, our plan, with current cost estimates, is to support not just a single less-than-commercial-scale R&D testing laboratory, but rather to provide funding for commercial demonstration of integrated advanced carbon capture and storage technologies.

The restructured FutureGen will provide commercial data on cost, performance, and reliability. This information will help reduce risk of siting/permitting and operations for subsequent deployment, confirm economics associated with CCS, and facilitate industry-wide private capital offerings. It is expected that these commercial projects will be in operation in the next 6 to 8 years or possibly sooner depending on the sites selected.

The Department's fiscal year 2009 budget request proposes substantial increases for FutureGen, Clean Coal Power Initiative (CCPI) demonstration of CCS, and Carbon Sequestration. We have also increased overall R&D in the area of carbon capture and storage. For example, the fiscal year 2009 Sequestration Program budget was increased to $149 million with the bulk of this funding being used to support the field test program through the Carbon Sequestration Regional Partnerships—including five large-scale (Phase III) demonstrations of the feasibility of storing CO_2 in geological formations. The results of this research will be directly applicable to the capture and storage of CO_2 from advanced power systems such as IGCC and existing coal-fired power plants. Further, the Gasification Program fiscal year 2009 budget of $69 million will focus on continuing to increase the efficiency of IGCC while lowering costs. Research from both programs will advance the development and ultimate commercial deployment of IGCC with carbon capture and storage.

Question. I am pleased to see that the office of Fossil Energy remains committed to expanding the Strategic Petroleum Reserve to a 1 billion barrel capacity, as outlined in the Energy Policy Act of 2005. I have noticed in your budget that there is $13.5 million for planning purposes to expand past a one billion barrel capacity. In

these tight budgetary times, do you not believe that we should focus on reaching the one billion barrel capacity before we fund the planning of further expansion?

Answer. The expansion of the Strategic Petroleum Reserve to 1.5 billion barrels is essential to providing the United States with critical energy security. The Department has requested an initial $13.5 million to perform planning studies to determine the optimum configuration of the expansion beyond 1 billion barrels, and complete the environmental review process and site selection. Once the sites have been selected, the expansion project is expected to require in the range of 12 to 15 years to develop the additional 500 million barrels of storage capacity.

Question. The new CURC–EPRI roadmap, released in September 2006, defines the steps necessary to achieve near zero emissions from coal use, including the capture and sequestration of CO_2, and suggests that the investment necessary to achieve the goals of Roadmap is approximately $17.0 billion between now and 2025. In fiscal year 2008, we provided nearly half that amount through the DOE Loan Guarantee Program. Do you believe that the funds provided through the Loan Guarantee Program in fiscal year 2008 will get us half way to near zero emissions from coal use?

Answer. No, the Loan Guarantee Program, although an important incentive for deployment of new clean coal technologies, by itself is not expected to move the Nation half-way to near-zero atmospheric emissions for coal use. The CURC–EPRI roadmap, released in September 2006, proposes a funding level for a Research, Development, and Demonstration (RD&D) program focused solely on coal-based electricity generation. The loan guarantee program is intended to provide incentives for deployment of early commercial facilities, which would come online after successful commercial-scale demonstration. As stated in the program regulation, it isn't a research, development or deployment program. Though we expect there to be some synergy between early commercial projects and demonstration projects, by and large the Government spending proposed by CURC–EPRI is geared toward reducing the cost and improving the performance of the technologies. The Loan Guarantee Program will support commercialization of technologies that have already been successfully demonstrated.

QUESTIONS SUBMITTED BY SENATOR THAD COCHRAN

Question. What are the Department's goals in regards to Clean Coal and Carbon Capture? Request levels have varied dramatically in the last few years, but I'm pleased to see an increase in the program. Is the Department planning on researching coal-to-liquids technology?

Answer. The technology goal for the Carbon Capture and Sequestration Program is "to develop, by 2012, fossil energy conversion systems that offer 90 percent carbon dioxide capture with 99 percent storage permanence at less than a 10 percent increase in the cost of energy services."

With respect to researching coal-to-liquids technology, the Department is planning and will soon release a Coal and Biomass to Liquid Fuels Funding Opportunity Announcement. This announcement will request applications for research and development proposals specifically limited to liquid hydrocarbon fuels from coal/biomass mixtures.

Question. The Department of Energy has chosen a site in my State as the preferred location for expansion of the Strategic Petroleum Reserve, and funds were included last year for land acquisition. Mr. Slutz, can you speak about the time frame and future steps required for such expansion to occur?

Answer. It will take approximately 12 years to complete the site.

Project Steps and Schedule: Design and Land Acquisition—2008–2011; Facilities and Pipeline Construction—2010–2016; Cavern Development (Solution Mining)—2014–2018; Initial Oil Fill Capability—2016; Planned Site Completion—2019.

QUESTIONS SUBMITTED BY SENATOR WAYNE ALLARD

Question. I understand that the administration has decided to restructure their approach to FutureGen. Can you tell me more about that decision and the reasoning behind it?

Answer. The FutureGen project encountered significant cost increases, which raised the total estimated project cost from $950 million (in 2004 constant year dollars) to $1.757 billion (in 2007 as-spent dollars). Since the Department was responsible for 74 percent of the total project cost, DOE's projected investment had risen to approximately $1.3 billion. The Department was concerned over the prospect of further uncontrollable cost increases and attempted to limit its exposure to future

cost growth by engaging the Alliance in a series of discussions. After several months of negotiation with the Alliance, a mutually acceptable agreement with the Alliance could not be reached.

Therefore, a "restructuring" of the FutureGen initiative was pursued in order to maintain the Department's commitment to the administration's goal of developing a near-zero atmospheric emission power plant operating on coal. A Request for Information (RFI) was released on January 30, 2007, and the comments received from that RFI are now being reviewed and analyzed.

Rather than investing in the total cost of a single commercial-scale experimental facility integrated with carbon capture and storage, the restructured FutureGen approach will invest only in the carbon capture and storage portion of several commercial power projects. This will limit taxpayers' financial exposure to only help fund the carbon capture and storage portion of the plant. Furthermore, this new approach will allow us to accelerate nearer-term technology deployment in the marketplace faster than the timetable for the previous approach. In order to be successful in competitive power markets (and comply with the Department's competitive proposal evaluation process), the underlying power plant projects will still need to be efficient, competitive, and environmentally sound.

Question. What does this decision do to ensure that the results of the project are something that industry can pick-up and integrate into current or future facilities smoothly, especially with regard to high-altitude.

Answer. FutureGen will provide early carbon capture and storage (CCS) demonstration experience in a commercial setting, which is aimed at accelerating deployment and advancing carbon capture policy. The previous approach to FutureGen would have created a single "living laboratory" for research and development of advanced technologies, which may have needed significant testing before being considered to be "commercial" by industry.

The intent is to select multiple projects competitively and at full commercial size. The scale of these projects is in the range of 300 to 600 MW, with the demonstration portion involving CCS integration to be on one power unit (~300MW). Depending upon where the winning projects are located, this approach should yield more diverse information for future facilities than would a single FutureGen project in terms of coal types, regional geology, and altitude.

SUBCOMMITTEE RECESS

Senator DORGAN. Let me thank all three of the Secretaries who have joined us today, and I think this is a useful and important hearing to try to establish priorities and necessary funding requirements as we proceed with some very important programs at the Department of Energy.

This hearing is recessed.

[Whereupon, at 11:02 a.m., Wednesday, March 5, the subcommittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

WEDNESDAY, APRIL 2, 2008

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:32 a.m., in room SD–124, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Murray, Domenici, Cochran, Craig, and Allard.

DEPARTMENT OF ENERGY

STATEMENT OF HON. RAYMOND L. ORBACH, UNDER SECRETARY FOR SCIENCE

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. The hearing will come to order. I thank all of you for being here today. We are here today to take testimony from three program offices within the Department of Energy that oversee major aspects of the U.S. Government's Science and Energy Research, Development, Demonstration and Deployment programs. This is a hearing of the Senate Appropriations Subcommittee on Energy and Water Development.

The programs that we will be discussing today from the Department of Energy run the gamut from basic research to applied research and development, and, finally, deployment of innovative energy technology projects. In essence, they represent the A to Z for energy technology research development and commercial deployment in the Department of Energy.

Important research performed by the Office of Science is the underpinning of our colossal achievements in energy. The research development and demonstration conducted by the Office of Energy Efficiency and Renewable Energy builds upon that basic research by working to make new technologies deployable.

And the Loan Guarantee Office provides the financial backing to industry for the development of new and innovative forms of conservation and energy. Without scientific and technical breakthroughs in these programs, the United States cannot expect to achieve the lofty goals that we have set for ourselves. Both the administration and the Congress have set very substantial goals in various energy initiatives and in recently enacted energy laws.

In the 2009 recommended budget for this Department, I think there are some concerns. I will express them during the questions. Science, of course—Mr. Orbach is with us—is the beneficiary in the budget request. The $749 million increase is the largest in the Department's budget; energy efficiency is evidently the donor. The $467 million reduction is also the largest reduction in the budget.

It seems to me that if we are serious about balancing our energy issues—for example, greater independence from foreign oil and all the other related matters—we've got to be serious about a wide range of things. That includes science.

It also includes energy efficiency, and it includes renewable energy, and so we'll talk about all of that today. The proposal from the President is simply his recommendation or set of recommendations. The Congress, both Republicans and Democrats, take a look at that and then evaluate what our recommendations are. In some cases we agree with the President and in other cases we do not.

I understand that those who are here today are duty-bound to tell us that they think the President's budget is just really wonderful, that they wouldn't change a thing, and that they think it's great. But I think, as we look at the priorities here, it's important for us in the Congress to evaluate how these recommendations relate to the decisions that we have previously made about where we want this country to go in energy policy.

With that, I will call on the ranking member, Senator Domenici.

OPENING STATEMENT OF SENATOR PETE V. DOMENICI

Senator DOMENICI. Thank you very much, Mr. Chairman. I look out at the three witnesses, and the only one that I am not personally familiar with—and that's my fault—is David Frantz. I have read about what you are doing, and I think we have hired the right person, but I wonder if you don't wonder, sometimes, whether you have been hired to do the right job, since it seems like more and more people want to make your job difficult when we thought it was going to be a very simple proposition.

Having said that, we hope that you are truly ready to go into the market and issue some loan guarantees as soon as possible, and we'll all be asking you that with a great deal of anticipation.

Mr. Chairman, I have prepared remarks. In some respects they sound somewhat like yours because you have put your finger on what this is that's before us here today. I want to take just a few moments, nonetheless, to talk about some of the things that are here.

Today we have these three witnesses who represent the entire pipeline of energy technology. Dr. Orbach has responsibility for discovery science and developing new technology solutions. The budget requests include $100 million for Energy Frontier Research Centers, and I think we ought to have that explained so we know what that means.

Last year was a difficult year for Science funding, but I am pleased to see that the administration has not changed its direction and remains committed to its 10-year strategy of doubling the Office of Science: Not just you but all science was to be doubled in the next 10 years on the hard side, the science, engineering, physics, mathematics, et cetera.

Assistant Secretary Karsner and his office is the next step in the technology development, as you have indicated, and then I won't repeat the ins and outs of his budget but we'll talk about it here today.

It is important to put into perspective $42 billion is nearly 10 times the annual budget of the Office of Science. The reason I bring that up is because Congress has provided $42.5 billion in guarantee authority for all three for both nuclear and the two others that go with it that received excellence funding for their guarantees.

And this is a very large amount of money, but when we look at what America will probably have to spend to achieve some degree of energy independence, the number approaches $350 to $500 billion, and, certainly, some people say it's much higher. My own guesstimate would be that we'll spend much more than that to get out of the mess that we are in. And the loan guarantees are a substantial part, and that's why it makes it so important, Mr. Frantz, that we get this part moving.

I want to comment on, while we have Dr. Orbach here, I'm deeply concerned about the lack of investment in upgrading the science facilities of NNSA laboratories, specifically the LANSCE facility which is needed to be refurbished in order to support the ongoing science mission.

Third, I am frustrated that the Congressional Budget Office has charged our bill, Mr. Chairman, with 1 percent of the cost of Loan Guarantees program despite the fact that this program is self-financed, and the Department is required to cover the cost of the program. CBO believes the Department will miss the mark by 1 percent. I don't know why they assume it will be 1 percent all in one direction. It seems if you're going to miss, you'll miss some high, some low, and probably come out neutral. But they assume it will all be a miss, and we get charged $352 million.

That's wrong. And if we had to bear that, that's just like coming into our budget, slicing out $352 million for which we get nothing. Nothing. And, to me, the Congressional Budget Office just didn't read the law. I read the law this morning, and it's clear that we cannot lose money. And you have to deliver the full cost of the loan to the Secretary before he makes the loan and the full cost of the loan to the Government, That's the way it's done, and that's what you're going to do.

I don't understand it, and I hope we all get a hold of this one and make sure we do it right. Thank you, Mr. Chairman.

Senator DORGAN. Senator Craig?

STATEMENT OF SENATOR LARRY CRAIG

Senator CRAIG. Mr. Chairman, thank you. Both you and Senator Domenici have done the broad overview. I'll be more specific and probably a little more parochial. And, let me say to all of you gentlemen, this will be the last time you will be making full budget presentations before this committee. It will also be my last time as a Senator to be specific about some of the issues that I've been involved in for a good long while.

Secretary Orbach, as you know, I've been generally pleased with your office, overall. My only advice since we first met was to look for ways to utilize our Nation's lead nuclear laboratory, the INL,

as it relates to the help necessary and important with nuclear science. The fiscal year 2009 Science budget spends about $3.6 million. That's less than 1 percent of your total annual budget at INL. That remains a question to me as to why that. But there are ways to fix it, and let me propose some ideas to you.

Your budget more than any other reflects the work of the Energy Committee, and the work we did in passing the COMPETES bill last year. Many educational provisions were funded. If you'll remember, a provision I put in with the cosponsorship of Senator Domenici and Senator Bingaman was the Nuclear Science Talent provision. That is section 5006.

It's my hope that this provision will be funded above the $12 million that had been authorized so that DOE science and the INL Center for Advanced Energy studies, the CAES, can administer this provision and increase our competitiveness in nuclear science. We've simply got to get there, and it is not as robust as it has been authorized or as we should allow it.

Secretary Karsner, I've been continually impressed with the results of your office to do so much with so little—only $1.2 billion. So I guess I am unabashedly pro-renewable, and I serve as a member of the Board of the Alliance to Save Energy. And efficiency is truly the most affordable clean energy solution we have.

A list of accomplishments from your office is too long, but there are some that attract my attention. The biomass, R&D, utilizing farm and forest waste is, I think, the nominal opportunity for us. Wind power in America, we're now frustrated about how we integrate the potential of so much wind power as an intermittent source into a baseload situation. Certainly, in the Pacific Northwest that may well be an opportunity and a difficulty.

Vehicle technology, advanced factories. I want my grand kids driving electric cars, so get with it because they're young, but they will soon be at that level, and I see that as a phenomenal opportunity even in a distant state like Idaho. Get us up to 400 miles, and we're in business. And I think that potential is there.

Industrial technology, I think across the board the R&D that we do there advances the efficiencies in all that are possible. So let me suggest that your lab and my lab have great synergy and cooperative relationships that can produce a lot of what you're attempting.

And, as Pete Domenici said, Director Frantz, we're glad to see you. We've been waiting for you for 2½ years and very disappointed that you weren't before us 2½ years ago. So get with it and deliver to us those kinds of loan guarantees that push science and push the technology out there.

As you know, I have focused a good deal on the frustration we now have growing out of this bulge in ethanol production, corn-base needing the move to cellulosic. In fact, I'm headed into Canada next week to look at a stand-up up there that we think has some potential, so it is very exciting that we get there. Caution is valuable, but daringness is more important as we push the edges of technology to get us to an area of energy independence. Caution will not get us there.

Thank you, Mr. Chairman.

Senator DORGAN. Senator Murray.

Senator MURRAY. Thank you, Mr. Chairman. I join you in welcoming our witnesses today. I will save my time for questions.

Senator DORGAN. Senator Allard?

STATEMENT OF SENATOR WAYNE ALLARD

Senator ALLARD. Mr. Chairman, for holding this hearing today. I don't think anybody can argue we're dangerously relying on foreign sources of energy, and we must decrease our reliance on foreign sources of energy by diversifying our energy sources, and increasing conservation. I have long felt that a balanced energy portfolio that takes no technology off of the table is what is best for this country.

I'd like to extend a special welcome to Mr. Karsner, who oversees the Office of Energy Efficiency and Renewable Energy, which, in turn, oversees the National Renewable Energy Laboratory in Colorado. NREL makes a major contribution to the development of renewable energy technology, and the technologies that are developed at NREL will remain vital to our Nation's energy progress, and they have established a great relationship with the research universities there, joining in the partnership with the University of Colorado, School of Mines, and Colorado State University in this renewable energy effort. And I commend them for joining that coalition. I think it helps make this a hub of renewable energy ideas.

Mr. Chairman, you and I co-chaired the Renewable Energy and Energy Efficiency caucus, and so I know I don't have to tell you about the importance of renewable energy. Renewable energy is a very important way that we can begin to reduce the demand for oil and thereby help make our country more secure.

There are great opportunities for solar, wind, geothermal, biomass, fuel cells, and hydro to make significant contributions. Research and the unit of both government and industry partners are very important to allowing these opportunities to live up to their potential.

I look forward to working with the community and share the research and development and all fields of energy technology are funded in a manner that is responsible, but sufficient to ensure that the development and implementation of new technology continue.

Thank you again, Mr. Chairman.

Senator DORGAN. Senator Allard, thank you very much.

We will now turn to the witnesses, and I want to thank all of them for coming today. We will begin with Dr. Orbach. Dr. Orbach, please.

STATEMENT OF HON. RAYMOND L. ORBACH

Dr. ORBACH. Thank you, Mr. Chairman. Thank you, Chairman Dorgan, Ranking Member Domenici, members of the committee. I'm very pleased to be able to appear before your committee for what I expect to be my final budget presentation for the Department of Energy's Office of Science. I would like to thank the Committee for your strong support for the Office of Science during my tenure.

I would particularly like to thank Senator Domenici for his invaluable service to the Nation and for his strong support for the Nation's scientific enterprise.

The President's budget request for fiscal year 2009 continues his strong and clear support for science in this country, expressed through his American Competitiveness Initiative and Advanced Energy Initiative, both announced in 2006. Congress has shown strong bipartisan support for an aggressive innovation and energy security agenda through the Energy Policy Act in 2005 and the America COMPETES Act and the Energy Independence and Security Act in 2007.

The President's fiscal year 2009 request to Congress for the Office of Science sustains this bipartisan platform for the long-term economic health, energy security, and intellectual strength of our country. Just a few examples:

We are introducing the concept of Energy Frontier Research Centers to accelerate scientific breakthroughs and innovations essential to the development of advanced energy technologies in the 21st century. We are providing $100 million in fiscal year 2009 to award grants of $2 million to $500 million per year for an initial 5-year period on a competitive basis to groups of researchers in universities, laboratories, industry, and other institutions.

We seek to engage the Nation's finest intellectual and creative talent to tackle the scientific grand challenges associated with how nature works to direct and control matter at the quantum, atomic, and molecular levels, and to harness this new knowledge and capability for some of our most critical energy challenges.

Another example is ITER. While the 2008 appropriation for ITER was reduced to R&D, the President's request calls for the full $214 million needed to fully engage in this crucial experiment. It is high risk, but the potential for energy security is immense. ITER will directly benefit U.S. domestic industries creating an American workforce knowledgeable in R&D and in the production of high tech components for the fusion industry.

My last example is high energy physics. The President's request firmly places this critical field back on track for world leadership. Former Princeton University President Harold Shapiro led the major National Academy of Sciences study on Elementary Particle Physics in the 21st century. He stated:

> "The United States has been at the forefront of elementary particle physics for more than half a century. Particle physics inspires U.S. students, attracts talent from around the world, and drives critical intellectual and technological advances in many other fields. The United States has an unprecedented opportunity as a leader of nations to undertake this profound scientific challenge."

President Shapiro's last sentence applies equally across the frontiers of basic research in science. The Office of Science has prioritized its investments to maintain U.S. global scientific leadership. The President's fiscal year 2009 request to Congress gives us the chance to be a leader of nations. I urge this committee to give our country and its citizens that opportunity.

PREPARED STATEMENT

Thank you again for your strong support for the Office of Science and for basic research. I look forward to answering your questions.

Senator DORGAN. Dr. Orbach, thank you very much.

[The statement follows:]

PREPARED STATEMENT OF HON. RAYMOND L. ORBACH

Thank you Mr. Chairman and members of the committee. I am pleased to appear before your committee for what I expect to be my final budget presentation for the Department of Energy's Office of Science. I would like to thank the Committee for your strong support for the Office of Science during my tenure. This support has enabled the Office of Science to make investments in basic research and advanced research capabilities that have and will continue to improve U.S. global competitiveness, energy security, the environment, and our fundamental understanding of the universe around us.

Our Nation continues to face significant challenges in energy security and in our ability to maintain the scientific leadership and innovation that assures our continued economic security. These challenges are addressed by the President in his American Competitiveness Initiative and Advanced Energy Initiative announced in 2006. In this year's State of the Union address, the President again called our attention to the importance of harnessing the creative genius of American researchers and entrepreneurs in developing the next generation of clean energy technologies and in keeping our Nation at the forefront of basic research in the physical sciences. The budget request for fiscal year 2009 demonstrates his forceful, continued commitment to these important initiatives. The Congress has also spoken and expressed strong, bipartisan support for an aggressive innovation and energy security agenda in passing the Energy Policy Act (EPAct) of 2005 and in following up with both the America COMPETES Act and the Energy Independence and Security Act (EISA) in 2007.

EPAct and the COMPETES Act both recognize the pivotal role of the Office of Science in securing the advantages that basic research as well as science, math, and engineering education can bring to the Nation. EISA's provisions are intended to reduce America's dependence on oil, improve efficiency, and cut emissions. Technology development proceeds fastest where there is a strong grounding in scientific understanding, but we will not meet the targets with solely incremental improvements in current technologies. We need the breakthroughs that will result only from transformational basic research.

Here are a few examples. EISA mandates the use of at least 36 billion gallons of biofuels by 2022. Without transformational breakthroughs in deriving fuels from plant cellulose materials, we reduce our chances of reaching these aggressive goals. Even though conventional approaches, such as sugar-based and corn-based ethanol, can be modestly energy positive—although this is still debated—they consume large quantities of food and feed grain. Increasing use of these feedstocks raises environmental concerns associated with land use changes and impacts on atmospheric concentrations of carbon dioxide. Biofuels derived from cellulose, and in particular feedstock crops such as switchgrass that can be grown on marginal land with minimal water and nutrient requirements, can provide the basis for a sustainable biofuels economy in the United States while benefiting the American farmer. Breakthroughs in science are essential for the development of more efficient and cost-effective processes for deriving fuels from cellulose and for developing dedicated feedstock crops. The approaches to cellulosic ethanol deployed in many pilot and demonstration bioethanol plants across the United States rely on niche feedstocks and conversion technologies that are not yet cost competitive. New scientific discoveries supported by the Office of Science will speed revolutionary gains in production efficiencies and cost reduction—and in some cases may be the only way to meet our goals.

The transformational basic research undertaken by the Office of Science's Bioenergy Research Centers is one way the Department is addressing the difficulties of cost-effective bioethanol production with minimal environmental footprint, by using plant and microbial genomics and other novel approaches.

EISA also mandates a national fuel economy standard of at least 35 miles per gallon by 2020—an increase in fuel economy of some 40 percent that will save billions of gallons of fuel. Automobile manufacturers will need to employ numerous conventional and advanced engine and vehicle technologies to reach this goal. Office of Science basic research will be critical in the development of cost effective advanced engine and vehicle technologies through research in areas such as high-strength, low-weight materials; electrical energy storage; hydrogen production, use, and storage; fuel cell materials; catalysts, combustion processes, and materials under extreme environments.

In fiscal year 2009 the Office of Science will initiate Energy Frontier Research Centers. They will pursue innovative basic research to accelerate the scientific

breakthroughs needed to create advanced energy technologies for the 21st century. These Centers will pursue fundamental basic research areas mentioned above as well as solar energy utilization; geosciences related to long-term storage of nuclear waste and carbon dioxide; advanced nuclear energy systems; solid state lighting; and superconductivity.

The Office of Science seeks to engage the Nation's intellectual and creative talent to address scientific grand challenges. These are the necessary transformational discoveries which will fundamentally alter our approaches to energy production and use, and they will come from the next generation of scientists, mathematicians, and engineers. If our fiscal year 2009 request is approved, the Office of Science will be able to directly support the research of more than 4,300 graduate students—and many more who are supported by other agencies will use our world-leadership scientific research facilities in their dissertation research.

The Office of Science is accelerating the pace of discovery and innovation to address the Nation's energy needs through our multifaceted research portfolio. Your confidence in the Office of Science is based on a number of demonstrated successes in our mission areas, and your support for the Office of Science has enabled us to assess the basic research needs and engage the scientific community to respond aggressively. We routinely assess and update these research opportunities and priorities with an eye to our mission and with an ear to the research community, whether at a national laboratory, a university, or in industry. Since we build and operate large-scale, long-term, and, by necessity, cost-effective scientific research facilities, and because our mission is so important, we take these assessments seriously. We cannot afford to go in a wrong direction; we need the most complete and robust analysis of scientific opportunity, mission need, cost, and benefit.

A large part of this assessment effort in recent years has been accomplished through a series of Basic Research Needs workshops and other workshops led by our science programs in partnership with the Department's technology programs. These workshops have brought together subject experts with diverse views from the broader basic and applied research community to discuss and identify areas of focus for DOE's basic research efforts. These efforts have enabled the Office of Science to stay informed of research needs and new opportunity areas, as well as scientific and technological roadblocks, and have enabled us to create a prioritized and comprehensive research portfolio within our available funding.

While these workshops are critical to building and balancing our research portfolio, we also have a number of planning and advisory resources at our disposal to inform our long-term research portfolio planning. The National Academy of Sciences, our Federal Advisory Committees, informal and formal communication with the international scientific community, OSTP, OMB, the Congress, and our in-house Office of Science personnel all play important roles. Our programs are strong because our research portfolio and facilities are internally and externally assessed regularly and because our research and facilities are awarded through a competitive merit review process.

We have established effective processes for assessing basic research needs, and we have also developed the capacity to respond quickly with highly leveraged investments in scientific facilities and research at the national laboratories and universities. This informed, rapid response provides the world-class research results that will help solve some of our most intractable energy supply and environmental challenges, while keeping our Nation's scientific enterprise and industry at the forefront.

I think the best way to bring my statement into sharp focus is to discuss some examples of how your investments in the Office of Science have brought quick and remarkable results, and what we plan to do with the funding requested for fiscal year 2009 to enhance the U.S. scientific and innovation enterprise and ensure the best possible return to the taxpayer.

Perhaps the best example of this aggressive and nimble approach is the response by the Office of Science to the challenge of High Performance Computing (HPC). In 2002 the Japanese announced the Earth Simulator, a high performance computer for open science which combined unprecedented performance and efficiency. Congress responded by dramatically increasing HPC funding, and making the Office of Science the lead in an effort to surpass the Earth Simulator. I am pleased to report that your confidence in us has already resulted in the United States attaining world leadership in open scientific computing—by the end of this year we will achieve peak capacity of one petaflop at our Leadership Computing Facility in Oak Ridge. This exceptional capability is helping us model such phenomena as turbulent flows related to combustion and to model and simulate complex climate processes that will inform decisionmakers on climate change, mitigation, and adaptation.

The benefits of Office of Science HPC capabilities extend well beyond DOE. We provide access to these resources to other Federal agencies, universities, labora-

tories, and industry. We have been involved in modeling and simulation runs as diverse as determining hurricane effects to save lives, and modeling aircraft engines and airframes to improve energy efficiency and reduce time-to-market. We use the Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program to openly compete access to these world-leading HPC resources. The Office of Science created INCITE for the purpose of bringing the capabilities of terascale computing to the community in order to transform the conduct of science and bring scientific simulation through computational modeling to parity with theory and experiment as a scientific tool. As a result, HPC modeling and simulation is now seen as a potent tool in the scientific toolbox; one that will potentially save lives, increases our energy and national security, and propels us to a competitive edge.

Another accomplishment of the past year is the successful competition and award of three Bioenergy Research Centers. These Centers will each take different approaches to discovering fundamentally new solutions and solving critical roadblocks on the path to energy security—how will we meet the new requirement to produce 36 million gallons of biofuels by 2022 from renewable plant sources that don't compete with the food supply? In authorizing and funding the Bioenergy Research Centers, Congress expressed its confidence in the ability of the Office of Science to tap the talent of our national laboratories and universities to tackle our fuels challenge, and these Centers are up and running well.

U.S. leadership in science and technology depends on the continued availability of the most advanced scientific tools and facilities for our researchers. The suite of research capabilities operated by the Office of Science and used annually by 20,000 researchers from industry, academia and government labs are still the envy of the world. And over the past several years, with your support, we have delivered new facilities and have achieved remarkable technical milestones with existing facilities, enabling the United States to work at the cutting-edge of many scientific disciplines. The Spallation Neutron Source, which came on line in 2006, is the world's forefront neutron scattering facility providing more neutrons, by a factor of 10, than any other neutron source in the world for research of materials and biological complexes. Let me give you just one example of why neutrons are so important. Neutrons are the only way to peer inside an operating fuel cell to view water forming and moving throughout the cell. In a fuel cell, water is formed as a by-product of the reaction between hydrogen and oxygen. If the water does not drain quickly and efficiently, then fuel cells will not work properly.

The Linac Coherent Light Source currently under construction will produce x-rays 10 billion times more intense than any existing x-ray source in the world when it comes on line in fiscal year 2010. It will have the capabilities for structural studies of nanoscale particles and single molecules and for probing chemical reactions in real time. All five Office of Science Nanoscale Science Research Centers are now in operation, providing unparalleled resources to the scientific community for synthesis, fabrication, and analysis of nanoparticles and nanomaterials. The Tevatron at Fermilab currently remains the world's most powerful particle collider for high energy physics. New records for performance in peak luminosity were achieved in 2006, enabling the observation of the rare single top quark and bringing researchers closer to understanding the basic constituents of matter and the laws of nature at high energies.

On October 24, 2007, the international ITER Agreement went into force. The ITER experiment will demonstrate for the first time that a reactor can create and sustain a burning plasma. The implications of this research are far-reaching. The world faces a series of tough choices in meeting our energy needs over the next century. While no silver bullet may exist, fusion appears to be the closest. Fusion energy provides the real possibility of abundant, economical, and environmentally benign energy, starting around mid-century. Our investments today will have huge pay-offs for our children and grandchildren. We are part of an international consortium that is sharing the cost and the risk of the project and will have full access to all experimental research data.

The Office of Science is aggressively pursuing a range of research areas that will provide answers critical to our future energy security, as the material that follows will show—and we also continue to plan for the future, seeking to identify opportunities within available resources and to update our priorities appropriately. An example of this is the "Facilities for the Future of Science: A 20-Year Outlook" report, which was released in November 2003 and updated last year. The Outlook contained a prioritized list of facilities to underpin our major research thrusts over the next 20 years and beyond. These facilities are designed to be world class and adaptable to evolving basic research needs to ensure that U.S. taxpayers get the most value for their money. These facilities also allow researchers access to the full array of physical and biological science large-scale resources, creating an all-important

balance and "unity" of science within the Office of Science. I ask the members during this appropriations cycle especially to consider the lasting value of the basic energy research done in the Office of Science to our Nation's well-being and economic prowess.

The following programs are supported in the fiscal year 2009 budget request: Basic Energy Sciences, Advanced Scientific Computing Research, Biological and Environmental Research, Fusion Energy Sciences, High Energy Physics, Nuclear Physics, Workforce Development for Teachers and Scientists, Science Laboratories Infrastructure, Science Program Direction, and Safeguards and Security.

OFFICE OF SCIENCE FISCAL YEAR 2009 PRESIDENT'S REQUEST—SUMMARY BY PROGRAM

[Dollars in thousands]

	Fiscal Year 2007 Approp.	Fiscal Year 2008 Approp.	Fiscal Year 2009 Request	Fiscal Year 2009 vs. Fiscal Year 2008	
				Request	Percent
Basic Energy Sciences	$1,221,380	$1,269,902	$1,568,160	+$298,258	+23.5
Advanced Scientific Computing Research	275,734	351,173	368,820	+17,647	+5.0
Biological and Environmental Research	480,104	544,397	568,540	+24,143	+4.4
High Energy Physics	732,434	689,331	804,960	+115,629	+16.8
Nuclear Physics	412,330	432,726	510,080	+77,354	+17.9
Fusion Energy Sciences	311,664	286,548	493,050	+206,502	+72.1
Science Laboratories Infrastructure	41,986	66,861	110,260	+43,399	+64.9
Science Program Direction	166,469	177,779	203,913	+26,134	+14.7
Workforce Dev. for Teachers & Scientists	7,952	8,044	13,583	+5,539	+68.9
Safeguards and Security (gross)	75,830	75,946	80,603	+4,657	+6.1
SBIR/STTR (SC funding)	86,936	.....	.....	.....	.....
Subtotal, Office of Science	3,812,819	3,902,707	4,721,969	+819,262	+21.0
Adjustments[1]	23,794	70,435	.....	–70,435	–100.0
Total, Office of Science	3,836,613	3,973,142	4,721,969	+748,827	+18.8

[1] Adjustments include SBIR/STTR funding transferred from other DOE offices ($39,319,000 in fiscal year 2007), a charge to reimbursable customers for their share of safeguards and security costs (−$5,605,000 in each of fiscal year 2007 and fiscal year 2008), Congressionally-directed projects ($123,623,000 in fiscal year 2008), a rescission of a prior year Congressionally-directed project (−$44,569,000 in fiscal year 2008), and offsets for the use of prior year balances to fund current year activities (−$9,920,000 in fiscal year 2007 and −$3,014,000 in fiscal year 2008).

BASIC AND APPLIED RESEARCH AND DEVELOPMENT COORDINATION

I would also like to highlight the fact that the Office of Science continues to coordinate basic research efforts in several areas with the Department's applied technology offices through collaborative processes established over the last several years. These areas include biofuels derived from biomass, solar energy, hydrogen, solid-state lighting and other building technologies, the Advanced Fuel Cycle, Generation IV Nuclear Energy Systems, vehicle technologies, and improving efficiencies in industrial processes. The Department's July 2006 report to Congress DOE Strategic Research Portfolio Analysis and Coordination Plan identified 21 additional areas of opportunity for coordination that have great potential to increase mission success. The Office of Science supports basic research that underpins nearly all 21 areas; and 6 areas are highlighted in the fiscal year 2009 Office of Science budget request for enhanced R&D coordination: Advanced Mathematics for Optimization of Complex Systems, Control Theory, and Risk Assessment; Electrical Energy Storage; Carbon Dioxide Capture and Storage; Characterization of Radioactive Waste; Predicting High Level Waste System Performance over Extreme Time Horizons; and High Energy Density Laboratory Plasmas. The Office of Science has sponsored scientific workshops corresponding to these focus areas in collaboration with related DOE applied technology program offices. The workshop reports identified high priority basic research areas necessary for improved understanding and revolutionary breakthroughs.

Advanced Mathematics for Optimization of Complex Systems, Control Theory, and Risk Assessment.—The Advanced Scientific Computing Research (ASCR) program supports basic research in advanced mathematics for optimization of complex systems, control theory, and risk assessment. A recommendation from the workshop focused on this subject indicated additional research emphasis in advanced mathematics could benefit the optimization of fossil fuel power generation; the nuclear fuel lifecycle; and power grid control. Such research could increase the likelihood for suc-

cess in DOE strategic initiatives including integrated gasification combined cycle coal-fired power plants and modernization of the electric power grid.

Electrical Energy Storage.—About 15 percent of the Basic Energy Sciences (BES) program funding requested to support basic research in electrical energy storage (EES) is targeted for a formally coordinated program with DOE applied technology program offices. The workshop report on this focus area noted that revolutionary breakthroughs in EES have been singled out as perhaps the most crucial need for this Nation's secure energy future. The report concluded that the breakthroughs required for tomorrow's energy storage needs can be realized with fundamental research to understand the underlying processes involved in EES. The knowledge gained will in turn enable the development of novel EES concepts that incorporate revolutionary new materials and chemical processes. Such research will accelerate advances in developing novel battery concepts for hybrid and electric cars and will also help facilitate successful utilization and integration of intermittent renewable power sources such as solar, wind, and wave energy into the utility sector, making these energy sources competitive for base-load supply.

Carbon Dioxide Capture and Storage.—BES, ASCR and the Biological and Environmental Research (BER) program support basic research in carbon dioxide capture and storage. The storage portion of this R&D coordination focus area was a subject of a BES workshop on Basic Research Needs for Geosciences in February 2007 that focused on the research challenges posed by carbon dioxide storage in deep porous saline geological formations. The workshop report noted that the chemical and geological processes involved in the storage of carbon dioxide are highly complex and would require an interdisciplinary approach strongly coupling experiments with theory, modeling, and computation bridging multiple length and time scales. The BES effort supports fundamental research to understand the underlying chemical, geochemical, and geophysical processes involved in subsurface sequestration sites. The BER research effort focuses on understanding, modeling, and predicting the processes that control the fate of carbon dioxide injected into geologic formations, subsurface carbon storage, and the role of microbes and plants in carbon sequestration in both marine and terrestrial environments. These aspects of this focus area were also the subject of additional SC workshops that identified basic research areas in carbon dioxide capture and storage that could benefit the optimization of fossil fuel power generation and the development of carbon neutral fuels. The ASCR research effort supports two Scientific Discovery through Accelerated Computing (SciDAC) partnerships with BER to advance modeling of subsurface reactive transport of contaminants; an area that has been identified as directly relevant to carbon sequestration research efforts.

Characterization of Radioactive Waste.—BES, BER, and the Nuclear Physics (NP) program support research in radioactive waste characterization. This R&D coordination focus area was the subject of six Office of Science workshops, including three BES workshops. The workshop reports noted that the materials and chemical processes involved in radioactive waste disposal are highly complex and their characterization requires an interdisciplinary approach that strongly couples experiments with theory, modeling, and computation bridging multiple length and time scales. The BES effort will focus on research relating to the underlying physical and chemical processes that occur under the conditions of radioactive waste storage, including extremes of temperature, pressure, radiation flux, and multiple complex phases. The BER research effort addresses processes that control the mobility of radiological waste in the environment. The NP research effort is focused on characterization of radioactive waste through the advanced fuel cycle activities. The NP program areas are structured as scientific disciplines with goals to understand the nuclear cross sections important for advanced fuel cycle reprocessing. A small portion of on-going research is relevant to the issues involved with radioactive waste and related advanced fuel cycles. The knowledge gained from this research will lead to enhanced understandings of radioactive waste characterization, which would make nuclear power a far more attractive component in primary energy usage.

Predicting High Level Waste System Performance over Extreme Time Horizons.—BES supports basic research in predicting high-level waste system performance over extreme time horizons. This R&D coordination focus area was a subject of a BES workshop on Basic Research Needs for Geosciences in February 2007, which focused on research challenges posed by geological repositories for high level waste. The workshop report identified major research priorities in the areas of computational thermodynamics of complex fluids and solids, nanoparticulate and colloid physics and chemistry, biogeochemistry in extreme and perturbed environments, highly reactive subsurface materials and environments, and simulation of complex multiscale systems for ultra-long times.

High Energy Density Laboratory Plasmas.—The Fusion Energy Sciences (FES) program supports basic reach in high energy density laboratory plasmas. In May 2007, Office of Science and the National Nuclear Security Administration (NNSA) jointly sponsored a workshop to update the high energy density laboratory plasmas (HEDLP) scientific research agenda. Three scientific themes emerged from the workshop: enabling the grand challenge of fusion energy by high energy density laboratory plasmas; creating, probing, and controlling new states of high energy densities; and catching reactions in the act by ultra-fast dynamics. In fiscal year 2009, the FES request expands existing HEDLP research in response to the research opportunities identified in the workshop.

BASIC AND APPLIED R&D COLLABORATION FUNDING SUMMARY

[Dollars in thousands]

	Fiscal Year 2007 Approp.	Fiscal Year 2008 Approp.	Fiscal Year 2009 Request	Fiscal Year 2009 vs. Fiscal Year 2008	
				Request	Percent
Advanced Mathematics for Optimization of Complex Systems, Control Theory, & Risk Assessment:					
Science: Advanced scientific computing research	.....	$1,900	$2,000	+$100	+5.3
Energy Efficiency and Renewable Energy	.....	.....	500	+500	.....
Nuclear Energy	$10,000	19,410	55,000	+35,590	+183.4
Total, Advanced Mathematics	10,000	21,310	57,500	+36,190	+169.8
Electrical Energy Storage:					
Science: Basic energy sciences	.....	.....	33,938	+33,938	.....
Energy Efficiency and Renewable Energy	.....	.....	2,000	+2,000	.....
Electricity Delivery and Energy Reliability	.....	.....	13,403	+13,403	.....
Total, Electric Energy Storage	.....	.....	49,341	+49,341	.....
Carbon Dioxide Capture and Storage:					
Science: Basic energy sciences	5,915	5,915	10,915	+5,000	+84.5
Advanced scientific computing research	.....	976	976	.....	.....
Biological and environmental research	16,841	16,874	17,374	+500	+3.0
Total, Science	22,756	23,765	29,265	+5,500	+23.1
Fossil Energy	97,228	118,908	149,132	+30,224	+25.4
Total, Carbon Dioxide Capture and Storage	119,984	142,673	178,397	+35,724	+25.0
Characterization of Radioactive Waste:					
Science: Basic energy sciences	.....	.....	8,492	+8,492	.....
Biological and environmental research	.....	.....	1,500	+1,500	.....
Nuclear physics	200	200	6,603	+6,403	+3,202
Total, Science	200	200	16,595	+16,395	+8,198
Nuclear Energy	37,190	53,722	59,000	+5,278	+9.8
Environmental Management	2,100	2,100	9,500	+7,400	+352.4
Total, Characterization of Radioactive Waste	39,490	56,022	85,095	+29,073	+51.9
Predicting High Level Waste System Performance Over Extreme Time Horizons:					
Science: Basic energy sciences	.....	.....	8,492	+8,492	.....
Environmental Management	500	500	1,500	+1,000	+200.0
Total, Predicting High Level Waste System Performance	500	500	9,992	+9,492	+1,898

BASIC AND APPLIED R&D COLLABORATION FUNDING SUMMARY—Continued

[Dollars in thousands]

	Fiscal Year 2007 Approp.	Fiscal Year 2008 Approp.	Fiscal Year 2009 Request	Fiscal Year 2009 vs. Fiscal Year 2008	
				Request	Percent
High Energy Density Laboratory Plasmas:					
Science: Fusion energy sciences	15,459	15,942	24,636	+8,694	+54.5
National Nuclear Security Administration	10,000	12,295	10,147	–2,148	–17.5
Total, High Energy Density Laboratory Plasmas	25,459	28,237	34,783	+6,546	+23.2
Total, Basic and Applied Research Collaborations	195,433	248,742	415,108	166,366	+66.9

CONCLUSION

I want to thank you, Mr. Chairman, for providing this opportunity to discuss the Office of Science research programs and our contributions to the Nation's scientific enterprise and global competitiveness. On behalf of DOE, I am pleased to present this fiscal year 2009 budget request for the Office of Science.

This concludes my testimony. I would be pleased to answer any questions you might have.

Senator DORGAN. Next we will hear from Secretary Karsner. You may proceed.

Mr. KARSNER. Thank you, sir.

STATEMENT OF HON. ALEXANDER KARSNER, ASSISTANT SECRETARY FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY

Mr. KARSNER. Chairman Dorgan, Ranking Member Domenici, members of the committee, thank you for this opportunity of testifying in the President's fiscal year 2009 budget request for the Office of Energy Efficiency and Renewable Energy.

EERE's fiscal year 2009 request of $1.25 billion is approximately $19 million higher than the fiscal year 2008 request and provides a balance in diverse portfolio of solutions to address the energy and environmental challenges facing us today. The request will enable the EERE to research and develop renewable energy technologies, to dramatically increase the amount of clean energy produced in the United States' advanced energy technologies and practices, to sustainably decouple energy demand from economic growth, and strengthen commercialization and deployment to support rapid adoption by private industry of clean energy technologies.

The need for clean energy solutions is abundantly clear. With the Nation's energy challenges plainly identified, our efforts today and onward need to be about the implementation of solutions: well-identified solutions, multipath solutions, parallel path solutions, trying what we must and at a pace that is commensurate with the magnitude and urgency of the challenges that we face.

On December 19, 2007, the President signed the Energy Independence and Security Act of 2007 into law. The new mandates included in EISA are unprecedented in size and in scope and in time frame. Together we've taken great strides to move beyond problem identification and towards problem-solving that will enhance our energy security, diversify our energy systems, and reduce our greenhouse gas emissions that contribute to the serious challenge of climate change.

EERE's overall budget request reflects the funding needed to meet our energy challenges head on. Advanced fuels in vehicles, renewable power, efficiency in buildings and industry, and technology deployment comprise EERE's portfolio and multipronged approach to energy solutions.

My written testimony which I'll submit for the record includes a description of the priorities and specific funding requests of the EERE's program areas. The achievement of EERE program goals could save consumers over $600 billion by the year 2030, and as much as $4 trillion by 2050, cumulatively.

Similarly, we expect that our portfolio will avoid at least six gigatons of carbon by 2030 and nearly 50 gigatons by 2050, cumulatively.

With action plans, performance milestones, clearly articulated deliverables, and continued performance, EERE's Budget Request will strengthen our dynamic partnership with private industry and academia that have grown our Nation's economic well-being.

PREPARED STATEMENT

Our laboratory products and partnerships resulting in industry commercialization at unprecedented levels will bring clean energy technologies and sources to large-scale commercial viability in the foreseeable future.

This concludes my prepared statement, and I'm happy to answer any questions the committee members may have. Thank you.

[The statement follows:]

PREPARED STATEMENT OF HON. ALEXANDER KARSNER

Mr. Chairman and members of the committee, thank you for this opportunity to testify on the President's fiscal year 2009 budget request for the Office of Energy Efficiency and Renewable Energy (EERE).

EERE's fiscal year 2009 request of $1.255 billion, approximately $19 million higher than the fiscal year 2008 request, provides a balanced and diverse portfolio of solutions to address the energy and environmental challenges facing us today. The request will enable EERE to research and develop renewable energy technologies that can help increase the amount of clean energy produced in the United States; advance energy efficiency technologies and practices; and promote adoption by private industry of clean energy technologies.

The need for clean energy solutions is clear. With the Nation's energy challenges plainly identified, our efforts today and onward need to be about the development of solutions—balanced, diverse, well-identified solutions, multipath solutions, as well as parallel path solutions.

On December 19, 2007, the President signed the Energy Independence and Security Act of 2007 (EISA) into law. Together, we have taken great strides to move beyond problem identification and toward problem solving that will enhance our energy security, diversify our energy systems, and reduce emissions that contribute to climate change.

EERE's overall budget request reflects the funding needed to meet our energy challenges head on. Advanced fuels and vehicles, renewable power, efficiency in buildings and industry, and technology deployment comprise EERE's portfolio and multipronged approach to energy solutions. I will now provide a description of the priorities and specific funding requests of EERE's program areas.

BIOMASS AND BIOREFINERY SYSTEMS R&D

In fiscal year 2009, the Department is requesting $225 million for the Biomass Program, an increase of $26.8 million from the fiscal year 2008 appropriation. The Biomass Program's funding supports the Biofuels Initiative that was launched in 2006 as part of the Advanced Energy Initiative (AEI) and is designed to achieve cost competitive cellulosic ethanol by 2012. The funding also supports the President's

"Twenty-in-Ten" initiative, announced in the 2007 State of the Union, to reduce gasoline consumption by 20 percent by 2017.

EISA includes increased Corporate Average Fuel Economy (CAFE) standards and an increased Renewable Fuel Standard (RFS). The act increases CAFE standards to 35 miles per gallon for all passenger automobiles, including light trucks, by 2020; and mandates the replacement of 36 billion gallons of gasoline with renewable fuel by 2022, including 16 billion gallons of cellulosic ethanol. The Biomass Program's funding request for technology development and demonstration is expected to support timely achievement of EISA requirements. The program is focused on: Feedstock Infrastructure to reduce the cost of feedstock logistics; Platforms R&D for efficiently converting feedstocks into cost competitive commodity liquid biofuels; and Utilization of Platform Outputs to demonstrate and validate integrated technologies that achieve commercially acceptable performance and cost targets through public-private partnerships. The program strategy is to accelerate development of the next generation of feedstocks and conversion technology options for validation and demonstration in integrated biorefineries at commercial and 10 percent of commercial scale. This strategy balances the program's research, development, and deployment (RD&D) portfolio by encouraging technology transfer while maintaining core R&D funding for next generation technologies. The program will continue to emphasize cellulosic ethanol and expand the focus on other renewable biofuels, such as biobutanol and green diesel.

VEHICLE TECHNOLOGIES PROGRAM

The fiscal year 2009 Vehicle Technologies Program's request is $221.1 million, an $8 million increase over the fiscal year 2008 appropriation.

Vehicle Technologies Program activities focus on advanced, high-efficiency vehicle technologies, including combustion engines and enabling fuels, hybrid vehicle systems (including plug-in hybrids), high-power and high-energy batteries, advanced lightweight materials, and power electronics. These technologies are critical to near-term oil savings when used in advanced combustion hybrid and plug-in hybrid electric vehicles (PHEVs). In fiscal year 2009, emphasis will increase R&D for PHEVs, such as high energy storage batteries.

The program continues to place increasing emphasis on accelerating RD&D on lithium-ion batteries, plug-in hybrids (including plug-in hybrid vehicle demonstrations), and drive-train electrification to diversify and make our Nation's vehicles more efficient to reduce petroleum dependency. The R&D centers on improving advanced combustion engine systems and fuels and on reducing vehicle parasitic losses. The Vehicle Technologies budget is modified in the fiscal year 2009 request by transferring three activities from the Hydrogen Technology Program: Education; Technology Validation; and Safety and Codes and Standards. These activity areas have congruent objectives with other efforts within the Vehicle Technologies Program, and combining them within one program enables management efficiencies.

The Program will continue fiscal year 2008 efforts to evaluate the impact of intermediate ethanol blended gasoline (i.e., greater than E10) in conventional (i.e., non-FFV) vehicles and to improve the efficiency of engines operating on ethanol blends. Late model and legacy vehicles will be tested for emissions, performance, and materials impacts. Intermediate blends could provide a way to increase ethanol use sooner. These efforts support existing requirements and the President's 20 in 10 plan.

HYDROGEN TECHNOLOGY PROGRAM

The Hydrogen Technology Program's fiscal year 2009 budget request is $146.2 million, $64.8 million less than the fiscal year 2008 appropriation, due in part to the movement of the three activities mentioned above to the Vehicle Technologies Program. In 2009, the program will focus on remaining critical path barriers to the technology readiness goals for 2015. Substantial increases are included for hydrogen storage and fuel cell R&D. To provide for those increases, all funding for hydrogen production from renewables was eliminated and systems analyses continues at a somewhat reduced funding level.

The Hydrogen Program continues to research and develop critical hydrogen technologies that enable near-term commercialization pathways. Hydrogen Storage is one of the most technically challenging barriers to the widespread advancement of hydrogen and fuel cell technologies in the transportation sector. Our portfolio continues to identify new materials for on-board storage having the potential for greater than 50 percent improvement in capacity than those available prior to 2004. Much needs to be done to enable these materials to operate at practical temperatures and pressures.

In 2009, the Hydrogen Program will significantly increase investment in applied R&D of novel materials and breakthrough concepts with potential to meet on-board storage system performance targets. R&D funding will be competitively awarded and conducted through both Centers of Excellence and independent projects. The overarching goal is lightweight, low-cost, low-pressure, and efficient on-board vehicular storage systems to achieve a driving range of greater than 300 miles, without impacting vehicular cargo or passenger space to be competitive with today's vehicles.

To address the critical barriers of fuel cell cost and durability, the fiscal year 2009 request significantly increases funding for Fuel Stack Components R&D. Our R&D efforts have made significant progress in this area and will continue efforts to achieve our stated goals, reducing the high-volume cost of automotive fuel cells from $275 per kilowatt in 2002 to $94 per kilowatt in 2007. In 2009, we hope to reduce the modeled cost of hydrogen fuel cell power systems to $60 per kilowatt. One notable recent achievement was the cost-shared development of a membrane with 5,000 hours lifetime, a giant leap toward the 2010 goal of 5,000 hours durability in an automotive fuel cell system.

The Hydrogen Program's fuel cell R&D will continue to pursue a number of technological advancements. Proton-conducting membranes that are low-cost, durable, and operable at a low relative humidity will be developed. Non-precious metal and alloy catalysts will be identified and developed to further lower the cost of fuel cell systems. Gas flow through the flow fields will be modeled and measured while fuel cells are in operation to ensure optimal gas and water distribution over the catalyst and membrane surface. And fuel cells for distributed energy generation will continue to be developed with an emphasis on system integration, cost reduction and efficiency improvements. The Department will also continue its participation in the International Partnership for Hydrogen Economy (IPHE)—collaborating on R&D of materials for both fuel cells and storage, and working on such projects as the evaluation of fuel cell-related test protocols from different countries, as well as hydrogen pathway and infrastructure analyses.

SOLAR ENERGY PROGRAM

The fiscal year 2009 budget request for the Solar Energy Program is $156.1 million, $12.3 million less than the fiscal year 2008 appropriation. Through the President's Solar America Initiative (SAI), announced in the 2006 State of the Union, the Solar Program will accelerate market competitiveness of solar photovoltaic technologies through R&D aimed at less expensive, more efficient, and highly reliable solar systems. Targeting improved performance and reliability with reduced cost, the Solar Program focuses its RD&D activities in two technology areas: photovoltaics (PV) and concentrating solar power (CSP).

The Solar Program's goal in the area of photovoltaics is to develop and deploy highly reliable PV systems that are cost-competitive with electricity from conventional resources. The Program focuses on improving the performance of cells, modules, and systems; reducing the manufacturing cost of cells, modules, plant components, and systems; reducing the installation, interconnection, and certification costs for residential, commercial, and utility systems; and increasing system operating lifetime and reliability. To lower costs more rapidly and improve performance, the Solar Program is focusing on PV technology pathways that have the greatest potential to reach cost competitiveness by 2015. Industry-led partnerships, known as "Technology Pathway Partnerships," will be continued in fiscal year 2009 to help address the issues of cost, performance, and reliability associated with each pathway.

The Program's CSP focus is to develop concentrating solar technologies. A solicitation issued in fiscal year 2007 resulted in 12 industry contract awards focused on establishing a U.S. manufacturing capability of low cost trough components and the technical feasibility of low cost thermal storage. In fiscal year 2008, funds will be provided for Phase I of these contracts with the more promising contracts moving into Phase II in fiscal year 2009. One of the most important advantages of CSP is its ability to thermally store power for later use. The development of advanced thermal energy storage technologies in fiscal year 2009 will be expanded to include single heat transfer fluid systems that eliminate the need for multiple heat exchangers and thereby increase system efficiency and reduce cost. For distributed applications, research in fiscal year 2009 will continue on improving the reliability of dish systems through the operation and testing of multiple units as well as improving the manufacturability of dish systems.

WIND ENERGY PROGRAM

The Wind Energy Program's fiscal year 2009 request is $52.5 million, an increase of $3.0 million from the fiscal year 2008 appropriation. The Wind Energy Program supports the AEI objective to maximize wind energy resource utilization in the United States by leading the Nation's R&D efforts to improve wind energy generation technology and address barriers to the use of wind energy in coordination with stakeholders.

In 2007, the United States installed more wind generation capacity than any other country by bringing on-line 5 GW of new wind installations. Wind is now a major source of new electricity generation, and accounts for roughly 30 percent of new capacity from all energy sources. Since 2000, wind energy has increased more than 6-fold, from about 2.5 GW to nearly 16.8 GW today. While there are significant challenges, wind resources have the potential to provide up to 20 percent of our Nation's generation potential.

The Wind Program believes that wind energy is at a transitional point, particularly for large land-based wind systems. The program is concentrating on reducing technological barriers that limit the growth potential of wind energy in the United States by focusing on improving cost, performance, and reliability of large scale land-based technology. As a part of the effort, NREL will be testing its first utility-scale multi-megawatt turbine at the National Wind Technology Center in Colorado, through a competitive CRADA solicitation.

In addition, the Wind Program is facilitating wind energy's rapid market expansion by anticipating and addressing potential regulatory, transmission and manufacturing barriers; and investigating wind energy's application to other areas, including distributed and community owned wind projects.

The Program's focus also includes energy storage efforts in coordination with the Office of Electricity Delivery and Energy Reliability to maximize wind energy resource utilization, which supports diversifying the domestic energy supply while enhancing system reliability.

WATER POWER PROGRAM

The Water Power Program's budget request of $3.0 million will support initial R&D activities, and follows an initial congressional appropriation of $9.9 million in fiscal year 2008. The program needs to evaluate the results of its fiscal year 2008 R&D projects and technology assessments (which will continue into fiscal year 2009) before considering further applied research efforts. The mission of the Water Power Program is to research and develop innovative and effective technologies capable of harnessing hydrokinetic energy resources, including ocean wave and current energy.

The program will focus on conducting technology characterizations to identify manufacturers, performance limits and issues, known environmental impacts, and other relevant technical and market variables. In addition the program will engage in collaborative international activities.

GEOTHERMAL TECHNOLOGY PROGRAM

The fiscal year 2009 request for the Geothermal Technology Program is $30 million, which is an increase of $10.2 million from the fiscal year 2008 appropriation. The Geothermal Technology Program works in partnership with industry to establish Enhanced Geothermal Systems (EGS) as an economically competitive contributor to the U.S. energy supply. Geothermal energy generates "base-load" electricity and/or supplies heat for direct applications, including aquaculture, crop drying, and district heating, or for use in heat pumps to heat and cool buildings.

The Program focuses on the innovative technology of Enhanced Geothermal Systems (EGS), which are engineered reservoirs created to produce energy from geothermal resources that would otherwise not be economical. EGS is a new pathway for producing geothermal energy by drilling wells into hot rock, fracturing the rock between the wells, and circulating a fluid through the fractured rock to extract the heat. While EGS reservoirs have been designed, built, and tested in various countries, a number of technical hurdles remain to be overcome, the most important involving creation of EGS reservoirs with commercial production rates and lifetimes. The Department's approach will concentrate initially on issues related to reservoir creation, operation, and management. This may involve working with cost-sharing partners at existing geothermal fields to develop, test, and perfect the tools needed to fracture hot, impermeable rock and efficiently circulate fluids.

A feasibility study by the Massachusetts Institute of Technology (MIT) estimates that EGS could provide 100,000 MW of electric power by 2050—10 percent of currently installed electric capacity. This compares with today's 2,800 MW of installed

capacity at existing U.S. geothermal power plants using today's technology. Expected program outcomes will include creation of a commercial-scale geothermal reservoir and power plant (approximately 5 MW in generating capacity) capable of operating for 7 years by 2015. This initial plant, followed by others in differing geologic environments, should foster rapid growth in the use of geothermal energy as predicted by the MIT study.

BUILDING TECHNOLOGIES PROGRAM

The Building Technologies Program's fiscal year 2009 request is $123.8 million, an increase of $14.8 million from the fiscal year 2008 appropriation. The Building Technologies Program develops technologies, techniques, and tools for making residential and commercial buildings more energy efficient, productive, and cost-competitive. The Program's funding supports a portfolio of activities that includes solid state lighting (SSL), improved energy efficiency of other building components and equipment, and their effective integration using whole building system design techniques that will enable the design of net Zero Energy Buildings. The Program also includes the development of building codes and appliance standards and successful education and market introduction programs, including ENERGY STAR and EnergySmart Schools.

The Residential and Commercial Buildings integration components of the Building Technologies Program aim to transform the carbon footprint of the built environment through Zero Energy Buildings. The residential-focused Building America subprogram focuses on reducing total energy use in a new home by 60 to 70 percent. During fiscal year 2009, research for production-ready new residential buildings that are 40 percent more efficient will continue for three climate zones, with completion in two. The Program's activities in the commercial sector are focused on alliances of leading market companies with national portfolios of buildings. The Program will engage with the developers of these buildings, which will provide the opportunity to better understand what R&D is needed to help promote the construction of highly efficient commercial buildings. DOE's role as convener of partnerships with developers and other key actors help promote leveraging of resources and encourage the private sector to undertake market transformation activities.

The Emerging Technologies subprogram seeks to develop cost-effective technologies for residential and commercial buildings that enable reductions in building energy use. Solid State Lighting will develop technologies that can help reduce commercial building lighting electricity consumption. Space Conditioning and Refrigeration R&D will continue work on innovative HVAC design concepts. Other highlights include highly insulating windows and building integrated solar heating and cooling systems.

The Equipment Standards and Analysis subprogram develops minimum energy efficiency standards that are technologically feasible and economically justified as required by law. Federal energy conservation standards that have gone into effect since 1988 are projected to save a cumulative total of 75 quadrillion Btus (quads) of energy by the year 2045 (in 2007, total annual United States consumption of primary energy was about 103 quads). Between fiscal year 2005 and fiscal year 2007, the Department identified and carried out significant enhancements to rulemaking activities. The Department has made a commitment to clear the backlog of delayed actions that accumulated during prior years, while simultaneously implementing all new requirements of the Energy Policy Act (EPACT) of 2005. EISA significantly increases the number of efficiency standards and test procedures DOE must develop. The Department will continue to implement productivity enhancements that will allow multiple rulemaking activities to proceed simultaneously, while maintaining the rigorous technical and economic analysis required by statute. Energy conservation standards for 10 products were initiated in fiscal year 2006 and 2007 that will continue in fiscal year 2009. In fiscal year 2008, efficiency standards rulemakings were initiated on four additional products. In fiscal year 2008, DOE is proceeding simultaneously on rulemakings for 15 products and 10 test procedures. In fiscal year 2009, four more standards and test procedures for seven more products will be added.

The Technology Validation and Market Introduction subprogram funds activities that validate and promote clean, efficient, and domestic energy technologies. Expanding and modernizing the ENERGY STAR program to include solid state lighting, water heaters, photovoltaics, fuel cells, micro-wind turbines, combined heat and power, and other advanced technologies, as well as targeting the civic infrastructure (e.g., schools, hospitals, libraries, municipal facilities), are central activities that the program carries out to invest in Energy Smart solutions. DOE will continue to work with the Environmental Protection Agency on the development and implementation

of Energy Star and other efforts to minimize duplication and maximize efficiency. In addition to these efforts, the Program focuses on outreach efforts to help move specific technologies—such as solid-state lighting and high-performance windows—toward commercial applications. These efforts include design and rating tools, durability and product lifetime data, testing procedures, demonstrations, retailer education, and training on proper installation.

INDUSTRIAL TECHNOLOGIES PROGRAM

The Industrial Technologies Program seeks to reduce the energy intensity (energy demand per unit of industrial output) of the U.S. industrial sector through coordinated research and development, validation, and technical assistance activities to increase dissemination of energy efficiency technologies and operating practices. The fiscal year 2009 budget request for the Industrial Technologies Program (ITP) is $62.1 million, which is $2.3 million less than the fiscal year 2008 appropriation. Internal funding shifts reflect a continued strategy to emphasize more effective ways to increase energy efficiency among energy intensive industries. The shift toward more crosscutting and higher impact R&D activities will allow ITP to develop advanced, energy-efficient technologies to serve a broader set of industries.

The program will continue to support the Secretary of Energy's "Easy Ways to Save Energy" campaign through the Save Energy Now (SEN) industrial energy savings assessments at the Nation's most energy-intensive industrial facilities. This has been a very successful activity, having reached its 24-month goal of conducting 450 assessments from 2006 through 2007. With 89 percent of the plants reporting results from these assessments, the program has identified savings of over 88 trillion Btus of source energy, including more than 71 trillion Btus of natural gas, the amount used by almost a million U.S. homes. If implemented, the improvements recommended through SEN assessments have a potential energy savings of more than $727 million per year and could also reduce carbon dioxide emissions by 6.3 million metric tons annually, which is equivalent to taking over one million automobiles off the road

Building on this success, ITP will expand partnerships with leading corporations across major manufacturing supply chain and deliver DOE plant assessments, tools, and technologies to enable dramatic energy efficient improvements, contributing to the EPACT 2005 goal of reducing industrial energy intensity by 2.5 percent per year from 2006 to 2016.

FEDERAL ENERGY MANAGEMENT PROGRAM

The Federal Energy Management Program (FEMP) budget request for fiscal year 2009 is $22 million, which is an increase of $2.2 million from the fiscal year 2008 appropriation. FEMP enhances energy security, environmental stewardship, and cost reduction within the Federal Government through reductions in energy intensity in buildings, increased use of renewable energy, and greater conservation of water. These goals are accomplished by means of technical assistance, coordination of Federal reporting and evaluation, supporting alternative fuel use in the Federal vehicle fleet, and supporting the Secretary's Transformational Energy Action Management (TEAM) Initiative.

In a new effort this year, FEMP will support private sector development of alternative fuel stations at Federal sites, help the Federal Government identify opportunities for petroleum displacement to increase alternative fuel use, and conduct reporting and analysis of the Federal vehicle fleet. In addition, with DOE Specific Investments, FEMP will support the Secretary's TEAM Initiative, which will establish DOE as the Federal agency leader in strengthening energy and alternative fuels management. The TEAM Initiative works with DOE programs to help meet and exceed the goals of Executive Order 13423, such as a reduction of energy intensity of 30 percent by the end of fiscal year 2015.

As part of the TEAM initiative, the Secretary has instructed all DOE sites to host private sector energy service companies to assess efficiency opportunities across the complex, addressing all lifecycle, cost-competitive options. DOE will lead by example, deploying a wide variety of lighting and other advanced technologies to achieve maximum energy savings. The Secretary's TEAM Initiative is bold and, as Congress looks to "green" the Capitol Complex, I would be pleased to provide additional information and periodic updates to this Committee on our efforts and actions.

WEATHERIZATION AND INTERGOVERNMENTAL ACTIVITIES PROGRAM

The fiscal year 2009 request for Weatherization and Intergovernmental Activities is $58.5 million. Stakeholders and partners include State and local governments, Native American Tribes, utilities, and international agencies and governments.

Significant changes in the fiscal year 2009 budget request include increases for the State Energy Program and the Asia Pacific Partnership, a refocusing for Tribal Energy Activities, and conclusion of funding for the Weatherization Assistance Program (WAP) and the Renewable Energy Production Incentive. The results of DOE's weatherization assistance activities are little changed in the last 2 decades: provision of positive limited benefits to selected recipients, but failing to catalyze broader solutions for the tens of millions of eligible homes that have never received retrofits. The Department requests no funding for WAP activities; however, States can continue to support weatherization assistance activities with resources provided by the Low-Income Home Energy Assistance Program at the Department of Health and Human Services. Concluding the program at DOE will allow the Department to focus on higher priority research and development as well as State, local, and utility energy projects in the State Grants program. Through fiscal year 2008, the Renewable Energy Production Incentive (REPI) provided financial incentive payments to publicly owned utilities, nonprofit electric cooperatives, and tribal governments and native corporations that own and operate qualifying facilities generating renewable electricity. The incentive value of REPI has diminished over time as renewable energy technologies have become competitive, rendering the program no longer necessary

In fiscal year 2009, the State Energy Program will continue to include competitive grants for State policies and programs that increase adoption and compliance of advanced building energy codes, accelerate the use of performance contracting and alternative financing by State and local governments, and increase investments in utility delivered efficiency programs and other high priority EPACT 2005 and EISA programs.

The State Energy Program helps enable State governments to target their high priority energy needs and expand clean energy choices for their citizens and businesses. Benefits include reduced energy use and costs, environmentally conscious economic development, increased renewable energy generation capacity, and lessened reliance on imported oil. A combination of technical assistance, outreach, and financial assistance support effective program implementation of the National Action Plan for Energy Efficiency and provisions of EPACT 2005 and EISA.

FACILITIES AND INFRASTRUCTURE

The budget request for Facilities and Infrastructure supports operations and maintenance (O&M) for the National Renewable Energy Laboratory (NREL), a single-purpose laboratory dedicated to R&D for energy efficiency, renewable energy, and related technologies. The request for fiscal year 2009 is $13.9 million: $10.0 million for core O&M (a $3.1 million increase) and $4.0 million required to complete Phase I construction of the Energy Systems Integration Facility (ESIF).

This budget request represents a decrease of $62.2 million compared to the fiscal year 2008 appropriation, primarily a reflection of Congress's fiscal year 2008 provision of $54.5 million to initiate construction activities for the ESIF and to begin additional site infrastructure work. Funding beyond that which is requested for fiscal year 2009 is not needed, as much of the construction taking place was fully funded in prior years. The remainder of the decrease is a result of including requested solar research capital equipment replacements within the Solar Energy Program budget, where such equipment is typically funded.

CONCLUSION

The penetration of EERE technologies into the marketplace could save consumers over $600 billion by the year 2030 and save as much as $4 trillion by 2050, cumulatively. Similarly, the technologies in our portfolio could avoid 6 gigatons of carbon (GTC) by 2030 and nearly 50 GTC by 2050, cumulatively.[1] With action plans, performance milestones, clearly articulated deliverables, and continued performance, EERE's budget request supports priority R&D and the achievement of stated goals. Our laboratory products and partnerships will help bring cleaner energy technologies and sources to commercial viability in the foreseeable future.

Senator DORGAN. Mr. Karsner, thank you very much. Finally, we will hear from David Frantz. Mr. Frantz, you may proceed.

[1] Energy Efficiency and Renewable Energy Fiscal Year 2009 Congressional Budget, 20.

STATEMENT OF DAVID G. FRANTZ, DIRECTOR, LOAN GUARANTEE PROGRAM OFFICE, OFFICE OF THE CHIEF FINANCIAL OFFICER

Mr. FRANTZ. Mr. Chairman, members of the committee, I am pleased to be before you today to review our budget for fiscal year 2009 as well as give you a program update on our office.

I am happy to inform you that significant progress on this program has been made over the past year. In fact, just 1 year ago, the Department began its processing of the first 143 applications from the 2006 solicitation, and that period involved very rigorous technical and financial evaluations in accordance with criteria set forth by our Credit Review Board, the governing board of our program.

STAFFING OF LOAN GUARANTEE PROGRAM

Coincidental with this activity, I was hired and began as a top priority: the immediate staffing of the office with permanent Government, Federal employees. In the way of a background, I have over 35 years of international project financing experience, and that also includes over 10 years of experience with the Overseas Private Investment Corporation as a director of loan origination.

And I would add, parenthetically, that the initial cadre of our officers that we are hiring reflect my background. They are significant professional people who have long experience in the field and who also have experience with the Overseas Private Investment Corporation as well.

LOAN GUARANTEE PROGRAM APPLICANTS

On October 4th, we reached our first significant milestone. On that day we announced the promulgation, the announcement of the release of the final regulations for our program under title XVII, and we also announced the selection of 16 preapplicants to be invited to submit 4 applications for the Loan Guarantee Program.

Prescreening conferences have been held with all of these applicants, finishing in the month of January, and all 16 have indicated the desire to proceed with us to full loan guarantees through our process of due diligence.

In addition, a prodigious amount of work has been completed to formulate and write policies and procedures to execute this program and to institute systems that will facilitate us in a very responsive way to process these applications.

LOAN GUARANTEES BUDGET

I would bring your attention to emphasize two points with respect to our 2009 budget. The first is that we are asking for $19.9 million of additional administrative expense to operate our office. And that is a function of the requirement to, essentially, double the size of our office within a year to accommodate our future solicitations.

And, finally, we also are seeking an extension on the fiscal year 2008 budget in accordance with the report language. As you're aware, the whole obligation terminates on September 30, 2009, and that's far too short a period of time for us to begin to prosecute our current workload as well as the new solicitations that you have en-

visioned in the report language. So we are seeking to extend that deadline to September 30, 2010, for all projects other than the nuclear plant facilities and for the nuclear plant facilities to extend that deadline to 2011.

In addition to the report, the language requires us to submit to you and the House Committee on Appropriations a Solicitation Implementation Plan for our future solicitations. We're in the process of working on that plan, and we hope to have it up to you within a month or so.

SOLICITATION IMPLEMENTATION PLAN

In conclusion, I would emphasize one or two items. We understand the objectives and roles of title XVII program. We are not a research and development program, nor are we an early stage venture capital finance group. We issue loan guarantees to help fund the advanced stages of projects that are designed to take pilot and documentation projects to full commercial viability.

We, in conjunction with the Department's Program Offices, will seek innovation and eligible projects as well as environmental benefits, and a reasonable assurance of repayment of our guaranteed loans in order to bring advances into the market, enabling others to replicate or to expand these technologies with full participation of the private sector.

Mitigating financial risk to the taxpayers is of utmost importance to us. In my personal conversations with the Secretary, he emphasized this point with me, and I can assure you our office is committed to do that.

A number of measures are being taken to ensure risks are properly mitigated for each project including a thorough investigation and analysis of each project's financial, technical, and legal strengths and weaknesses, as well as all identifiable risks. In addition to the underwriting expertise of our office, each project will be reviewed in consultation with independent engineering consultants outside of the Department of Energy.

PREPARED STATEMENT

Over the past 12 months a remarkable amount of work has been accomplished. Based on my experience at OPIC and my familiarity with other loan guarantee programs at other agencies in the Federal Government, I can tell you that the Department has moved very quickly in making the title XVII program operational. I know there has been some congressional frustration with the pace of activity, but we have sought to move quickly as possible while ensuring technical and fiscal soundness of the program.

I appreciate the opportunity to be before you today, and I will be happy to answer any questions you may have. Thank you.

[The statement follows:]

PREPARED STATEMENT OF DAVID G. FRANTZ

Mr. Chairman and members of the committee, I am pleased to be before you today to present the Department of Energy's Loan Guarantee Program Office (LGPO) fiscal year 2009 budget proposal and program update. The LGPO administers the Federal loan guarantee program that was authorized for title XVII of the Energy Policy Act of 2005 (EPAct 2005). Under this program, DOE may issue loan guarantees for innovative energy technology projects that avoid, reduce, or sequester air pollutants

or anthropogenic emissions of greenhouse gases, and have a reasonable prospect of repaying the principal and interest on their debt obligations.

I am happy to inform you that significant progress on this program has been made over the past year. Let me quickly review with you some salient milestones. A year ago this week, two very experienced individuals were detailed from the U.S. Treasury Department to help lead the effort of evaluating a total of 143 pre-applicants seeking an invitation to submit full applications for loan guarantees. The 143 pre-applicants resulted from the initial solicitation of the program which officially closed on December 31, 2006. Supported by contractors, over the course of last summer the pre-applicants underwent a rigorous technical and financial review in accordance with criteria set forth by the Department of Energy's Credit Review Board (CRB), the governing board for the program. Coincidental with this activity, I was hired and began as a top priority the immediate staffing of the office with permanent Federal employees. In the way of background, I have over 35 years of project finance experience, predominantly in energy, independent power and heavy infrastructure industries. I have spent the past 10 years with the Federal Government's Overseas Private Investment Corporation (OPIC) as a Director of Loan Origination, which provided me with significant experience working under the Federal Credit Reform Act of 1990.

On October 4, 2007, DOE achieved two major milestones. DOE announced the release of its final regulations implementing the title XVII EPAct 2005. These regulations marked a significant step forward and were the result of a rigorous review and evaluation of Federal credit policy, public comments received on the notice of proposed rulemaking and analysis by DOE. The provisions of the final regulations have provided greater flexibility in the structuring of transactions as compared to the Guidelines originally published in August 2006, including the ability to provide guarantees up to 100 percent of one or more debt instruments employed in eligible projects. Simultaneously, the Department announced that 16 projects from the 143 pre-applications submitted in response to DOE's August 2006 initial solicitation would be invited to submit full applications for a loan guarantee.

Pursuant to those invitations, pre-screening conferences were conducted with the 16 pre-applicants during the months of December 2007 and January 2008 to provide the LGPO updates on the respective projects as well as to inform the project sponsors of the policies and procedures to be followed in preparing and submitting full applications. All 16 of the pre-applicants have indicated a desire to submit full applications and are currently in the process of preparing their applications in compliance with the requirements of title XVII program regulations. We expect that the first applications will be submitted to DOE this month through the Department's electronic data submission system, and the balance of the applications are expected to be received in an evenly distributed progression over the next several months. To date, the CRB has not established a firm deadline by which the 16 applications must be filed but the CRB may do so in the future. A prodigious amount of work has been completed to formulate and write policies and procedures for the application process; to establish the electronic data submission system for receipt of applications and supporting documents; to install requisite accounting systems and procedures for the office; and to develop a model for determining the credit subsidy cost of loan guarantees for projects that receive title XVII loan guarantees.

The LGPO has worked aggressively to assemble a staff of highly qualified project finance experts with significant experience in the private sector as well as in Government working under the Federal Credit Reform Act of 1990 closing other Federal loan guarantees. In accordance with the fiscal year 2008 budget, the plan is to fulfill organizational staffing for a total of 16 Federal full time equivalent (FTE) employees by September 2008 augmented by 6 to 10 contractors. This organization is sufficient to perform the credit underwriting and due diligence process associated with the 16 projects invited to submit full applications, as well as to issue new solicitations within the next year. The schedule for hiring additional staff will be undertaken in close coordination with the requirements for managing the new solicitations and the processing of subsequent applications.

FISCAL YEAR 2009 BUDGET REQUEST

The Department requests $19.9 million in funding in fiscal year 2009 for administrative expenses to operate the LGPO and for support personnel and associated costs. This request essentially doubles the size of the office, over the fiscal year 2008 appropriation, to support continued processing and then monitoring of loan guarantees that may be issued in response to the August 2006 solicitation, as well as the execution of new solicitations to be released this year. This request will be offset

by fee collections from project sponsors in the same amount, as authorized both by EPAct 2005 and the Department's implementing regulations.

In the Committee Report accompanying the Consolidated Appropriations Act, 2008, Congress stated the Department should issue no more than $38.5 billion in loan guarantees under the title XVII program before the end of fiscal year 2009. Pursuant to the act, the budgetary authority provided by the act to issue loan guarantees is available only until September 30, 2009. DOE's fiscal year 2009 budget request seeks to extend that budget authority through fiscal year 2010 for all projects other than advanced nuclear power facilities and through fiscal year 2011 for advanced nuclear power facilities. This extension is necessitated by long development lead times for completing all of the steps preceding the issuance of loan guarantees for major energy projects. Of the total loan guarantee amounts made available by Congress and identified in the fiscal year 2009 budget request, $20.0 billion will be available through fiscal year 2010 to support projects such as Uranium Enrichment, Coal Based Power, Advanced Coal Gasification, Renewables, and Electricity Delivery. The remaining $18.5 billion will be available through fiscal year 2011 to support nuclear power facilities. The $38.5 billion total is in addition to the $4.0 billion in authority provided in fiscal year 2007 under Public Law 110–5.

FISCAL YEAR 2008 AND FISCAL YEAR 2009 SOLICITATION IMPLEMENTATION PLAN

The Consolidated Appropriations Act, 2008 requires that at least 45 days prior to the execution of a new loan guarantee solicitation, DOE must submit a loan guarantee implementation plan to the Appropriations Committee of both houses of Congress. The implementation plan must define award levels and eligible technologies. DOE is in the process of preparing such an implementation plan. The Department plans to submit the plan to the Committees on Appropriations later this month.

CONCLUSION

In conclusion, I would like to emphasize the following points:

We understand the role and objectives of the title XVII loan guarantee program. We are not a research and development program nor are we early stage venture capital providers. We issue loan guarantees to help fund the advanced stages of projects that are designed to take pilot and demonstration projects to full commercial viability. We, in conjunction with the Department's Program Offices, will seek innovation in eligible projects as well as environmental benefits, and a reasonable assurance of repayment of our guaranteed loans, in order to bring advances into the market enabling others to replicate and to expand these technologies with full participation of the private markets.

Mitigating financial risk to taxpayers is of utmost importance to Secretary Bodman and to the LGPO in implementing the title XVII program. A number of measures are being taken to ensure risks are properly mitigated for each project prior to approval of a loan guarantee. First, the due diligence process includes a thorough investigation and analysis of each project's financial, technical, and legal strengths and weaknesses as well as all identifiable risks. In addition to the underwriting expertise of the LGPO staff, each project will be reviewed in consultation with independent engineering consultants. Finally, in addition to taking a significant equity stake in a project, each project sponsor will also be required to pay to the Federal Government the credit subsidy cost to offset the risks associated with the DOE's issuance of the loan guarantee.

The LGPO, when evaluating the eligibility of projects for loan guarantees, and throughout the process of negotiating terms and conditions with eligible applicants, will give due consideration to the technological and commercial maturity of each project in its development cycle. For that purpose, the LGPO will draw upon technical appraisals from experts both within and outside DOE.

Over the past 12 months, a remarkable amount of work has been accomplished. Based on my experience at OPIC and my familiarity with loan guarantee programs at other agencies, I can tell you that the Department has moved very quickly in making the title XVII program operational. I know there has been some Congressional frustration with the pace of activity, but we have sought to move as quickly as possible while ensuring the technical and fiscal soundness of the program. We are continuing to recruit additional qualified staff to finalize the credit subsidy model, as well as to institute comprehensive policies and procedures to initiate the application and due diligence process. Finally, we are developing state of the art accounting and processing systems that will allow the LGPO to monitor and manage the loans over the life of the projects.

I appreciate the opportunity to appear before you today. I will be happy to take any questions that the members of the committee may have.

Senator DORGAN. Mr. Frantz, thank you very much.

We thank all three of you for testifying. Senator Cochran has arrived. Senator Cochran, did you have an opening statement?

STATEMENT OF SENATOR THAD COCHRAN

Senator COCHRAN. Mr. Chairman, I simply want to congratulate the witnesses for the work they're doing to lead the way with the President's Competitiveness Initiative. It's hard work, and I think you're doing a commendable job, and I ask unanimous consent that the balance of my statement be printed in the record.

Senator DORGAN. Without objection.

[The statement follows:]

PREPARED STATEMENT OF SENATOR THAD COCHRAN

Mr. Chairman, I appreciate your holding this hearing to review budgets of the Department of Energy's Office of Energy Efficiency and Renewable Energy, Office of Loan Guarantees, and Office of Science. Development of efficient and clean energy technologies is one of the most pressing issues in the world today. I'm glad that we are here to consider the budgets for these accounts within the Department of Energy. I am pleased to welcome Dr. Raymond Orbach, who has been gracious in his efforts to keep me informed about current initiatives in the Office of Science. I'd also like to thank Dr. Karsner and Mr. Frantz for being here to provide testimony and answer questions.

It is important that the Department continue to look for alternative and renewable sources of energy to lessen our dependence on foreign sources of oil and gas, while promoting cleaner energy production. Mississippi is blessed with abundant resources capable of producing biomass-based energy, and funds need to be directed to the unique capacities of the Southeastern region of the United States. In order to reach a goal of domestic energy sustainability, we must research and develop a broad energy portfolio. I am hopeful that partnerships between Mississippi's research institutions and the Department of Energy will continued be strengthened.

I am glad that the Department of Energy has created cohesion between the Office of Science and the Office of Energy Efficiency and Renewable Energy. Without basic scientific research capability, the United States cannot reap the benefits of our natural resources to meet our growing energy demand. As the rest of the world rapidly increases energy demand, they are also advancing their scientific research. We need to stay competitive in the world market and make wise choices about fulfilling our energy needs.

Finally, I am pleased that the Loan Guarantee program has begun

designating its appropriated funds to deserving technologies. I hope the program will continue to succeed in helping to fund forward-thinking projects.

Thank you all for your time today and for the good work you are doing.

RENEWABLE ENERGY FUNDING

Senator DORGAN. First of all, Mr. Karsner, I'm going to ask you a series of questions and as I've indicated before, I'm pleased that you have joined public service. I think you do an excellent job, and have an excitement and a passion for renewable energy. So let that be a precursor to my questions.

You indicate in your testimony, Mr. Karsner, EERE's fiscal year 2009 request of $1.25 billion is approximately $19 million higher than fiscal year 2008, and as I heard you I thought, well, that's good news. At least they are proposing an increase. And then I took a look at the grid sheet and saw that I'd already known: In fact, the budget proposal is nearly $450 million less than the Congress appropriated last year.

So it's clever to say this is a $19 million increase, but, in fact, your budget requests for a very important part of the Energy De-

partment is close to a half a billion dollars less than last year. To me, that's not justifiable, and so let me describe my concern.

Hydrogen technology. I'm a big fan of hydrogen fuel cells. Senator Domenici and I were the only two legislators invited to a big deal with President Bush about 3 years ago, because both of us have been big supporters of hydrogen, hydrogen fuel cell futures. So we went down to the Building Museum, and the President talked about his support. The fact is, this year's request for hydrogen is not only well under last year's request—it cuts it by well over a quarter—it's $50 million short of what we were spending three years ago.

Weatherization Assistance is zero. And I'm going to show you when we talk about this, the McMillan Report demonstrates that building issues are by far the most likely areas to achieve substantial gains in energy efficiency. You know, my concern about solar energy is cut. The fact is, we're way behind in solar energy, and we ought to be doing much more with respect to solar.

So let me have you take a shot at that. I know you have a passion for these things. I know you can't possibly be up here feeling good about a budget request that's nearly a half a billion dollars under what we gave your office last year. How bad do you feel about this?

Mr. KARSNER. Well, thank you, Mr. Chairman, and thanks for your passionate support of our portfolio.

I feel good every day I serve the President and get to work with Congress and advance these goals. So to be clear, the budget request is above our 2008 request. Of course, the Congress was more generous with the request than last year—and that was an aberration over the historical line—so we enjoyed an enormous plus-up of our portfolio last year, an unanticipated surprise, and we are working to integrate and manage that money usefully.

But in terms of the multiyear planning, the programmatic technological R&D and deployment portfolio, it is a substantial aberration that we went up almost 50 percent last year, and so what I'm suggesting is that this year's request is back in line with what the administration's request had been consistent.

Senator DORGAN. Well, Mr. Karsner—let me apologize for interrupting you—the decision by myself and Senator Domenici and other members of this subcommittee, should not be called an aberration. We decided that this is where we wanted to invest the money because, in the context of the Energy bill that Congress passed, we decided we have to do much, much, much more in renewables.

And, if I might continue to interrupt for one second, this is the McKinsey & Company study which you're well aware of.

Mr. KARSNER. Yes.

Senator DORGAN. Go to the far left side. By far the biggest bang for the buck by far in terms of saving energy is building insulation. And yet you come with this proposal to zero out Weatherization Assistance. I mean, just because we added a half a billion dollars in this day and age when energy is so critical, don't call it an aberration. It was a decision by a subcommittee that was a very informed decision.

I'm sorry to interrupt.

Mr. KARSNER. No, it's a quite fair statement.

Would you like me to address each of those, categorically?

Senator DORGAN. Please do.

HYDROGEN TECHNOLOGY FUNDING

Mr. KARSNER. Okay. First let's talk about hydrogen. Hydrogen, obviously, was announced in the 2003 State of the Union and the President introduced it, a 5-year plan for $1.2 billion. The Department had completed that 5-year plan in 2008 for the $1.2 billion. Hydrogen remains amongst the most robustly funded of any of the programs in the EERE portfolio, precisely because of the progress that was made during the years of the hydrogen fuel initiative that enabled us to focus on the acute problems and the metrics that would define the barriers that needed to be overcome in order to achieve a 2014 commercialization decision.

We have upped the amount of budgetary focus on those key areas, principally: on-board storage in the vehicles that would enable a 300-mile driving range and further reduction of the fuel cell stacks, the Pennfuel cell stacks, that would get them to the programmatic target of $30 per kilowatt on a manufactured basis. We are making continual progress on that, but we seek to accelerate the progress by moving more money, disproportionately, into those areas.

It's a little bit deceptive when we talk about the amount of money it was cut, because, actually, more than half of the hydrogen funding that appears to be lowered was moved over into the Vehicles Technology program—things like education cogent standard, technology validation, and demonstration—because of the need to diversify all of those things across biofuels, across plug-ins and hydrogen. In other words, Vehicles Technologies was a better-placed program to have a more agnostic technology-neutral view of all the technologies that we are cultivating for gasoline displacement. In order to do that, it has sort of become the air traffic control of transportation platforms for education cogent standard.

The other portion of hydrogen that was diminished are specifically those elements that we think are ready for prime time and commercialization, and eligible for the Loan Guarantee Program today, and that would be renewable production of hydrogen, principally through electrolysis. Electrolysis is not overly high tech; there is not a lot of value added. When compared to the amount of investment, we need to dedicate the fuel cell stacks and storage, and so we think we can still, in places like the Dakotas, wind power to hydrogen with electrolysis using loan guarantees on a commercial basis today. That would be a better use of the $10 billion allocation that we have in that area. There are some things that need to graduate out based on the progress that we've made. That really sort of addresses hydrogen. Would you like me to go on, on this?

WEATHERIZATION GRANTS

Senator DORGAN. Well, because I want my colleagues to have ample time. Weatherization you zero out, and I was thinking of the—I forget who it was describe something as the "homeopathic soup made from boiling the shadow of a pigeon."

How do you zero out weatherization and come here and say this is a good approach to dealing with energy efficiency?

Mr. KARSNER. Well, we're driven precisely by the chart that you held up with regard to the need to address building technologies in the built environment. The question isn't what is the mission of weatherization with respect to doing that, but what is the efficacy and efficiency of this mechanism, this program in doing that?

Weatherization grants are income-related assistance grants that are good and worthwhile things for the Federal Government to do, but, chronically, every year we have a discussion about not whether we should do them but where in the Federal budget they belong. Because competing against the Building Technology programs that are the ones that can satisfy the McKinsey metrics for 50 percent efficiency savings and that get 20-to-1 return, these chronically fall short, being rated at about 1.5 return on the dollars.

All of the metrics for weatherization suggest that it should be competed where it belongs in income-related assistance programming, which is a good and worthwhile thing, but it is, unfortunately, lodged to compete against these building technologies that deal with climate change, national security, that require much greater leveraging.

Senator DORGAN. But the President does not recommend it be over in the other area competing in his budget as I see the budget. So, I understand your point, but that's not what the President is recommending.

Mr. Frantz, I'm going to allow my colleagues, Senator Domenici and Senator Craig to have a pretty good opportunity to talk to you, and I know they've got a lot on their minds.

And, Dr. Orbach, I'm going to wait until a second round. I appreciate the work that goes on at our laboratories. Our laboratories are very important institutions for investment in the future of this country's science. And so I'll wait. But I appreciate your testimony, and you've raised a lot of interesting questions as well.

Senator Domenici.

LOAN GUARANTEES

Senator DOMENICI. Well, first, Mr. Chairman, thank you for holding this meeting, and let's hope that within the next 2 or 3 months we will be fully aware of the facts and the funding that we are going to put together for the country in this bill, which many fail to understand is so important to the country, this small appropriations bill.

First, let me talk about loan guarantees because nothing is more frustrating—it's not your fault, Mr. Frantz, but my good friend, Senator Craig, just handed me a piece of paper a little bit ago, and he put two dates on it, 2005 and 2011, because you indicated that you probably needed 2011 for the Nuclear—which is not your fault again. But we just looked at those two numbers and shook our heads.

Six years from the passage of the bill, the General Energy bill first in 12 or 15 years that had a provision in it about loan guarantees that, frankly, I can tell you everyone on this committee that helped with it—two of the members here helped on it—he helped a lot—we thought we passed a loan guarantee provision in that

bill, and we run it through every lawyer around, and we thought it was self-executed. And if you read it, it's clear that the full authorization for as much loan guarantee authority as the Secretary wanted, he could exercise. He didn't have to come back to Congress, and we were very happy. We thought even though we had then a reluctant Secretary of Energy—he was reluctant, he didn't think loan guarantees were the right thing—but let me make sure it's understood, he changed his mind, and he's been a strong supporter. But the changing of the mind took a little while.

Then we have the Secretary of the Treasury. You remember that, Senator Craig. I came to you and said, "Can you imagine? Now we have even a bigger bomber against us, the Secretary of the Treasury." He didn't know what he was talking about—excuse me, Mr. Secretary, but you didn't. He thought—he didn't read the section of the law, he thought we were pledging the Federal Government's full faith in credit to these loan guarantees when we aren't. And he didn't read they would pay for themselves, and they'd pay an up-front fee equivalent to what the estimate risk was. That was the theme, right? And it was right.

So contrary to that we had to go through this whole process of appropriating it, getting you hired, setting up a whole new operation, and it's been 6 years and we still do not—it'll be 6 years and we might get some of the loan guarantees for Nuclear. They're a little different, and it's how many do you have? How many do you clear?

Senator CRAIG. Sixteen, Senator.

Senator DOMENICI. Sixteen. They're different than that, and they're going to be big guarantees for a project, and we understand that's not going to be quite as difficult as sorting out, because you're not going to have 50 to compete. And we've got seven formal applications pending, though, which is rather exciting for our country.

Now, let me ask you, do you have everything you need to proceed with your job?

Mr. FRANTZ. I do, sir, thank you.

Senator DOMENICI. You're adequately funded and adequately—the Energy Department gives you adequate authority?

Mr. FRANTZ. Yes, sir, Senator. With the approval of this budget, I'll have sufficient resource to prosecute the——

Senator DOMENICI. All right. Now let me ask you, you were with which department of the Federal Government doing loan guarantees?

Mr. FRANTZ. With the Overseas Private Investment Corporation, sir.

Senator DOMENICI. Now, doesn't it strike you strange that the OPIC made money on its loan guarantees using the same provisions that we are? They don't lose money, they make money, and we've got the Office, the Congressional Budget Office, insisting that this one is going to lose 1 percent because we're going to make mistakes. You didn't even know who you are, what—how good you are, you're just going to lose 1 percent. So he charges us $352 million for the whole portfolio even though we haven't spent a penny yet.

Does that strike you as a little bit wrong?

Mr. FRANTZ. It does, sir. As a matter of fact, I made a presentation, ironically enough, to the Congressional Budget Office on December 7, on this very subject and made the very point that you're making. And that is when a self-pay program which differentiates us from the Overseas Private Investment Corporation, as you're well aware, where our clients are actually paying this credit subsidy cost to cover our risk, that seems redundant, to say the very least, that this additional 1 percent would be levied on the projects.

The answer, the only answer we've received, is that it's because it's a new program and there is the technology aspect, the unproven technology risk associated with them.

Senator DOMENICI. Well, when you build a nuclear powerplant, it isn't as if somebody is toying around with new technology. When they invest $4 billion, they're using a technology that is well known, and it has passed all kinds of gifted overseers to make sure that it's correct, and all kinds of things are built into the law to make sure that this happens. And so it's not like a gamble. They wouldn't gamble. American industry wouldn't gamble on nuclear power if they thought it was what he thinks over there at CBO.

Thank you very much. Let me move over to Dr. Orbach.

AMERICA COMPETES ACT

Dr. Orbach, last August Congress passed the President's—and the President signed—COMPETES, the COMPETES law. This proposal is consistent with the recommendations of the National Academy of Sciences rising above the gathering storm, and it directs the Department to focus greater attention on Science, Mathematics, Education.

Can you tell us, specifically, how your Department is supporting this legislation, and how much money is provided in the President's request, if you know, for COMPETES legislation?

Dr. ORBACH. Well, in the educational——

Senator DOMENICI. For COMPETES.

Dr. ORBACH. For the COMPETES——

Senator DOMENICI. Yes.

Dr. ORBACH [continuing]. Itself, I'll have to answer that, for the record, our budget is responsive to the America COMPETES Act and actually covers the issues that were addressed. So I would say that our increase in the budget request would deal with the America COMPETES Act.

Senator DOMENICI. All right.

Dr. ORBACH. In the specific area of education, we've increased the Workforce Development program within the Office of Science together with the Fellowship program that matched the education components of the America COMPETES Act. About half of them—there's a considerable opportunity there—will be found in our fiscal year 2009 budget request.

Senator DOMENICI. So is it fair to say that this time we are taking the COMPETES Act seriously, and we're attempting to fund it?

Dr. ORBACH. Yes, sir. I believe it's an opportunity for our country, and we are going to be fully behind it.

LOS ALAMOS NEUTRON SCATTERING CENTER (LANSCE)

Senator DOMENICI. All right. LANSCE Refurbishment and MaRIE, a proposal that is built around LANSCE; Dr. Orbach, you and I have spoken extensively about maintaining our science capability at our national laboratories, both the Office of Science facilities and NNSA labs. I believe you share my belief that we need to update LANSCE at the LANSCE facility to sustain cutting-edge science at that lab on materials research. That's what it has to do with. This will have relevant science applications for both NNSA Weapons programs and the Office of Science.

Now, why doesn't the 2009 budget request provide funding necessary to upgrade this excellent facility called LANSCE?

Dr. ORBACH. Well, our part of the funding that surrounds the operations of LANSCE works through the Lujan Neutron Center, and that's fully funded in the President's request.

In addition, the Nuclear Physics program has increased its funding at Los Alamos to about $4 million. And, finally, we have invited Los Alamos to participate in the Energy Frontier Research Center competition, and there is a provision in there for materials under extreme conditions. And we think this is an opportunity for the whole country, but especially for Los Alamos in the competitive environment.

ENERGY FRONTIER RESEARCH CENTERS

Senator DOMENICI. What are the frontiers of science that you spoke of?

Dr. ORBACH. The Energy Frontier Research Centers cover the basic science that will enable energy prospects for our country for the future. Very frankly, we can't get to where we want to go using technology that was invented in the 19th century and developed in the 20th century.

The opportunities in the 21st century, as I outlined at the atomic molecular level, have yet to be plumbed. And those centers are focused on those issues, namely energy issues that use modern technology.

We're talking about opportunities for photosynthesis, artificial photosynthesis to take solar energy and produce fuels. We're talking about an electrical energy storage that will enable the grid issue, which was brought up before, to be dealt with which we can't do now, but with advanced technologies, with nanotechnology, and multielectron transfer, we believe are possible.

And other elements that I can go into——

Senator DOMENICI. That's fine.

Dr. ORBACH [continuing]. Of that basis.

Senator DOMENICI. So you're going to do this kind of advanced frontier work?

Dr. ORBACH. Absolutely.

Senator DOMENICI. Thank you, Mr. Chairman. I have some additional questions. I'll wait or I'll submit them.

ETHANOL TECHNOLOGY AND PRODUCTION

Senator DORGAN. Senator Craig?

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

Mr. Frantz, the chairman has already offered you up to Senator Domenici and I, so I will not miss that challenge or opportunity.

Let me walk you through a scenario that's going on in America as we speak that would suggest to me your sense of urgency in dealing with some of these loan guarantees in Advance Technology. Last year we produced 7.8 billion gallons worth of ethanol, corn-based. Everybody's frustrated now by its potential disruption of the food chain right down to, if you will, tortilla shells. And the reality that America's agriculture will suggest that we may be planting 8 percent less corn this year than we did last year.

We just have a new ethanol plant coming on in Idaho, and you're going to see unit trains of corn, literally, moving out of the Midwest to Idaho because we're not a corn-production State. We're largely cold weather grains and all of that, and yet those prices, the whole commodity market is considered by, at least historic values, upside down today.

Farmers are smiling and they should, and they're profiting and they should. The consumer is beginning to feel it at the shelf in some areas.

Having said that, last year we suggested, by law, that if ethanol production by 2022 can be at 36 billion gallons and yet we anticipate that corn-base can only take us to about 15, now having said that, we are already stressing out under the current environment at 8 to 10 billion gallons. So 15 may be a very real stretch unless Monsanto can bring on their GMO of 300 bushel of corn. But that's still out there in the scientist eye.

Now the environmentalists are concerned about the carbon footprint of corn-based ethanol and what that does in climate change, and it's very energy intensive, and it needs to be subsidized, but yet it's factoring into the price at the pump. Articles last week suggested that consumers were paying less for gas because of ethanol in the world market.

My point is quite simple: We believe, many of us who spend a lot of time looking at this, that to get to the 36 billion gallons or near that, we've got to get to cellulosic ethanol, and we must get there as soon as we can. And if you were the consumer out there—and you are, like all of us are—buying $3.30 or $3.40 a gallon for gas, there is a very real sense of urgency, the reason I penciled for Senator Domenici the spread of 6 years of time of bureaucratic movement in which we sense no urgency whatsoever.

Now, having said that, New York Auto Show, almost every automobile on the floor was a flex fuel or E85 or an electric car. And yet the world is not yet ready to produce that, or at least we had our discussion about hydrogen today, and the world is not yet ready to produce it in the volume that the car companies will need because they're about ready to bring to commercial value a hydrogen fuel cell car.

Time is of the essence, and I know you talk very optimistically about how you've geared up to handle this. Now, I hope that you have running shoes on and you are bringing that sense of urgency into that staff.

Now, diligence, surely. Responsibility, of course. But run 12 hours a day, turn the lights on, don't oh-hum this and move it through. America is ready to become independent, and we are

struggling to get there, and this whole committee senses that, and that's why we jumped in front of it in 2005, and we hit it again last year. And we're phenomenally frustrated when it's handed off downtown to a sluggish, uncertain, frustrating, and sometimes less-than-willing participant.

I don't know if we can get to cellulosic. I think there are some commercial operations stood up, but we ought to try. And we ought to try and if we fail in one, there are some technologies out there that might lead to the front.

Now, if you had the loan guarantees ready 2 years ago, we would probably have a commercial-grade stand-up operation going right now.

Senator DORGAN. For which?

Senator CRAIG. But we don't have that.

Senator DORGAN. For what?

Senator CRAIG. Cellulosic ethanol.

Senator DORGAN. Cellulosic ethanol.

Senator CRAIG. At least that's what we're told by the industries involved. I don't necessarily believe you need to respond to my small rant, but I hope you appreciate what we're sensing on the ground with the consumer, both in food and in energy as to their frustration today about their pocketbooks being stretched beyond their capability.

Mr. Orbach, I would like to suggest that in my conversation with the Center for Advanced Energy Studies in Idaho this last week, they will be contacting you, and sensing the opportunities that you hold in your office and that we hold at the lab; and I assured them that they should anticipate and expect full cooperation from you, as I know that will be the case, and I thank you for it.

I'm out of time, I'll come back. Thank you.

Senator DORGAN. Senator Craig, thank you very much.

Senator Murray?

PHYSICAL SCIENCES FACILITY

Senator MURRAY. Thank you very much.

Dr. Orbach, as you know well, we've had a number of conversations about the level of funding and various pieces of the budget that relate to the tri-party memorandum of understanding for the Physical Sciences Building being built at PNNL, and the 300 Area. I know you know the topic well.

Last year's fiscal year 2008 appropriations resulted in about $65 million to the Department of Energy and the Department of Homeland Security. That wasn't an easy task because the Department of Homeland Security request was zero, and we had to work with our colleagues here to include an increase of $15 million for that project.

I appreciate that the Department of Energy this year has requested the appropriate level of funding in the 2009 budget. However, the Department of Homeland Security's 2009 budget request is not what was assumed in that memorandum of understanding. Now, I have no idea what conversations have been between your office and Under Secretary Cohen's office, but I have been ensured by them that whatever additional funds I will be able to add to the

Department of Homeland Security budget for 2009 will be received, enthusiastically.

I wanted to ask you while you're in front of our committee today what your understanding is of the reasons why DHS didn't see the required funding in 2009 consistent with that MOU.

Dr. ORBACH. Senator Murray, first of all I want to thank you for your help in moving this critical project forward. We deeply appreciate it.

To be honest with you, I don't know why DHS submitted the numbers that it did. It is, as you point out, $13 million less than the MOU requirement that we had agreed to. I have been in contact through my staff with Under Secretary Cohen, and your description is the same as mine, namely, that he is eager to implement the MOU. We will do everything that we can to see to it that that building is built on time and on schedule.

Senator MURRAY. Okay. I don't know the timing for the fiscal year 2009 appropriations bill, but ensuring that we have sufficient funds for that MOU is going to be a top priority of mine.

I want to ask you if I have your commitment that you will do what you can to assure this project as it is currently envisioned is going to continue on schedule regardless of when the funding is made available in 2009?

Dr. ORBACH. We'll do our very best to do precisely that.

Senator MURRAY. Okay, I appreciate that, and we'll work with you to do that.

ENVIRONMENTAL MOLECULAR SCIENCES LABORATORY

Dr. Orbach, I'm also really pleased to see a small increase in funding for the Environmental Molecular Sciences Laboratory, and I know the lab is planning to upgrade some of their equipment that's now several years old. I wanted to ask you today what your vision is for EMSL and what kind of challenges you foresee in the future?

Dr. ORBACH. Well, I have two comments to make both of which are laudatory about EMSL. When we visited 4 years ago, we set them a target. We said this is over the edge. "This is beyond normal, and if you can meet it, we will continue and expand our support of the laboratory." We didn't tell them what areas to invest in, but those two areas that they chose are now world-leading, and Interfacial Chemistry and Subsurface Biogeochemistry, if you say that phrase, people think EMSL. And it's really wonderful.

The opening of the new facility, jointly with Washington State University, is again a statement of how successful EMSL has been and how it now will have an educational component as well.

SCIENCES LABORATORIES INFRASTRUCTURE

With regard to the future, and in particular the infrastructure issue that you raised, this is, unfortunately, true not just of PNNL but of all of our laboratories. And you will see an increase in what we call our SLI component, our infrastructure component in the President's request. And I can tell you that over the next 5 to 10 years you will see that component increasing substantially as we attempt to address these needs.

I met yesterday with all 10 of the laboratory directors of the Office of Science, and to a person they spoke of the need for infrastructure support. And you will see substantial numbers increases as a consequence in our budget proposals.

Senator MURRAY. Very good, I appreciate that.

Mr. Karsner, I also wanted to ask you about the budget request for a small investment in Water Power to study the potential of marine, ocean, and wave energy. As you know, the 2007 Energy bill explicitly authorizes R&D for marine and hydrokinetic technologies—can you tell me a little bit about what your goal is for that research, including ocean and wave energies?

Mr. KARSNER. Yes, Senator. I'm actually quite excited about the introduction of that budgetary item as part of our request, along with the geothermal—reinvention of the Geothermal Program. It demonstrates what I'd like to think of as portfolio agility as new technologies evolve.

Obviously, in the early years, it is standing up the correct programmatic organizational piece that would be disproportionate than what we would predict for subsequent years. But we have specific statutory requirements as well that need to be addressed in terms of soliciting for Marine Energy Center partnerships around the countries. So finding out where the best skills lie in universities and laboratories, in businesses and product manufacturers around the country, we are not long for putting out a solicitation for that purpose in the very near future.

As well, we intend to facilitate some of the existing technologies that we know have evolved during the period of time that the Department has been engaged in this activity. So thanks for run-of-the-river hydro, buoys off the west coast of Washington and Oregon, in Hawaii, other places, and we also see an international component to this. There are other nations that have been engaged in this activity, principally in the United Kingdom and Scotland, in Spain, in China, where we want to sort of galvanize what the best of has been out and around the world.

We have our work cut out for us to catalyze something new. There's a hardware component to it—an organizational component to it.

Senator MURRAY. Okay. Well, you may know that the DOE's only Marine Science Lab is located on the Olympic peninsula in my home State.

Mr. KARSNER. I hope to visit there soon.

Senator MURRAY. And we'd love to have you come out and see it.

Mr. KARSNER. Yes, and I'm going to.

Senator MURRAY. I think you'd be really excited about it and some of the opportunities there.

Mr. KARSNER. Sure.

Senator MURRAY. And while you're out—my time is short—I'd love to have you stop by the Bioproduct Science and Engineering Lab at WSU and see that great public partnership there that's working on some biofuel and bioproduct.

Mr. KARSNER. My intention is to visit PNNL on May 8. Hopefully, I can work with your office in collaborating on it.

Senator MURRAY. We'd love to work with you on that. Fantastic. Thank you very much.

Senator DORGAN. Senator Allard?

ENERGY TRANSMISSION

Senator ALLARD. Thank you, Mr. Chairman, and Mr. Karsner. It's good to see you with us this morning. I'm real proud of the work that's being done on Colorado Renewable Energy.

I'm going to focus on another tangential area which I think is important when we look at the total energy picture. One is transmission. You know, particularly, in rural areas transmission is an issue where you're having electricity travel over a certain period of time. There's not only access to getting transmission lines, but I think there's some efficiency issues that come out.

What are we doing to develop some technology where, when you move your electrical current over a long period of time, you don't lose a lot of the electrons in the transmission process? And what are you doing in that particular area?

Mr. KARSNER. Thank you, Senator, and thank you for your leadership, both in terms of the Colorado Caucus and hosting NREL and the Renewable Caucus here up on the Hill. Let me say that the principal responsibility for the questions that you've asked reside in my colleague Kevin Kolevar's office, the Office of Electricity which at one point was part of our office, but has, because of the growing role——

Senator ALLARD. Yes.

Mr. KARSNER [continuing]. Of the issues that you just addressed has stood up admirably, an excellent program for both emergency response and grid integration issues.

On the latter, grid integration and integrating the new technologies to meet the intrinsic characteristics of renewable technologies, Kevin and I have worked very closely. In fact, we jointly program a great deal, and much of that is reflected in the budget. He talks about long distance DC lines and available technology that need citing, permitting, the transmission corridor authority that he's exercising, and also superconductivity. I don't want to go——

SUPERCONDUCTIVITY

Senator ALLARD. I do want to get into the superconductivity at this time. I understand those other problems, and what are you doing in that area?

Mr. KARSNER. And as I was just about to say, that superconductivity is an area where I can't go too far in, because that really is Kevin's portfolio.

Senator ALLARD. I see.

Mr. KARSNER. But I just would like to add, because of NREL's role, because of the new Energy Systems Integration facility that we're building, that the Office of Electricity will have a role in, that the transmission technologies that are evolving through Kevin's portfolio, and the deployment of those technologies that David's portfolio are taking care of, are indispensable to the growth of renewable technologies on the trajectories that our office plans.

Senator ALLARD. Okay. Yes, Mr. Orbach?

Dr. ORBACH. Senator Allard, I would like to comment on the Superconductivity, directly——

Senator ALLARD. Okay.

Dr. ORBACH. Because the Office of Science works very closely with Assistant Secretary Kolevar's program on electrical transmission. This is an example of where the applied program through Kevin Kolevar's program and the basic research work very closely together. And you will find in the budget a coordinated program for this effort.

We are using nanotechnology and other methods to increase the current carrying capacity at temperatures for high-temperature superconductors that would allow us to use liquid nitrogen cooling rather than having to go down to helium. This is a tremendous advance and a power line in the State of New York in Albany has already been put into place to demonstrate that you can, over reasonably short distances, conduct electricity without loss——

Senator ALLARD. That's interesting.

Dr. ORBACH [continuing]. Using high TC.

Senator ALLARD. I knew with high—with very cold temperatures you could do that. This is high temperatures using nitrogen.

Dr. ORBACH. Precisely, and that's what we've been working on very closely, and that's a perfect example of the interaction between basic science and the applied programs where we would call it use-inspired research.

Senator ALLARD. Yes.

Dr. ORBACH. And because of the new, as I referred to in my opening comments, the new capabilities that we have in the 21st century, we have made substantial progress.

ELECTRIC ENERGY STORAGE

Senator ALLARD. Thank you for your comments. The other area that's sort of tangential to all the energy development is storage. And, of course, though, when you talked about solar or wind, it's intermittent to some degree. In Colorado we happen to have plenty of both, so maybe it's not as much of a problem as it is in some States. But again, storage, I think, is an important issue.

What are you doing on storage technology? I'd like to hear some of your comments on that. Yes?

Dr. ORBACH. Could I respond to that? The problem that we have currently with storage is that our batteries are no different than they were in the 19th century.

Senator ALLARD. Yes, you have to think beyond just a traditional battery.

Dr. ORBACH. Precisely.

Senator ALLARD. Yes.

Dr. ORBACH. And there are two developments that are taking place right now that we have great expectations for, but they're difficult.

Senator ALLARD. Uh-huh.

Dr. ORBACH. The first is to take the battery, which currently takes one electron and transfers it, and do two-electron transfer—actually up to four-electron transfer. That would increase the capacity of storage by factors of two to four.

Senator ALLARD. Uh-huh.

Dr. ORBACH. That's what nature does.

Senator ALLARD. Are you changing the materials

or——

Dr. ORBACH. Oh, yes. We'll be going to vanadium compounds, for example.

Senator ALLARD. Uh-huh.

Dr. ORBACH. People have even talked about six-electron storage.

Senator ALLARD. Uh-huh.

Dr. ORBACH. We're looking at these new materials to see which would be most efficient, but there's another area that's also developing, and if you ever built a radio, you remember the electrolytic capacitors back when I was growing up. They had microfarads of capacity.

We now, in the same volume, can store farads—a million times more electrical charge—and this is because, again, the new technologies that are being developed for nanoparticles, the very, very tiny spaces between the electrodes. So it's very possible that supercapacitors, which is what we call them, may well be an efficient energy storage device.

Senator ALLARD. I'd—go ahead.

Mr. KARSNER. I was just going to comment from the applied perspective.

Senator ALLARD. Sure.

Mr. KARSNER. Ray, Kevin, and myself, in fact, work very closely on storage because we all see it as a priority to enabling the growth of the technology solutions. So in our context it's both transportation and generation. We are moving on a much more wholesale basis on the generation side from multiple storage solutions that we had not previously invested in, like compressed air, molten salt for concentrated solar power, grid-based battery storage, electrolysis to hydrogen, viewing our hydrogen not just as a source but as a carrier and, of course, trying to optimize the best storage that's already available out there, which is natural gas turbines that we begin to alleviate the gas dependency in already existing hardware.

Senator ALLARD. Yes, I like the idea of the hydrogen.

CELLULOSIC ETHANOL

Mr. Chairman, I have one comment I want to make. I know my time has run out.

I visited a company in Colorado—they're a research company—call Range Fuels, and this is for Senator Craig.

They actually have developed a very ready-to-go on the product, cellulosic source of ethanol. And the by-product they bring back into the equipment and itself—they don't have to rely on energy itself, it can stand alone—and they're using wood chips and converting it to product, a combination of alcohols: ethyl, methyl, propo, butanol.

Then, obviously, there's a way of, you know, separating out those different alcohols. So they're ready to go, they tell me, but they need more wood than what Colorado can provide, and so they're going ahead to Georgia or Southern States where they have more wood and shorter growths time as far as the forests and what not are concerned.

So that's good news, and they did it with, I believe, a grant from your Energy Department in doing that, and they tell me they're ready to go to market.

Mr. KARSNER. In fact yesterday, it was announced in The Wall Street Journal that that group was the first to close of the six contracts related to the section 932 cellulosic facilities. They closed $150 million in private funding against the $76 million grant that we provided through the sector capital. So it is a success story, particularly in the current investment environment that cellulosic ethanol companies that are just breaking ground of this initial six are still able to track enormous private sector capital.

Senator ALLARD. Thank you, that's good to hear.

ITER PROJECT

Senator DORGAN. Dr. Orbach, a quick question about the Fusion Energy Sciences Program. Tell me, how close are we to some unbelievably exciting breakthroughs in that area?

Dr. ORBACH. Mr. Chairman——

Senator ALLARD. Unbelievable.

Dr. ORBACH.—I hope we're very close. We are, together with six other parties representing half of the world's population, prepared to put our money on the table to build an experimental reactor called ITER. And the reason we can do that now and could not do that before is our computational facilities have now shown that there's a good chance that we can keep that plasma continued and operating for significant periods of time.

This is the most important thing that I think the world addresses because we're starting construction within 8 years. The construction will be finished, we hope, within 5 to 10 years. It will meet its target of producing 10 times as much energy as it goes into the machine itself.

I think we're closer, so close that it's so exciting the opportunities that fusion brings if either is successful, will then generate a demonstration powerplant. And my guess is that's somewhere between 20 and 30 years away. So we're not talking 50, we're not talking in abstract terms; we're talking about leapfrogging the technology from ITER to a demonstration power plant.

ITER itself is half a gigawatt. It's not a small machine, and we have every expectation that it will work and work well, and we're working very hard on the basic science to make sure that it does work.

Senator DORGAN. The President's recommending close to a half a million dollar—half a billion dollars in this coming fiscal year, $493 million.

You talk about the other countries involves. What kinds of contribution exists from other countries?

Dr. ORBACH. We have fallen behind an order of magnitude. Europe is at the same level we are or higher, and Japan is also at the same level or higher. But you have to also now count China and India, which are making major investments in fusion.

In fact, the world's first superconducting tokamak is called East in Hefei, China. It's, believe it or not, our design, which we never developed. But it is now operating. They are putting major efforts into fusion research.

Senator DORGAN. Do my other colleagues have questions? One last one, go ahead, Senator Domenici?

Senator DOMENICI. Let Senator Craig, go ahead.

IDAHO NATIONAL LABORATORY

Senator DORGAN. Senator Craig, go ahead.

Senator CRAIG. Mr. Karsner, I did not have an opportunity to visit with you. In combination with the work that you're doing and the work that we have done and are currently involved in at Idaho and I'm talking about—we've already talked about hydrogen, hydrogen fuel cells, advanced vehicles in that sense, both the hybrids and the electrics. We've done a good deal of that work out at the lab, and the testing team continues to provide this function for present and future vehicle testing.

I would hope that, you know, where we partner that there's a relationship there that makes sense between what you do and what they do, and, you know, I know there is this desire that, oh, that's that technology. We will reach out and grab it and pull it in, and sometimes that effort isn't as productive as it relates to how you effectively utilize resources as it is to team and to partner.

We've, you know, when all of us sit here and look at our phenomenal lab facilities nationwide and sort out the resources as it relates to these labs, we recognize levels of expertise and talent, and know that that's where it ought to be versus going somewhere else.

Can you respond to that? What is your vision for the vehicle testing program, and what future do you see in the relationship that you would have with the INL and its role?

Mr. KARSNER. Well, yes Senator, and I would say I don't want to limit my comments to just vehicle testing, because you may or may not know that Idaho National Lab was the instrumental lab working together with NREL last year in resolving the FAA, Department of Defense radar challenges that we face.

Senator CRAIG. Yes

Mr. KARSNER. It almost closed down the wind industry, and the difference between the work that was done, the collaborative work between INL and NREL had it not occurred, had we not had that collaboration from that expertise located at the Idaho National Lab, we would not have been the world leader in wind energy last year. Arguably we would have had a fraction of the projects come on line.

What that tells us is exactly what you're suggesting, is that there are repositories of good work all around the laboratory system, and it has been my philosophy that even though I have responsibility exclusively for an applied lab, working together with Ray and the Office of Science, we want to maximize the available talent spread across all of these laboratories. That inspires our visits to Lawrence Livermore where they have 50 years of experience on radioactive diffusion of particles, so the best wind assessment data available globally that can inform the way that we grow that industry: Idaho on vehicles and battery technology, and wind, as I suggested has been indispensable. Sandia has a very old relationship with us and is a leader on the solar technologies and high performance computing. We are doing generalized lab calls that are new to us to say, what do you have out there? Who are we underperforming the

opportunity to engage? That's the way we approach these labs as national assets.

Senator DORGAN. Senator Domenici?

Senator DOMENICI. Thank you, Mr. Chair—Senator Craig are you finished?

Senator CRAIG. Thank you, I——

Senator DORGAN [continuing]. You at the end of the answer there, I think.

WIND ENERGY

Senator CRAIG. No, no. No. No, it's what I wanted to hear because I think that we sense that, and we hope that those relationships continue, then, and the wind issue, yes, I'm familiar with what went on out there. I think it was Gary Siefer?

Mr. KARSNER. That's right.

Senator CRAIG. That did the work. The Air Force might have stopped wind development otherwise. I mean there was that problem that got worked out, and he deserves a lot of credit for it.

Mr. KARSNER. Absolute credit for Gary. And bear in mind because that was a high security lab, we had all those people that can contribute had top-level to Q clearances that could engage the long-range missile radar that folks in my laboratory couldn't.

Senator CRAIG. Yes.

Mr. KARSNER. And so it was just a very important collaboration we intend to——

Senator DOMENICI. Thank you. Thank you very much.

First, Mr. Karsner, I wanted to say that I suspected when we had you before us not too long ago for your hearings on whether we should send you to the Senate after the President had sent you up here, I was convinced that there was no way to contain your enthusiasm, and that if we gave you enough to do, you would be enthusiastic every day of the week, and if you could invent an extra day you'd use that, too. And I have come to believe that that analysis that I made when I said we should hurry up and get you there was right.

Mr. KARSNER. Thank you, sir.

Senator DOMENICI. And I commend you for the exceptional work, and you also work—if you remember, you were very willing to say it—you were going to get something done even if we only had 2½ years.

Mr. KARSNER. Yes, sir.

Senator DOMENICI. Because no one expects you to stay on if a Democrat was elected president. We'll just have to see how that all works out. If it works out otherwise, you can rest assured we'll be recommending that you stay longer, if that's what you'd like.

Mr. KARSNER. Thank you, sir.

Senator DOMENICI. In any event——

Mr. KARSNER. My family has other plans for me.

Senator DOMENICI. I—specific questions. Did you want to comment? Am I wrong about your——

Mr. KARSNER. Thank you for that kind compliment, and I would say to you and Senator Dorgan, we've enjoyed so much support from your committee, the authorizers and the appropriators, that

it has made our job easier to work on a bipartisan basis and get things done.

Senator DOMENICI. I think the real problem we have is that so much is going on the poor American people don't believe us and don't know what's going on because to get from where we are to where we're going to be, it's not going to be a one-way path.

Mr. KARSNER. That's right.

Senator DOMENICI. And it's paths all over the place things are going on. Our money, private money is being invested all over with all kinds of people excited, and the public can't discern that. A breakthrough is going to be made in one or two of these areas and it makes things a lot easier to get where we have to go.

Who knows which ones it's going to be? It might be the one you and Dr. Orbach spoke about on capacitors, on storage. That may be one of the big ones, if we break it. But it seems to have difficulties. I hope you're right, both of you, that you're going to make some movement.

FEDERAL PROCUREMENT REGULATIONS

But I'm going to ask you about a New Mexico problem. Part of your responsibility problem includes increasing the Federal Government's usage of renewable energy, and I've been made aware of a Federal Procurement Rule that prevents an air base in Albuquerque from signing a long-term power purchase agreement beyond 10 years.

We have a site in New Mexico located between a major piece of property called Mesa del Sole and Kirtland Air Force Base. It has been identified as an ideal site for 100 megawatt concentrating power plant with a molten salt storage reservoir. However, procurement rules prevent the base from entering into the contract beyond 10 years. That's short of the useful life of the plant, which has a big impact on the economics of this transaction agreement—potential agreement.

Do you believe these procurement limitations are having an impact on the deployment of Clean Energy Technology, and if Congress were to change the requirement to allow Federal agencies to enter into a longer term power contracts, do you believe this would have a positive impact on commercial development of renewables?

Mr. KARSNER. Yes, sir. The answer is, unequivocally, yes it would have an impact, and I would go further and say nothing would have a greater impact to the Federal Government's role as an early adopter moving markets than to change the rules that enable lifecycle, cost-effective long-term procurement. It is a foolish limitation that is put upon ourselves to not be able to buy things cheaper.

An air base down in Texas buys renewable energy credits because it has to when it is surrounded by the cheapest source of wind energy available that those wind developers would like to sell to the Air Force direct. But they can't sell it directed 2½ cents because of the limitation in long-term contracting, so they have to sell it to them as renewable energy credits for 15 cents. So we lose twice. We fail to stimulate the market, and we charge the taxpayer more for it. Nothing could be greater than long-term contracts; and without it none of the dams across the West would have ever been

built. Life-cycle benefits of clean energy can't be realized if we can't give 20 and 30-year contracts.

Senator DOMENICI. Well, maybe we have to look into that and seek your assistance with where we'll put it.

Mr. KARSNER. We'd be pleased.

Senator DORGAN. Senator Domenici, might I interrupt for just a moment, as I want to understand this. I fully agree with you and with the intent of Senator Domenici's question.

But what would prevent, in the absence of a long-term contract, a wind developer from Texas providing power at 2½ cents to the air base in Texas. I don't understand what would prevent them doing that.

Mr. KARSNER. They do it, indirectly.

Senator DORGAN. But at 15 cents, what would prevent them from doing it, directly, at 2½?

Mr. KARSNER. Because what the power developer is seeking is that long-term contract——

Senator DORGAN. I understand what they're seeking.

Mr. KARSNER [continuing]. So if the base can't provide it, they sell it to the utility. So the utility gets the 2½ cent power, and the obligation then for the military to buy it is achieved through the sale of the attributes of the power, which is an independent market, the RECs, the Renewable Energy Credit.

Instead of buying the power, they're buying the attributes, the green attributes of the power. But it's driven by the fact that, ultimately, the developer needs a long-term contract from somebody. So the question is; is the Government allowed to be that somebody, in its own interest. They will get it from somebody. They will get it from a utility, or they won't show up.

Senator DORGAN. But I was trying to understand the point. Texas has the largest reservoir of wind power in the country.

Mr. KARSNER. Right.

Senator DORGAN. That wind power already exists. And I'm not talking about what's potentially——

Mr. KARSNER. But the base has to buy it, not wholesale, not direct from the supplier, but retail, indirect, from the utility.

Senator DORGAN. There's nothing that prevents them from buying it direct except——

Mr. KARSNER. The inability to get the long-term contract.

Senator DORGAN. But what prevents them from buying another short-term contract, year to year buying it direct?

Mr. KARSNER. A private developer won't have—that would put them in a merchant power situation where they're selling on the spot market their electrons. They need one big long-term, stable offtake agreement to pay for that new facility and to fund the project without it——

Senator DORGAN. You're talking about new facilities. I'm talking about the largest reservoir of wind power in America that's already built. So we'll talk about that later. I'm just trying to understand.

Mr. KARSNER. We'd be pleased to engage on this issue.

Senator DORGAN. I don't disagree on the central point that you're making——

Mr. KARSNER. Yes.

Senator DORGAN [continuing]. But I don't understand another piece of that.

Mr. KARSNER. Okay.

Senator DOMENICI. Okay. Well, we'll have to work on it because we've got to get agreement if we're going to get this change.

Mr. KARSNER. I'm enthusiastic about that one as a renewable energy developer.

Senator DOMENICI. All right.

Mr. KARSNER. So we'd definitely be pleased to provide any technical bipartisan direct——

CLIMATE CHANGE MODELS

Senator DOMENICI. Dr. Orbach, 2 weeks ago I traveled to New Mexico with Senator Bennett for a tour of the NNSA laboratories. During the tour we received briefings on the status of various climate models and challenges facing the scientist to develop an accurate predictive capability.

While your budget seeks modest increases in funding for climate modeling, it is unclear what your specific goals and priorities are for this program. Does the Department or the Federal Government have a roadmap for identifying and solving data gaps and modeling limitations, and what is the Department of Energy's role in solving these complex problems?

Dr. ORBACH. This is a very serious issue that we take particular interest in. There is an increase, as you noted, in our budget for Climate Modeling. Last week we held a measure workshop on precisely this question. It was joint with the NOA from Commerce, the two agencies that are most active in the Climate Change Science Program. And it's through that program that the Office of Science contributes.

We believe that the new computational capabilities, some of which you visited, will give us opportunities for long-term climate change prediction that we've never had before. And so the purpose of this workshop was to lay out advice to us on where to invest our funding: how much we should invest in Measurements and how much we should invest in Modeling.

The results of that workshop are just becoming clear, and we're very excited about the prospect for U.S. leadership in this area.

Senator DOMENICI. Thank you very much.

SOLAR ENERGY TECHNOLOGY

Mr. Karsner, on Solar Power, recently Sandia Laboratory announced a world record for solar to energy conversion. On January 31, 2008, a sterling concentrating solar array located at Sandia Thermal Test Facility achieved a world record of 31.25 net efficiency rate.

Despite the promising performance, your budget maintains a wide disparity between funding for Photovoltaic research, $137 million, and Concentrating Solar research (CSP), $19 million. Based on the economics and technology performance with concentrating solar, a wide, large disparity, or is there—am I missing something?

Mr. KARSNER. No, sir, you're not. It's actually the CSP that has come back from almost nothing. Concentrated Solar Power a few

years ago before I was confirmed was actually knocked by the National Academy of Science and others that wasn't viable at all.

I think that their views on that have evolved, largely with the engagement of our office and much credit to Sam Baldwin, my chief technology officer, so we robustly funded it again, organizationally, to start it out and get the ball in motion. Because of some of the down selects last year and a greater focus on precisely the technology you were talking about, molten sodium, molten salt storage, it's a little lower this year than it was last year.

To be clear, I view the potential for concentrated solar power to be at par with wind power in this country if we can begin to iron out intermittency with improved storage capacities. And these new records that we are setting in that are proof of that.

Senator DOMENICI. What happened is exactly what you said. They had this capacity 20 years ago when we had the first solar energy push followed by the dramatic drop in oil prices down to $8 again, and everybody went out of business. And up there at Sandia was this gigantic array thought to be worthless. But you're saying it's not worthless.

Mr. KARSNER. Not only that, I'm saying to your previous question, if we had 20- and 30-year Federal contracting authority through my Federal Energy Management Program, to bring the bases into compliance, to bring Federal assets into compliance with the EISA law, if we had that tool, you would see an explosion of concentrated solar projects in the country.

NANOSCALE SCIENCE RESEARCH

Senator DOMENICI. And my last one to you has to do with nanotechnology, Dr. Orbach. And the Department now has all the National Nanotechnology Centers in operation. And each center has more applications than they financially support. This leaves many important research projects without funding and you hear that, we hear that, it's a reality.

Your budget request provides $20 million in operational funding for each center, roughly the same level for the last 2 years.

Now, I, myself, understand your limitations. You can't get around the fact that when the Federal Government's balancing the whole budget and talking about that to the people, and they're taking it all out of domestic discretionary spending, we don't have enough money to spend even for exciting things. And that's got to stop one of these days when we'll be down to zero, and then maybe we'll stop cutting it.

But, in any event, these Nano Center centers have great, great potential, and five of them you have in the country. They have to have money, and I'm just wondering, is $20 million the right number for 2 years in a row for such an evolving, explosive kind of R&D? And they need to work with the private sector. Each one of them has to go out there and find people that work in the same area that put up money for the development. That has to happen, right? At each center and universities.

But can they do it with $20 million?

Dr. ORBACH. So far we believe they can. Last year's budget was severe, and we were unable to fully fund those operations. This

year we restored the operations to what we believe is the optimum level.

But you are quite right. These centers are achieving performance targets that we did not expect them to achieve in 3 to 4 years, and so as their needs increase we will support them. It's a truly remarkable opportunity for the country. And, to be honest with you, we had no—we had some idea, but we were delighted at the developments that have taken place, especially at CINT.

Senator DOMENICI. Let me close by just telling you and Mr. Karsner, both, when you have an opportunity to go visit a Nano Center, or have an opportunity to go visit a Micro-Engine Management Center like they have at Sandia at Mason, and you see the development of little things, that's the real push: the development of little things.

And this doesn't mean "little" like this, so little that you have to work under a microscope, you can't see the machines you were operating. They're so small, and you put them on a pad just like you do now for computers and you see what they're going to do in the future; you just wish that you were 21 instead of my terrible vintage of 75, because it's so exciting.

And the nano is just coming to meet up with the micro. They're matching up, and I just think you don't want to drop the ball on the five centers that are fortunate to have this nanotechnology at their disposal. And if they need $25 or $30 or $40 million, to me it's the best money we could spend.

I thank you, and thank you for listening to me so much today.

Mr. KARSNER. Thank you, sir.

Senator DOMENICI. I appreciate it.

FEDERAL PROCUREMENT REGULATIONS

Senator DORGAN. Senator Domenici, thank you very much.

Let me come back to the point I was trying to make, because I think we were talking past each other, Secretary Karsner, on the issue of wind energy. You're talking about the incentives to develop new wind energy.

Mr. KARSNER. Correct.

Senator DORGAN. I'm talking about an air base that's paying 15 cents a kilowatt hour for energy that exists. We have two air bases in North Dakota that are buying wind power. I set that up. There are no long-term contracts. The two wind turbines that provide that power for the Grand Forks and the Minot base, two wind turbines each, are owned by Rural Electric Co-ops. They then resell to the base, and that puts some money in the budget for the base to buy green power.

But, look, I'd agree with the central point that Senator Domenici was making and you're making about long-term contracts. I want to ask you about something else.

ALGAE RESEARCH

Two weeks ago I was in Phoenix, Arizona, and I toured an area where they are taking carbon off of a coal plant and using it to invest in algae. Now, algae is single-cell pond scum. It grows in waste water, and it grows by CO_2 and sunlight.

And we stopped funding algae research about 15 years ago. Last year for the first time I think we put some algae research money in, but this particular application is really interesting because when you get rid of the CO_2 by feeding pond scum, you create this algae. The algae increases its bulk in hours, and then you harvest it for diesel fuel.

And the diesel fuel from algae, for an equivalent amount of corn-based ethanol, for example, and equivalent amount of acreage, algae will produce roughly 10 times the diesel fuel that corn-based ethanol will produce for an equivalent amount. And so you have the capability of consuming CO_2—which is a terrific thing because we need to be able to use our coal plants—by feeding it to algae, growing the algae, and harvesting the algae for diesel fuel.

Now, there are a couple of projects around the country that I'm very interested in. The one in Arizona is a very big project, and they're not doing it in algae ponds, they're doing it in long greenhouse.

And so my question is, are you looking at that under renewable fuels? Because this is a renewable fuel when you can harvest the algae, and it's up to 10 times more capable of production than, for example, corn-based ethanol. Are you looking at that?

Mr. KARSNER. Yes, sir, we are looking at that. We just started looking at that, you're right. All of this has been in hibernation for quite some time while oil prices were low, and we're working, inaugurating work, with folks out of Sandia and Los Alamos. NREL has engaged Chevron on that subject. I'm aware of the project you're talking about. It's really two separate topics that require work. And Ray is aware of this, the push for carbon utilization as much as sequestration, as a pathway for dealing with climate change solutions, but also, obviously, the benefit of using algae and other microorganisms for advanced fuels that go beyond ethanol alone. So both of those areas are of keen interest to us.

Senator DORGAN. The Texas company that told me about the process they have developed—and this is not renewable energy, this goes more to carbon capture—and I know this is fossil energy—but they are apparently treating the flue gas chemically and producing chloride, hydrogen, and the equivalent of baking soda. And the baking soda contains and captures the CO_2, and then they just landfill the baking soda.

Dr. Orbach, you're waving your head yes?

Dr. ORBACH. Yes, that's correct.

Senator DORGAN. Do you agree with that?

Dr. ORBACH. There are two different ways of handling it. One is the way you just described it, which is chemically. Another is with the IGCC, the integrated plan where you actually separate out the CO_2 before combustion. Both of those now are becoming, you know, within factors of 20 percent, 30 percent, the same cost as normal coal-fired powerplant.

So those technologies are moving rapidly, and I can assure you that fossil energy, the Office of Science and EERE work very closely together in developing those parameters.

Senator DORGAN. I hope. And I hope that's the case because, 50 percent of this electricity comes from coal. We're going to have to

continue to use coal. The question is not whether, it's how, and we've got to find a way to capture and use, or sequester, or contain.

In June, we're going to have a climate change debate on the floor of the Senate. It's going to be a big debate. The question is: are the targets of that bill going to meet the capability, technologically, for us to deal with CO_2 and to be able to continue to use coal? And much of that is going to come, I think, from the basis of scientific inquiry and from the work in the case of algae. It would be a terrific thing if we could convert CO_2 that we don't want entering the atmosphere into a superfuel. It represents the best of all choices, it seems to me.

WEATHERIZATION PROGRAM

Now, one other point I want to make. I think that we have not done a very good job on solar. The fact is, there have been some technology changes in the last 20 years. I understand that the solar plates are still solar plates, but there have been some advances in solar capability, and I think both from a tax incentive standpoint and in other areas, our country has not done well with solar. We need to do much, much better, and I hope we can continue to talk about that.

And, finally, Mr. Karsner, you seemed not to be very disappointed about a proposal to cut your funding by about half a billion dollars. We're hoping to make you happier than you might want to let on.

Mr. KARSNER. Can I speak to that, sir?

Senator DORGAN. Yes, of course.

Mr. KARSNER. Because—and it's considered bad form to not—to speak to something and I wasn't directly asked, but this is my last hearing in front of this committee, and most of that cut is about the Weatherization Program.

Senator DORGAN. About half of it.

Mr. KARSNER. And so I wanted—but the largest chunk is weatherization.

Senator DORGAN. That's true.

Mr. KARSNER. Most of my mission today is making my successor more successful than I was. This issue is chronic, and we will work with anybody in this town, any administration or in Congress, to rationalize where income-related weatherization assistance can best be placed. It's something that is worthwhile and good, and I believe that the people that deserve that money ought to get it.

But 30 years into this, we have delivered 5½ million homes with an annual need of 27 million people. So we are underperforming that mission. Then, at the same time, we're underperforming the mission of the McKinsey Study that you held up by not enabling greater investment in the building technologies that can seriously transform the built-environment. We have got to separate the assistance programs from the technology programs and be able to serve them both. That is our mission this year.

Senator DORGAN. But the key is to serve them both, and the zeroing out here and not adding it elsewhere means that we're missing a part. And so that was my point.

I don't put on your shoulders the zeroing out of weatherization assistance. I don't assume that you recommended that, but—and it

is about half of the reduction—I do think, however, that the reduction in the Hydrogen Technology, and for all the reasons you have described, I still think it is not justifiable.

I think, if we're going to really make progress looking out 15 and 25 and 40 years from now about what we want to have our grandchildren drive—in my judgment hydrogen fuel cell vehicles—I think we really need to put our shoulder to the wheel and fund these projects. The same with solar and other things.

So I agree with Senator Domenici, I like your spirit and your passion, and, you know, I wish you had the resources in your President's budget to match your passion. But we'll probably see if we can help a little bit on that this year.

LONG-TERM INVESTMENT FUNDING

I do want to make one final point, because Senator Domenici was chairman of the Budget Committee for so long, and he made the point that we've got to make sense of all this. We understand that there has to be some belt-tightening, but it's also important the things that really invest in this country's future, really invest in a big way and pay dividends such as trying to fix this energy situation. Failure to invest also can cost you a lot of money.

Now, we have a big fiscal policy problem. People say the deficit this year is $400 billion in the President's proposal. It's not. We're going to end up borrowing $800 billion this year on the fiscal policy side, and $800 billion red ink, and then Trade side $800 billion. That's $1.6 trillion on a $14 trillion economy. There isn't anybody that looks at that from around the world and says that that's an economy on track.

So I understand the challenge. We've got to find a way to deal with all of this. My hope remains, however, that the allocation this subcommittee gets is an allocation that understands the difference between spending and investing. And there's a very big difference: Investments bring dividends, dividends that will accomplish a better future for this country. And I think if we understand that as we allocate funding in the appropriations process, the investments in energy, the investments of basic science, investments in clean energy facilities for the future, this country will be well served by those investments.

I want to thank all three of you for being here today, and wish you well as you work through this year. And I thank my colleague Senator Domenici for his work on this subcommittee.

FEDERAL LOAN GUARANTEE APPLICATIONS

Senator DOMENICI. Mr. Chairman, could I ask David Frantz, you mentioned how many applications you have and how many you've cleared. Are the subject matter of those cleared applications private? Or are they available for committee to look at?

Mr. FRANTZ. They're private, Senator, while we're processing them. They're business-confidential and proprietary information relative to each of the projects that are——

Senator DOMENICI. How long will that last? How long will that—a couple years, or——

Mr. FRANTZ. Yes, at least. Really, a lot of the information can only be released by the applicants that are applying, not on our side. Most of that information is business-confidential proprietary.

Senator DOMENICI. And aren't we going to know, for the people of our country, that we have funded a program doing such and such, or is that not going to happen on along that——

Mr. FRANTZ. We'll publicly, with their permission, we will publicly make announcements as we have reached a successful conclusion on each one of their applications.

Senator DOMENICI. I would hope so. I mean, it's very, very important.

Mr. FRANTZ. Yes, sir.

Senator DOMENICI. Not next week but that it be on your agenda.

Mr. FRANTZ. Yes, sir.

SOLAR ENERGY RESEARCH

Senator DOMENICI. And on solar and what I say, Mr. Chairman, I agree with you. And I think the mistake was made because we stopped the program when the price of oil cam down because we made it—too big of demands on solar were made at that point because of the disparity.

But now we ought to relook at where we are, and maybe you and I could figure out a way to meet for an hour or so and talk about solar in our budget and see where we might make some better investments. And your use of the word "investment" used to not impress me when I was doing the budget because I was always being asked for more money; but as I look at how we spend our Government's money, the committees and all, without trying to take precedence, our committee over another, it is not too difficult to determine where we have an energy crisis, where we have energy-related investments.

I mean, this is the nucleus of whether we're going to get out of this mess 10 years early or 30 years later. Science breakthroughs, that's the difference. And we're there whether people like to spend money on us or not.

Thank you all very much.

Senator DORGAN. Senator Domenici, thank you.

ADDITIONAL COMMITTEE QUESTIONS

At this time, if the members of the subcommittee have any additional questions, please submit them for the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO HON. RAYMOND L. ORBACH

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

COMPETES

Question. Last August the Congress passed and the President signed the COMPETES legislation into law. This proposal, consistent with the National Academy of Sciences study "Rising Above the Gathering Storm," directs the Department to focus greater attention on science and mathematics education and research. Can you tell me specifically how the Department is supporting this legislation and how much

money is provided in the President's request to implement the COMPETES legislation?

Answer. The Department is committed to meeting its responsibility to help increase America's talent pool in science, technology, engineering, and mathematics and ensure that we will have the scientific workforce we will need in the 21st century to address future challenges and maintain U.S. global competitiveness. No additional funds were appropriated in fiscal year 2008 to expand existing programs or to establish new programs authorized under the COMPETES Act. The fiscal year 2009 request, however, contains increases for STEM education efforts aligned with the American Competitiveness Initiative and consistent with the goals of the COMPETES Act.

The fiscal year 2009 budget request includes $13,583,000 for the Office of Science Office of Workforce Development for Teachers and Scientists (WDTS), a $5,539,000 increase from the fiscal year 2008 appropriated levels. Of this increase, $4,214,000 is for the DOE Academies Creating Teacher Scientists (DOE ACTS) program. The $6.4 million requested for the DOE ACTS program is consistent with the summer institutes authorized in section 5003(d) of the COMPETES Act. This section calls for the establishment or expansion of programs of summer institutes at each of the DOE national laboratories to provide additional training to strengthen the science, technology, engineering, and mathematics (STEM) teaching skills of teachers employed in public schools for K–12 students. Fiscal year 2008 is the fourth year the DOE ACTS program will bring K–12 teachers into the laboratories for research intensive experiential-based opportunities to build their content knowledge in STEM fields that they then bring back to their classrooms. The teachers selected for the program participate in research at the DOE national laboratories for three consecutive summers and bring their new knowledge and skills back to their school districts. The fiscal year 2009 request will support an additional 227 teachers to participate in the program, for a total of 341 teachers.

The Outstanding Junior Investigator award programs carried out by the Office of High Energy Physics, the Office of Fusion Energy Sciences, the Office of Nuclear Physics, and the Office of Advanced Scientific Computing Research, and the Office of Science Early Career Programs are consistent with the early career award programs authorized in section 5006 of the COMPETES Act. These programs are focused outstanding scientists that are yet to be tenured university faculty early in their careers and support the development of their individual research programs. Approximately $10,298,000 is requested in fiscal year 2009 across the programs to support early career scientists.

In addition to the programs above, the Office of Science supports several activities that are consistent with the intent of several sections of the COMPETES Act, but differ in their specific implementation. The fiscal year 2009 budget request outlines several programs targeted towards support of graduate student activities and graduate student fellowships that are consistent with the PACE fellowships authorized in section 5009 of the COMPETES Act. The fiscal year 2009 request provides approximately $19,121,000 in graduate programs that range from traditional graduate fellowships that include stipend and tuition support to summer programs for graduate students for experiential learning experience in a number of scientific disciplines supported by the Office of Science. This is an increase of $983,000 over the fiscal year 2008 appropriated levels.

Section 2008 of the COMPETES Act authorizes discovery science and engineering innovation institutes at the DOE national laboratories. These institutes must focus on the missions of the Department and should support science and engineering research and education activities related to areas such as sustainable energy technologies, multiscale materials and processes, micro- and nano-engineering, computation, and genomics and proteomics. Several research centers supported by the Office of Science for a total of $183 million are consistent with this authorization. This includes two of the three DOE Bioenergy Research Centers located at Lawrence Berkeley National Laboratory and Oak Ridge National Laboratory ($50,000,000 total in fiscal year 2009) and seven of the Scientific Discovery through Advanced Computing (SciDAC) Centers for Enabling Technologies that are multiple institution partnerships but centered at the national laboratories. In fiscal year 2009 approximately $18,800,000 is provided to support these seven centers. Additionally, approximately $100,000,000 is requested for the Energy Frontier Research Centers in fiscal year 2009. The competition for centers is open to laboratories, universities, and private sector organizations, or partnerships among these groups. Awards for each center will be $2–5 million per year for an initial 5-year period and centers will focus on innovative basic research to advance scientific breakthroughs relevant to 21st century energy technologies.

The fiscal year 2009 request of $4,721,969,000 for the Office of Science will support approximately 23,700 Ph.D's, graduate students, undergraduates, and technical staff at universities and the national laboratories, a significant number of the Nation's scientific and technical skilled workforce. Additionally, the request will support the use of the Office of Science scientific user facilities by over 21,000 researchers in fiscal year 2009. These sophisticated research instruments and facilities are a significant pillar of the U.S. scientific enterprise, enabling U.S. researchers to remain at the cutting-edge of science and innovation, and provide tremendous training opportunities for researchers and students across the country.

LANSCE REFURBISHMENT

Question. Dr. Orbach, you and I have spoken extensively about maintaining our science capabilities at our national labs—both the Office of Science facilities and the NNSA labs. I believe you share my belief that we need to upgrade the LANSCE Facility to sustain cutting edge science at the lab in advanced materials research. This will have relevant scientific applications for both the NNSA weapons program and the Office of Science. Why doesn't the fiscal year 2009 budget request provide the funding necessary to support an upgrade of this facility?

Answer. The Office of Science-supported Manuel Lujan Jr. Neutron Scattering Center (Lujan Center) is part of the Los Alamos Neutron Science Center (LANSCE). The combined facility is comprised of a high-power 800-MeV proton linear accelerator, a proton storage ring, and instrumented beam lines for the Lujan Center for civilian research and the National Nuclear Security Administration (NNSA) Weapons Neutron Research facility for national security research. NNSA is responsible for the accelerator upgrade project, which would increase the LANSCE neutron source intensity by delivering more proton beam power to the neutron production target.

The Office of Science has invested a total of $26 million in the development of six new instruments and the refurbishment of two existing instruments at the Lujan Center in the last decade, and significant strides have been made at the Lujan Center during the past several years. New sample environment capabilities complement existing strengths in high pressure and engineering stress, and the improved quality of user experiments are resulting in more scientific publications. Continued support of the Lujan Center by Science is contingent upon the Science triennial peer review, and further instrument upgrades by Science are contingent on the LANSCE accelerator upgrade by NNSA. The LANSCE accelerator upgrade was not possible in fiscal year 2009 due to competing priorities in NNSA.

Although the Spallation Neutron Source (SNS) will become the Nation's signature neutron scattering facility, an October 2006 workshop, "The Lujan Center in the SNS Era," concluded that a strong national neutron research program requires the SNS plus other high intensity user facilities. The Lujan Center can remain world class with a future emphasis on cold neutron instruments optimized for 20Hz repetition rate and a shift to more inelastic neutron scattering capabilities at the facility.

SANDIA—ADVANCED COMPUTING

Question. The fiscal year 2008 Energy and Water Conference report directed the Department to establish an Institute for Advanced Architectures and Algorithms at Sandia National Labs and Oak Ridge as a joint endeavor between the NNSA and the Office of Science to continue research of high performance computing architectures. I included this language because I am very concerned about maintaining the U.S. and DOE leadership in high performance computing. As you are well aware the Science-based Stockpile Stewardship program and the NNSA labs pioneered the advanced computing platforms being deployed today and we should not forfeit our leadership in this field. What is your office doing to carry out the congressional direction to establish this joint Advanced Computing R&D capability and what is your plan to sustain this research capability?

Answer. The Office of Science appreciates this committee's support for High Performance Computing in the Department. On January 28, 2008, Sandia and Oak Ridge briefed NNSA and the Office of Science and opened a dialogue about the Institute for Advanced Architectures and Algorithms. This was followed by a series of conference calls and a formal proposal from Sandia. The proposal was funded by the Office of Science in May and it is being jointly managed by the Office of Science and the NNSA.

As we look to the future, research on advanced architectures and algorithms will continue to be a critical element of the computing programs of both the Office of Science and the NNSA. This area is one in which sustained, multi-year efforts are required to achieve progress and where active collaboration between the Office of

Science and the NNSA will leverage scarce resources and enable the broadest impact.

CLIMATE CHANGE

Question. Dr. Orbach 2 weeks ago, I traveled to New Mexico to host Senator Bennett on a tour of the NNSA laboratories. During this tour we received briefings on the status of various climate models and the challenges facing the scientists to develop an accurate predictive capability. While your budget seeks a modest increase in funding for climate modeling, it is unclear what your specific goals and priorities are for this program. Does the Department, or the Federal Government, have a roadmap for identifying and solving data gaps and modeling limitations? What is the Department of Energy's specific role in solving these complex problems?

Answer. The Department coordinates its climate change research, including its climate modeling activities, with other agencies through the interagency Climate Change Science Program (CCSP). While the CCSP has a Strategic Plan that was released in 2003, it does not have an implementation plan or roadmap for achieving the scientific goals of the CCSP. The Department of Energy's Climate Change Research Program is focused on addressing data and information gaps and uncertainties that are limiting climate modeling. DOE has a draft strategic plan that provides a roadmap to address the key gaps and uncertainties and improve climate models and modeling. We will utilize findings and recommendations from several recent reports and workshops to revise our draft strategic plan before it is released. The reports we will use to guide the revision include a pending report from a recent DOE-sponsored workshop on grand challenges in climate change research, the 2007 Intergovernmental Panel on Climate Change (IPCC) Working Group I Report on the Physical Science Basis of Climate Change, a 2007 report from a jointly organized workshop by the Department of Energy's Program for Climate Model Diagnosis and Intercomparison and the World Climate Research Program on Systematic Errors in Climate and Numerical Weather Prediction Models, and National Research Council reports on climate change research science.

DOE's specific role in solving data gaps and limitations in climate modeling include developing and applying diagnostic tools and methods for evaluating climate model performance and identifying the limitations in model performance; supporting research and infrastructure to collect data and information; developing new and improved process models and parameterization schemes that more accurately represent the effects of clouds and aerosols, the two largest sources of uncertainty in climate modeling; developing and applying new and improved ocean, sea ice and land ice models for simulating their role in climate and sea level changes and potential feedbacks between sea and land ice changes and climate change; providing the climate modeling community with access to high performance computing capabilities at DOE laboratories needed to implement advanced, high resolution climate and Earth system models that are essential to modeling the physics of climate processes (e.g., transport of heat, atmospheric motion, formation and evolution of clouds, etc.) and the resulting response of climate to natural and human-induced forcing at regional to global resolution over decade to century time scales; and developing new and improved models of global carbon cycling in the ocean and terrestrial biosphere that can be incorporated in an Earth system model to simulate the interactions and feedbacks between climate, carbon cycling and CO_2 forcing of climate.

Question. The Advisory Committee for the Office of Biological and Environmental Research raised concerns in its report from May 2007 regarding the availability of computing time at the laboratories to run climate simulations. They also raised concerns regarding general difficulties in "engaging" DOE. What has been done to improve this interaction and access?

Answer. Two DOE Federal Advisory Committees, the Biological and Environmental Research Advisory Committee (BERAC) and the Advanced Scientific Computing Advisory Committee (ASCAC) were charged by me to address the computing needs for climate modeling, including changes that may be needed to provide and improve access to DOE high performance computing capabilities for climate modeling. The findings and recommendations in the report of a joint ASCAC–BERAC committee are under review, and a plan will be forthcoming that addresses the climate modeling access issues raised in the May 2007 BERAC report.

NANOTECHNOLOGY

Question. Dr. Orbach, the Department now has all the National Nanotechnology Centers in operation and each center has more applications than they financially support. This leaves many important research projects without funding. Your budget request provides $20 million in operations funding for each center, roughly the

same level for the last 2 years. In light of the tremendous interest in this field of research, why hasn't your office sought an increase? If additional funding was provided to these centers, do you believe it would be well spent?

Answer. The fiscal year 2009 request provides for support that will allow for full operation of the five Office of Science Nanoscale Science Research Centers (NSRCs). The recently completed NSRCs are user facilities that scientists from all sectors—academia, Federal laboratories, and industry—can access to pursue their ideas and are still in the early phases of maturing their operations. As the unique capabilities of the NSRCs become more widely known, the NSRCs are becoming oversubscribed with applications for time from potential users. The synchrotron and neutron scattering user facilities operated by the Basic Energy Sciences program have a history of such oversubscription. It is important to understand that such oversubscription is natural and healthy, because all applications for use of the NSRCs undergo rigorous peer review, which ensures that the best user proposals are supported. Furthermore, the number of users to whom time can be allocated is not simply dependent on the level of operating funds. Each NSRC was designed to operate at its full capacity to serve users with an annual operating budget of approximately $20 million. It is imperative, however, that the operating budgets for the NSRCs—and all SC user facilities—receive appropriate cost-of-living increases in subsequent fiscal years so that they may maintain full operations. This was not possible in fiscal year 2007 and 2008, and the fiscal year 2009 budget request for the NSRCs seeks to redress the situation. As with other user facilities, additional funding will be required and requested in subsequent years to re-capitalize the equipment in the NSRCs.

RADIATION R&D

Question. Dr. Orbach, in your testimony, you highlight the role your office is playing in "Predicting high level waste system performance over extreme time horizons." I would think this research would be very valuable to the EPA and the NRC which has responsibility for setting regulatory and safety standards for nuclear waste. How will the data your office develops be integrated into the rulemaking process to ensure that the standards are scientifically sound? How far into the future do you intend for your models to predict? Do you intend to make predictions as far out as 1 million years?

Answer. Predicting high level waste (HLW) system performance over extreme time horizons is one of the research coordination efforts proposed for the Office of Science in the fiscal year 2009 budget request. This area was identified as one of the scientific grand challenges in the Basic Energy Sciences (BES) workshop on Basic Research Needs for Geosciences in February 2007. The regulatory framework for HLW systems asks that the performance of a geological repository be predictable for time periods of up to 1 million years. Current models require significant improvements to become capable of more accurate predictions on such time scales. This is why the scientific community identified this area as a grand challenge in the BES Geosciences report and why we are targeting this area as one of our R&D coordination efforts in fiscal year 2009. The BES workshop report noted that the chemical and geological processes involved in the performance of HLW systems over extreme time scales are highly complex and require an interdisciplinary approach that strongly couples validation experiments with theory, modeling, and computation bridging multiple time and length scales. The report further concluded that fundamental research is required to provide the scientific basis for predictive models of HLW in geological repositories over extreme time horizons, including research on: computational thermodynamics of complex fluids and solids, the physics and chemistry of particles and colloids on the nanoscale, biogeochemistry in extreme and perturbed environments, highly reactive subsurface materials and environments, and simulation tools that can handle an enormous range of spatial and temporal scales.

The Office of Science is not directly involved in rulemaking regarding HLW systems. The data, scientific knowledge, and computational models generated from the fundamental studies we perform will, of course, be widely and openly disseminated in the scientific literature. In addition, the R&D coordination effort proposed for fiscal year 2009 will directly benefit and involve the Office of Civilian Radioactive Waste Management (OCRWM) and the Office of Environmental Management (EM). An important component of integration between BES and these offices are the strong BES programs in the DOE laboratories in actinide and radiation chemistry, materials sciences, and geosciences. Capabilities and knowledge developed in these lab programs are readily and directly conveyed to complementary programs in the labs that are supported by OCRWM and EM.

JOINT DARK ENERGY MISSION

Question. I have a few questions that underscore this committee's continued interest and support for DOE's role in JDEM and the science it is meant to address. Given that this now appears to be a NASA-led mission, are you comfortable that JDEM will yield the best science to address the science priorities of the Office of Science's High Energy Physics Office?

Answer. DOE and NASA will coordinate in selecting the winning concept for JDEM. An important part of the selection process will be to ensure that the science obtained by the concept will address the needs of both the NASA science mission and of the High Energy Physics science mission. If the submitted concepts fall short of either agency's mission need, then the agencies will reevaluate the mission.

Question. Last year the National Research Council considered a number missions and experiments to advance the state of physics "Beyond Einstein." The resulting report stated that JDEM should be the top priority. Unfortunately, we've heard from BEPAC panel members that the mission being planned will not meet their very explicit expectations due to budget restrictions within NASA. Are you confident that the Joint Dark Energy Mission that results from NASA's competition will be within the range of the specific scientific objectives laid out by the NRC panel?

Answer. NASA and DOE are jointly planning the mission. Although NASA will issue the Announcement of Opportunity (AO), we will be working with them to write the terms of the AO and will coordinate the selection process. We will work together to ensure that the selected mission will significantly advance the study of dark energy in the most cost-effective manner. Until we see the actual proposals we cannot evaluate how well they meet the scientific objectives of the NRC panel. The agencies will need to decide whether the science provided by the selected JDEM concept is sufficient.

Question. Recent reports from NASA indicate that DOE's contribution to JDEM will be "up to" $200 million. This is a big reduction from the $400 million that DOE had pledged earlier. First, is this accurate? Second, if so, why was this change made and where is the remaining $200 million going? DOE has requested and this committee has provided tens of millions of dollars in research and development for JDEM. We would hate to see our significant investments go underutilized.

Answer. DOE's expertise is in the areas of scientific collaborations and instrumentation. NASA, in addition to expertise in these areas, is the agency with the expertise and stewardship responsibilities for space launches and operations. The mission concept studies that are nearly complete indicate that the science could be done in a medium-class strategic mission targeted at a cost of approximately $600 million, not including the launch services. The scientific package is estimated to cost about $400 million and both DOE and NASA want to participate in the fabrication and operation of the scientific package. An equal partnership in the scientific package is the basis of the present $200 million cost estimate for DOE.

With the reductions from the requested levels in the fiscal year 2007 and fiscal year 2008 congressional appropriations, there is no "remaining $200 million," and indeed the present $200 million commitment will stress the High Energy Physics program. In our planning, the projects and programs that can be supported depend upon the funding available and their priority for mounting a world-class, productive U.S. High Energy Physics program. The funding level is determined by congressional appropriations. We use guidance from the scientific community as input to establishing priorities within the funding available. Guidance is presently being sought from the High Energy Physics Advisory Panel about the options and priorities for an optimal U.S. program at different funding levels.

Question. Are you confident that DOE's investment in this project to date—that is, the country's investment in this project—will be adequately utilized?

Answer. Yes, DOE's investment has been and will be well utilized. DOE's investment to date is mostly in the Supernova/Acceleration Probe (SNAP) concept for JDEM for R&D on the advanced optical and infrared sensors that would be used in the camera, as well as in designing a mission concept. This sensor development R&D can also be used for other missions and by the general scientific community. The SNAP concept development funded by DOE has helped the technical advancement of the whole JDEM mission, which was noted by the National Research Council study as a particular strength of JDEM compared to some other Beyond Einstein mission proposals.

Question. Will DOE and NASA jointly select the winner of the JDEM competition?

Answer. Yes, DOE and NASA will coordinate in selecting the winning concept for JDEM.

Question. Dr. Orbach, can you give us the background on the development and overall strategy for the Energy Frontier Research Centers? As you know, this is an

initiative contained in the fiscal year 2009 budget that some might construe as an alternative to ARPA–E or as another way of funding additional programs in the Science budget, as opposed to the Energy R&D budgets.

Answer. The overall goal of the Energy Frontier Research Centers (EFRCs) is to foster, encourage, and accelerate high-risk, high-reward research that may provide the basis for transformative energy technologies of the future. The EFRCs will bring together the skills and talents of a critical mass of investigators, especially from universities, to enable energy relevant, basic research of a scope and complexity that would not be possible with the standard single-investigator or small-group award. EFRCs will enable research programs that are balanced and comprehensive and, as needed, support experimental, theoretical, and computational efforts. Finally, the EFRC program provides a tremendous opportunity for universities to engage in fundamental basic research critical to future energy technologies, and to inspire, train, and support leading scientists of the future who have a deep and sincere appreciation for the global energy challenges of the 21st century.

The scientific background for the EFRC initiative has been developed over the last 6 years through an extensive series of workshops sponsored by the Basic Energy Sciences (BES) program and its advisory committee, the Basic Energy Sciences Advisory Committee (BESAC). In 2002, BESAC sponsored a workshop on Basic Research Needs to Assure a Secure Energy Future. That workshop lead to a series of 10 more BES workshops on basic research needs for the hydrogen economy, solar energy utilization, superconductivity, solid state lighting, advanced nuclear energy systems, combustion of 21st century transportation fuels, geosciences, electrical energy storage, materials under extreme conditions, and catalysis for energy. Finally, BESAC recently completed a report entitled Directing Matter and Energy: Five Challenges for Science and the Imagination. This set of 12 workshop reports, developed by some 1,500 scientists from universities, DOE laboratories, and industry, define the scientific and technological basis for the EFRC initiative.

The high-risk, high-reward fundamental research within the EFRCs represents 15 percent of the total BES funding for research; the success of the EFRCs depends in part on their integration with the core research programs in BES. All of the core research programs in BES are actively engaged in coordination efforts with the DOE technology offices to promote the flow of knowledge and ideas from basic to applied research. This integration obviates the need for the creation of a new ARPA–E bureaucracy, rendering it unnecessary and counterproductive.

Question. Dr. Orbach, can you give us the background on the level of funding for General Plant Projects (GPP)? I understand that the GPP level has increased over time to reflect inflation, etc. and the current level is $5 million per project. Anything above $5 million requires a reprogramming or to be a part of a Science Laboratory Infrastructure project. Do you believe the current level of $5 million provides you the flexibility to do the projects that are necessary under those constraints? If not, what level would you recommend?

Answer. General Plant Projects are miscellaneous minor new construction projects of a general nature, the total estimated costs of which may not exceed $5 million per project. This $5 million threshold has been set since fiscal year 1999. A construction project that otherwise met the GPP criteria, but with a total cost above $5 million, would have to be requested and appropriated as a line-item construction project, which could stretch the necessary time frame between identification of the need and completion of the project, and thus increase overall costs. Based upon the Engineering News Report Annual Construction Inflation Index, $5 million in fiscal year 2009 would construct a project that would have required only $3.6 million in fiscal year 1999. So over time, inflation has reduced the Department's flexibility to pursue minor construction projects using GPP. An increase in the GPP threshold to $7 million would make the GPP threshold approximately equivalent after inflation to what it was when it was last increased in fiscal year 1999. GPP is supported both through direct funding and through Institutional General Plant Projects, or IGPP, which are funded through laboratory overhead for projects that cannot be allocated to a specific program. Examples of acceptable IGPP projects include site-wide maintenance facilities and utilities, such as roads and grounds outside the plant fences or a telephone switch that serves the entire facility. In the fiscal year 2009 Office of Science request, $31 million is planned for direct-funded GPP and an additional $35 million is anticipated in IGPP funding at Office of Science laboratories, for an overall level of $66 million for such minor construction projects.

Question. Dr. Orbach, the Basic Energy Sciences budget has grown substantially over the past few years with the construction of several projects, namely SNS, the Nano Centers, and CLS at Stanford, etc. What do you envision the Basic Energy Sciences budget's steady state being in 5 years?

Answer. The fiscal year 2009 budget request of $1,568 million for the Basic Energy Sciences (BES) program in the Office of Science reflects part of a Government-wide strategy to enhance U.S. world leadership in the physical sciences and maintain our Nation's competitive lead in technology. This strategy is the result of important actions by two branches of Government—first by the administration's American Competitiveness Initiative (ACI), and second by the congressional passage of two authorization acts, the America COMPETES Act (Public Law 110–69) and the Energy Independence and Security Act of 2007 (Public Law 110–140). Together these actions would approximately double the budget for the SC over a period of 7 to 10 years. The Science portfolio supports a broad research program and facilities operations that seek to understand the fundamentals of how nature works and then to use this understanding to promote transformational changes in the way we approach energy production, conversion, transmission, storage, and waste mitigation.

Under the ACI and congressional authorizations, we envision that the BES program will continue to be strong in 5 years with many exciting new capabilities. In developing future BES budget requests, Science will consider giving priority to six components of the BES budget: providing increases at least at the rate of inflation for core research programs and core facility operations; providing significant research increases in energy sciences, including the growth of Energy Frontier Research Centers; providing optimal construction funding, including for the NSLS–II project; providing instrumentation upgrades and fabrication for the scientific user facilities and the core research programs; upgrading and expanding the Spallation Neutron Source; and planning and conducting R&D toward the next-generation of light sources. The fiscal year 2009 request begins to put the BES budget on track with respect to the doubling path defined by the ACI and congressional authorizations. Projecting along that path in subsequent fiscal years would see the BES budget grow to approximately $2 billion by fiscal year 2013. I encourage your strong support of the President's fiscal year 2009 request to help bring this vision to fruition.

Question. Dr. Orbach, the Office of Science budget this year includes funding that was formerly in the Office of Nuclear Energy budget dealing with medical isotopes. What is the rationale for the decision to transfer the funding from Nuclear Energy to Nuclear Physics?

Answer. The Office of Science, with sustained commitment in promoting physical science research and experience in facility operation and infrastructure management, is well equipped to meet the needs for a successful and viable national isotope program. In fiscal year 2009, the Nuclear Energy isotopes program will be transferred to the Nuclear Physics (NP) program within Science, and will be renamed and reformed as the Isotope Production and Applications program. This new program will expand the scope of the present program of radioisotope production to include research production of commercially-unavailable radioisotopes in response to the needs expressed by the entire research community. Based on the successful NP model of fostering fundamental research, and within the scope of fiscal year 2009 budget, the new program will include the support of $3.2 million for development and production of research isotopes, based on competitive peer review. The recent report of the National Academy of Sciences (NAS), entitled "Advancing Nuclear Medicine Through Innovation" (September 20, 2007) raises concerns about Federal support for sustained U.S. competitiveness including deteriorating infrastructure, lack of a domestic source for research isotopes, shortage of trained workforce and lost opportunities. The NP has established a working group with the National Institutes of Health to address the recommendations in the report and is also planning a workshop in the summer that will bring, for the first time, all of the major stakeholders in isotope production together discuss the Nation's needs in isotope development and production and initiate the development of a community-driven strategic plan.

QUESTIONS SUBMITTED BY SENATOR DIANNE FEINSTEIN

Question. The Department of Energy (DOE) does not always allocate funding to transform basic research results into applied applications. What is the Department doing to expedite development and deployment of fuel cell technology and other technologies to bridge the gap between basic and applied research?

Answer. The Office of Science's fiscal year 2009 budget request contains proposals for four new areas of coordination between programs in Basic Energy Sciences (BES) and the applied technology offices within DOE. In each area, the basic research needs required to advance energy technologies and close the gap between basic and applied research have been identified through one or more of the Basic Research Needs workshops conducted by BES. The four areas are Electric Energy

Storage (EES), Carbon Dioxide Capture and Storage, Characterization of Radioactive Waste, and Predicting High-Level Waste System Performance Over Extreme Time Horizons.

In EES, the BES workshop on Basic Research Needs for EES (April 2007) identified key areas of interfacial chemistry, electrochemistry, and materials science required to advance EES for novel battery concepts in hybrid and electric cars and for the effective utilization in the utility sector of renewable, but intermittent energy sources, including solar, wind, and wave energy. DOE technology offices that might benefit include Electricity Delivery and Energy Reliability for utility-scale energy storage and Energy Efficiency and Renewable Energy for the FreedomCAR and Vehicle Technologies program and the Solar Energy Technologies program.

Carbon Dioxide Capture and Storage was a primary topic of the BES workshop on Basic Research Needs for Geosciences (February 2007), which identified the research challenges associated with the complex chemical and geological processes that occur when carbon dioxide is stored in deep porous underground formations. The Office of Fossil Energy is the primary beneficiary of this coordination effort.

Characterization of Radioactive Waste is a broad coordination area that was covered in three BES Basic Research Needs workshops: Advanced Nuclear Energy Systems (July 2006), Geosciences (February 2007), and Materials Under Extreme Environments (June 2007). These workshops noted the extraordinary combination of complex chemical and physics processes that occur under the extreme environments associated with radioactive waste (temperature, pressure, radiation flux, and multiple complex phases) and defined the materials, chemical, and geological sciences needed to address them. Technology offices that could benefit from this coordination area include the Offices of Nuclear Energy (NE), Environmental Management (EM), and Civilian Radioactive Waste Management (RW).

Predicting High-Level Waste System Performance over Extreme Time Horizons was also covered in the BES workshop on Basic Research Needs for Geosciences (February 2007), which addressed the remarkable challenge of developing the scientific understanding of the chemical and geological behavior of high-level waste in geological repositories necessary to develop models with predictive capability over extreme time durations, perhaps up to 1 million years. The DOE technology offices benefiting from this area include EM, NE, and RW.

These four new coordination areas complement and expand already ongoing areas of coordination between Science and the technology offices in the hydrogen fuel initiative (HFI) and solar energy utilization. Our HFI coordination is noteworthy because it has been in operation for over three fiscal years and has demonstrated impressive results, particularly in the area of fuel cells. The BES and EERE have coordinated their HFI activities through extensive interactions between program managers, including information sharing on proposal solicitations and awards, and by promoting scientific interactions between BES investigators and those supported by EERE through joint contractor research meetings, which began in fiscal year 2006 and have continued on an annual basis since then.

An example of the benefits of the HFI coordination in the area of fuel cells comes from work funded both by BES and EERE and conducted at Brookhaven National Laboratory. This work is aimed at developing electro-catalytic materials for hydrogen fuel cells that address one of the key barriers to widespread use of this technology—the prohibitive cost of fuel-cell catalysts that are based on precious metals, typically platinum. Basic research supported by BES led to the rational design, enabled in part by advanced computational chemistry, and development of nano-structured, electrocatalytic materials that have ultra-low platinum content. Detailed characterization of these new materials demonstrated improved catalytic activity toward the oxygen reduction reaction, which causes most of the efficiency loss in low-temperature fuel cells. In work supported by EERE, this fundamental discovery is being examined for its potential in making efficient catalysts that may be used to convert hydrogen to electricity in fuel cells for electric vehicles. While platinum is the most efficient electrocatalyst for accelerating chemical reactions in fuel cells in electric cars, platinum dissolves in reactions during stop-and-go driving—a major impediment. Recently, however, Brookhaven researchers added gold clusters to a platinum electrocatalyst, which kept it intact during an accelerated stability test under laboratory conditions, a potential breakthrough for fuel-cell technology.

Question. I am pleased to see the administration has again asked for an increase in spending at the Office of Science. DOE's Office of Science plays an essential role in developing cleaner sources of energy, stimulating breakthroughs in the biological sciences, pushing the frontiers of knowledge in physics, and improving energy efficiency. If Congress provides you with the increase to $4.7 billion for the Office of Science, as requested, what will the agency be able to do that it cannot do under its current budget?

Answer. The fiscal year 2009 budget request will help enable the Office of Science to meet mission needs of the Department in energy, the environment, and national security as well as the goals of the American Competitiveness Initiative and the America COMPETES Act of 2007 for U.S. leadership in science and innovation.

Specifically the increase in the budget request will fully fund the U.S. fiscal year 2009 commitment for ITER (+$203,874,000). In fiscal year 2008 funding for ITER was limited to $10,626,000 and fell far short of the U.S. commitment of $160,000,000. The ITER project, which will demonstrate the scientific and technical feasibility of fusion power, is the top priority new facility for the Office of Science and a high-visibility international commitment. While the Office of Science and the U.S. ITER Project Office have implemented a strategy to mitigate the adverse impacts in fiscal year 2008, the United States would likely be forced to default on its ITER commitments and terminate the U.S. ITER project if sufficient funds are not provided and would likely damage our credibility as a partner in future large scale international projects.

The requested increase will also allow the Office of Science Basic Energy Sciences program to initiate support for new areas in what we refer to as use-inspired research related to future energy technologies and fundamental research grand challenges that could result in greater understanding of how nature works. Approximately +$100,000,000 will be for the Energy Frontier Research Centers. The centers will bring together the Nation's intellectual and creative talent from universities, national laboratories, and private sector organizations to conduct innovative basic research to advance scientific breakthroughs relevant to 21st century energy technologies. Research topics would include solar energy utilization; hydrogen production, storage, and use; electrical energy storage; advanced nuclear energy systems; superconductivity; solid-state lighting; materials under extreme environments; catalysis; combustion of 21st century transportation fuels; and geosciences related to long-term storage of CO_2 and nuclear waste. Awards for each center will be $2–5 million per year for an initial 5-year period and we would expect to make 20–30 awards.

Approximately +$71,270,000 of the requested increase would provide for more optimal operations of our major scientific user facilities. These facilities, from synchrotron light sources, neutron scattering sources, and whole genome sequencing facilities to particle colliders, high-performance computing resources, and nanoscale science research centers, are used by over 21,000 individuals each year. The suite of research capabilities and instruments supported by the Office of Science make up a significant pillar of the U.S. scientific research enterprise. Users come from universities, national laboratories, and industry. The increase in funding requested for the facilities will provide for maintenance, improved operations and extended operation times which enable greater researcher utilization

Approximately +$136,280,000 is requested for construction of the next generation scientific user facilities and instruments. This includes continued construction of the Linac Coherent Light Source at Stanford Linear Accelerator Center, an x-ray light source with unprecedented intensity and ultrashort pulses for probing materials and biological molecules and observing chemical reactions in real time; the initiation of construction of the National Synchrotron Light Source II at Brookhaven National Laboratory, which will have the capability to resolve molecular and materials structures down to the 1 nanometer level resolution; and the 12 GeV upgrade to the Continuous Electron Beam Accelerator Facility at Jefferson Laboratory, which will enable advanced studies of nuclear structure. The funding increase will also support scientific instrument fabrication for several projects including the Neutrinos at the Main Injector (NuMI) Off-Axis Neutrino Appearance (NOvA) detector at Fermilab.

Additional increases for research (+$265,387,000) is requested for high performance computing, systems biology for bioenergy and environmental applications, chemistry, materials sciences, climate change research, plasma sciences, high energy physics, and nuclear physics and radioisotopes. Part of this increased funding is requested for international linear collider (ILC) research and superconducting radiofrequency (SRF) research to support the development of next generation accelerator-based facilities such as light sources, neutron sources, and particle colliders. Such research is not only critical to push the technology frontiers of future facilities, but it also enables advancements in technologies for medical instruments and cancer treatments. Fiscal year 2009 funding increases for neutrinos research capabilities such those enabled by NOvA, the ILC, and SRF research provide support for U.S. researchers to participate in the Large Hadron Collider at CERN. Such investments will position U.S. researchers to participate in the leading-edge high energy physics research here and abroad and maintain the critical scientific and technical capabilities to successfully lead the development of the next-generation particle collider facility in the coming decades.

Research increases in scientific computing and applied mathematics will enable U.S. researchers to take advantage of petascale computing capabilities for the advancement of some of our most challenging scientific questions that are not tractable through theory or experimentation. Increases will also support transfer of the DOE Isotope Program to the Office of Nuclear Physics from the Office of Nuclear Energy and the creation of a research and isotope production program that will focus on addressing the radioisotope needs of the medical, research, and industry communities in the United States.

The fiscal year 2009 request of $4,721,969,000 for the Office of Science will support approximately 23,700 Ph.D's, graduate students, undergraduates, and technical staff and universities and the national laboratories, a significant number of the Nation's scientific and technical skilled workforce. In fiscal year 2006, the Office of Science provided approximately $161,472,000 to California universities and research and industry organizations, not including the research and facilities supported at the four DOE laboratories in your State. The contributions that California scientists and engineers make to the Department's mission and to U.S. innovation and competitiveness are tremendous and I assure you they are well positioned to participate in the research activities we have proposed as part of the fiscal year 2009 budget request.

Question. I am interested by your proposed plan to establish Energy Frontier Research Centers (EFRC) Initiative. I think we can anticipate that many California universities will be eager to apply for the centers. How is the Department soliciting input from the scientific community on the initial areas of investment?

Answer. The areas of emphasis for the EFRC initiative were developed over the last 6 years in an extensive series of workshops sponsored by the Basic Energy Sciences program and its advisory committee, the Basic Energy Sciences Advisory Committee (BESAC). These began with a BESAC workshop on Basic Research Needs to Assure a Secure Energy Future in 2002. This was followed by a series of 10 Basic Research Needs workshops run by BES that covered the hydrogen economy, solar energy utilization, superconductivity, solid state lighting, advanced nuclear energy systems, combustion of 21st century transportation fuels, geosciences, electrical energy storage, materials under extreme conditions, and catalysis for energy. Finally, BESAC recently completed a report on scientific grand challenges, "Directing Matter and Energy: Five Challenges for Science and the Imagination." In total, some 1,500 scientists, the bulk of whom were from universities, participated in these workshops. The EFRC initiative requests proposals that satisfy two criteria with regard to topical areas—that they address one of the grand challenge themes from the BESAC report and that they address one of the energy grand challenges put forth in the series of 10 Basic Research Needs workshop reports.

Question. What is your vision for the centers?

Answer. We envision the EFRCs as centers that will bring together the skills and talents of a critical mass of investigators to enable energy relevant, basic research of a scope and complexity that would not be possible with the standard single-investigator or small-group award. The EFRCs should present research programs that are balanced and comprehensive and, as needed, support experimental, theoretical, and computational efforts. We expect that EFRCs will be lead and managed in such a way as to present world-leading programs that encourage high-risk, high-reward research. Finally, the EFRC program provides a tremendous opportunity to inspire, train, and support leading scientists of the future who have a deep and sincere appreciation for the global energy challenges of the 21st century.

Question. When do you anticipate the competition to be announced?

Answer. The Funding Opportunity Announcement (FOA) for the ERFC competition (DE–PS02–08ER15944) was initially published on April 4, 2008, and was amended on April 23, 2008. Applications in response to the FOA will be accepted through October 1, 2008.

Question. How will universities be judged?

Answer. Pursuant to section 989 of EPAct 2005 regarding DOE merit review of proposals, the EFRC FOA provides a single opportunity announcement for universities, for-profit companies, nonprofit entities, and DOE laboratories. The FOA is open equally and fairly to all of these entities and, importantly, is very flexible with regard to teaming between such entities. All applications, regardless of the nature of the lead organization, will be judged through rigorous merit review, in accordance with 10 CFR 605.10(b), on the basis of four major criteria: scientific and/or technical merit of the project, appropriateness of the proposed method or approach, competency of the applicant's personnel and adequacy of the proposed resources, and reasonableness and appropriateness of the proposed budget. Additional information on the EFRCs, including a link to the FOA, can be found on the EFRC webpage on the BES website at http://www.sc.doe.gov/bes/EFRC.html.

Question. As you know, Berkeley Lab is leading the Joint BioEnergy Institute (JBEI), along with Sandia, Livermore, UC Davis, UC Berkeley and the Carnegie Center for Plant Biology at Stanford. With funding from the Office of Science, JBEI is developing the science and technology that will drive sustainable biofuel solutions to the market in time to make a difference. Could you please give the committee a report on the progress of JBEI and the other bioenergy research centers? Is $25 million per year, per center, enough to meet the biofuel production targets in the Energy Independence and Security Act?

Answer. All three DOE GTL Bioenergy Research Centers (BRCs) are up and running today and engaged in cutting-edge basic research needed to develop cost-effective methods of producing cellulosic biofuels. Secretary Bodman announced the award of the three BRCs on June 26, 2007, following an open competition and an intensive scientific merit review process. From July through September, DOE negotiated with the lead institutions of the selected BRCs on the terms and conditions of the awards. These negotiations were concluded before the end of fiscal year 2007, and each of the BRCs received $9.97 million in fiscal year 2007 funds to accelerate their start-up. The Department plans to provide each BRC with $25 million per year through fiscal year 2012, for a total 5-year program investment of $405 million.

The three BRCs are the Joint BioEnergy Institute (JBEI), led by the Lawrence Berkeley National Laboratory (LBNL) and located near Berkeley, CA.; the BioEnergy Sciences Institute (BESC), led by Oak Ridge National Laboratory (ORNL) and based on the ORNL campus in Oak Ridge, TN; and the Great Lakes Bioenergy Research Center (GLBRC), led by the University of Wisconsin-Madison (UMW) in partnership with Michigan State University and based on the UMW campus in Madison, WI. All three BRCs represent multi-institutional partnerships. Partner institutions include universities, DOE National Laboratories, private firms, and one nonprofit.

DOE will evaluate the performance of the BRCs on a yearly basis. The Department conducted an early Technical and Management Review of the BRCs in November 2007. As a result of the review, all three BRCs have put in place strong management plans and systems and have established clear sets of scientific milestones and deliverables to focus and guide their research programs.

The BRCs are geographically dispersed, with scientific approaches that are complementary and synergistic. All three BRCs are using the advanced genomics-based techniques of modern systems biology to re-engineer both plants and microbes for more efficient biologically-based conversion of plant fiber into fuels.

JBEI is focusing on the widely studied "model plants" of Arabidopsis and rice (as well as some work on switchgrass), for which there is abundant genotypic and phenotypic information. JBEI believes that critical changes can be accomplished more readily in model plants and then transferred to bioenergy crops. JBEI is pursuing a novel strategy vis-a-vis lignin—a substance that occludes cellulose and forms a major barrier to deconstruction of plant fiber. Through detailed analysis of cell wall biosynthesis, JBEI is seeking to change the monomer composition of lignin, replacing existing monomers with new monomers whose mutual bonds can be cleaved by specialized enzymes. In addition, JBEI is studying the use of ionic liquids for pretreatment using advanced imaging technology, in an effort to overcome the limitations of current pretreatment methods, which produce chemical byproducts that inhibit enzymes used in subsequent hydrolysis and that are often toxic to the microbes used for fuel synthesis. JBEI is pursuing a series of unique strategies on microbes, including re-engineering microbes to better degrade plant fiber and to produce a range of fuels beyond ethanol that are more like gasoline. JBEI is also seeking to adapt microbes to achieve Consolidated Bioprocessing, using single microbes or microbial communities.

BESC is focusing on the central problem of "recalcitrance," i.e., overcoming the resistance of plant fiber, or lignocellulose, degradation into sugars that can be converted into fuels (usually by fermentation). Research by BESC investigators has shown that recalcitrance of plant fiber forms the major cost barrier to achieving commercially viable production of cellulosic ethanol and other fuels from lignocellulose. BESC is focusing directly on the bioenergy crops of switchgrass and poplar as well studying the microbes that can degrade them, attempting to re-engineer both the plants and microbes to facilitate degradation. On the plant side, BESC is building a high-throughput screening system with standardized pretreatment and enzymatic hydrolysis steps to screen thousands of genetic variants of switchgrass and poplar for amenability to deconstruction. The genomes of the most readily deconstructed variants will then be re-sequenced to identify the genes responsible for cell wall digestibility, providing a basis for genetically engineering optimized feedstocks. On the microbial side, BESC has engaged in bioprospecting in hot pools in Yellowstone National Park, inhabited by thermophiles that degrade cellulose.

Samples are being subjected to metagenomic DNA sequencing and analysis in an effort to discover more efficient cellulases (cellulose-degrading enzymes) that operate at high temperatures. BESC's long-term objective is to achieve "Consolidated Bioprocessing," or combined degradation and fuel synthesis in one step, using a re-engineered microbe or community of microbes.

GLBRC, in addition to focusing on recalcitrance of plant fiber, is pursuing the alternative approach of engineering plants to produce more starches and oils. These substances can be more readily converted to fuels. GLBRC points out that a 20-percent increase in plant oil content could nearly double the fuel yield from plant biomass. GLBRC, reflecting its affiliation with universities with strong agricultural programs, is focusing on re-engineering a wide variety of plants as well as microbes that can degrade plants and produce fuels, and they are investigating the sustainability of biofuel production. GLBRC plant researchers (mostly located at the Plant Research Laboratory at Michigan State University) are pursuing in-depth, genomics-based analysis of the complex process of cell wall biosynthesis to find methods of inducing more starch and lipid production in these structures. GLBRC is also engaged in bioprospecting and metagenomic analysis of microbial communities using somewhat different techniques and focusing on samples from Costa Rican rain forests. GLBRC is utilizing the technique of directed evolution (accelerated by a new generation of genomic sequencing technologies now available at the DOE Joint Genome Institute) to optimize microbes for ethanol production. GLBRC is also studying the production of hydrogen through microbial biorefineries.

The current level of proposed funding for the three Bioenergy Research Centers will yield transformational discoveries that will enable dramatic improvements in our ability to produce biofuels from biomass at greatly reduced cost.

Question. Recently you described to me how the Joint Genome Institute in Walnut Creek, California is sequencing the genomes of the organisms within the guts of termites in search of ways to more efficiently and cost-effectively break down biomass for conversion into fuel. Could you please elaborate on why this research is important and why the Office of Science is the appropriate funder and steward of this type of scientific inquiry? Additionally could you explain the broader role the JGI is playing in the Office of Science's energy research objectives? Finally, please describe how technologies developed through the bioenergy research centers will make their way to the marketplace.

Answer. The diverse community of microbes inhabiting the guts of termites is one of nature's most efficient systems for breaking down cellulosic plant material and converting it into simpler products, including hydrogen and short chain carbon compounds, that feed the termite host. Although we have a general understanding of the chemical reactions that take place in the termite gut, we know relatively little about the specific microorganisms and enzymes that carry out these processes. However, new research techniques are now allowing us to directly probe novel metabolic capabilities encoded in the genomes of termite gut microbes. The DOE Joint Genome Institute recently completed sequencing of the microbial community genomes (i.e. "metagenomes") of two Costa Rican termites capable of very high rates of cellulose degradation. More than 800 new genes believed to be involved in cellulose breakdown were identified, as well as over 150 genes involved in hydrogen production and hundreds of additional genes encoding functions crucial to the operation of the system. Far more than just a catalogue of new genes and enzymes, this study provides researchers with an important new tool to understand the complex systems biology that allows the host and microbial community to act as an integrated whole. Continued studies of the termite gut symbiosis will allow us to not only consider novel approaches that are being applied to the conversion of plant biomass to biofuels, but also provides critical new information on a key component of the global carbon cycle. As the Federal Government's lead agency for biofuels research, DOE's Office of Science is the appropriate funder and steward for this fundamental, transformation research.

In addition to its critical sequencing of the termite gut metagenome, the JGI is playing a key role in the DNA sequencing and analysis of prospective biomass crops, including the poplar (the first tree genome), soybean (for biodiesel), and switchgrass and of other microbes with enzymes or biochemical pathways important for cellulose degradation and carbon cycling.

All three DOE Bioenergy Research Centers have already begun laying the groundwork for eventual transfer of new technologies that emerge from their research. Both the BioEnergy Sciences Institute (BESC), led by Oak Ridge National Laboratory (ORNL), and the Great Lakes Bioenergy Research Center (GLBRC), led by the University of Wisconsin-Madison (UMW) in partnership with Michigan State University, have industry partners as integral members of their respective teams. All three BRCs have advisory boards with industry representatives. The Joint Bio-

Energy Institute (JBEI), led by the Lawrence Berkeley National Laboratory (LBNL) and located near Berkeley, CA is developing close relations with the biotech industry and investment community centered in the San Francisco Bay Area. The BRCs will have multiple paths for commercialization of new technologies that flow from their discoveries. In addition, BER is coordinating the research in its Genomics:GTL program, including research at its Bioenergy Research Centers, with biorefinery demonstration projects funded by DOE's Office of Biomass Programs.

Question. The Department of Energy's Office of Science pioneered the field of modern supernova cosmology. DOE's strength in this area has led to many awards, prizes and international recognition of the strength of this program. It was your personal support of this important work that set the stage for this international scientific leadership. Through the Joint Dark Energy Mission, which is a collaboration between your office and NASA, are you confident that DOE will maintain its vitality and leadership in the field? Please give the Committee an update on the Joint Dark Energy Mission.

Answer. The DOE sponsored scientific community has broad expertise in scientific collaborations, data analysis, and advanced instrumentation. By contributing to these areas of expertise the community will maintain vitality and a leadership role in the field.

DOE, NASA, and OSTP have been meeting regularly to lay out the plan for the Joint Dark Energy Mission (JDEM). As a result of the agency collaboration, DOE and NASA have agreed to participate in a JDEM; JDEM will be a medium-class strategic mission with a competitively selected, principal investigator-led dark energy science investigation; DOE and NASA will partner in the fabrication and operation of instrumentation necessary to execute the science investigation; and DOE's cost for the fabrication and operations phase is estimated to be up to $200 million in fiscal year 2008 dollars, or roughly 25 percent of the cost of the expected total lifecycle mission. The agencies are currently working on a Memorandum of Understanding describing the collaboration. The planning schedule includes the release of the Announcement of Opportunity (AO) near the end of 2008, with a draft in summer; selection of a particular concept and start of conceptual design in fiscal year 2009, and launch in 2014 or 2015.

QUESTIONS SUBMITTED TO HON. ALEXANDER KARSNER

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

BIOMASS/ETHANOL MANDATE

Question. The Energy Independence and Security Act of 2007 requires that suppliers must blend 36 billion gallons of renewable fuel into gasoline by 2022. Of the 36 billion gallons of renewable fuel, 21 billion gallons must be "advanced biofuels" (fuels produced from non-corn feedstocks). On March 4, Guy Caruso, Administrator of the Energy Information Administration, testified before the Senate Energy Committee, and said that it was unlikely that we would reach these mandates by 2022. Do you believe that we can reach the 36 billion gallon mandate by 2022?

Answer. The Department believes that the Renewable Fuels Standard (RFS) established in EISA is achievable. Achievement of the RFS will require consistent policy and regulatory certainty so as to sustain the necessary private investment.

The RFS is not limited to ethanol. Other biofuels, including biodiesel and biomass-to-liquids, may contribute to the mandates specified in the RFS. However, ethanol is expected to play a central role in the fulfillment of this standard. In terms of ethanol produced from corn, the current U.S. ethanol production capacity exceeds 9.9 billion gallons with an additional 3.7 billion gallons under construction.[1] Based on current trends and our analysis of industry plans, we believe that the industry will likely reach the 15 billion gallons of conventional biofuel requirement before the scheduled 2015 date.

Integrating large amounts of renewable fuels required by the RFS into the current transportation fuel distribution system presents unique challenges, most likely requiring the use of either E85 or possibly intermediate ethanol blends. Combining the supply and demand elements of the RFS will require close coordination among renewable fuel and feedstock producers, transportation fuel producers and blenders, and Federal and State agencies. The Biomass R&D Board will play an important role in achieving the national goals established in EISA by bringing coherence to

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[1] See Renewable Fuels Association, http://www.ethanolrfa.org/industry/locations/ as of August 20, 2008.

Federal strategic planning. The Board is co-chaired by the Departments of Energy and Agriculture, and also consists of senior decisionmakers from across the Federal Government.

Question. What advanced biofuel do you foresee making up the 21 billion gallon requirement?

Answer. In terms of advanced biofuels, DOE's goal is to make cellulosic ethanol cost-competitive by 2012. We anticipate that cellulosic ethanol will comprise the majority of the 21 billion gallon "advanced biofuel" requirement.

WEATHERIZATION

Question. Mr. Karsner, I understand that since 1976, we have spent $8 billion on the Weatherization Program, but only improved 5 million homes. Your budget states that, "EERE's Energy Efficiency portfolio has historically provided approximately a 20 to 1 benefit to cost ratio; in comparison, Weatherization has a benefit to cost ratio of 1.5 to 1." Clearly, we have a considerable amount of work to do to make our buildings and homes more energy efficient. But, as policy makers we need to understand the quickest and most cost effective way to do so. If you were to develop a more effective program what would you propose?

Answer. After almost three decades, DOE has weatherized about 5.5 million homes out of the 34 million annually eligible. As you have noted, based on a study by the National Research Council, investments in some energy efficiency applied R&D between 1978 and 2000 resulted in returns 20 times greater than the cost of the investment.[2] In contrast, the energy savings from Weatherization Assistance Program grants result in a significantly lower benefit/cost ratio of 1.53 to 1. This ratio was calculated by Oak Ridge National Laboratory based on past evaluation efforts and Energy Information Administration projected energy prices.[3] Weatherization Assistance is an important goal, but is an anomaly because it addresses social welfare goals in addition to energy efficiency improvement.

Prudent portfolio management requires DOE to focus available resources on its core areas of expertise and mission consistent with the DOE Strategic Plan. DOE is currently prioritizing development of new technologies, model building codes, and innovative programs for existing homes. Through the Building Technologies Program, the Department is committed to developing reliable, affordable, and environmentally sound renewable energy and energy efficiency technologies that significantly reduce the energy consumption and peak electrical demands of residential and commercial buildings. During the design and construction of a new home, far more can be achieved to bring it to net zero energy use in a cost-effective way than can be done with an existing building. Furthermore, many of these gains can be achieved in new construction at no initial first cost. It is important that buildings added to the housing stock be more energy efficient when built, so as to prevent the more costly and less effective task of fixing the problem by retrofitting them in the future.

However, building energy codes only establish a minimum level of construction below which builds cannot be built. While it is important to continue to raise the building energy codes bar, it is also important to invest in research, development and demonstration of homes that can achieve greater energy efficiency than code and eventually net-zero energy homes, as well as to apply these technologies to existing homes as much as possible. It is important to raise the bar on appliance standards, so that replacement appliances and equipment are made continually more efficient than the models they replace. It is also important to put in place incentive programs, such as Home Performance with ENERGY STAR, to encourage private sector investment in greater efficiency, as well as upgrade our existing building stock.

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[2] "Energy Research at DOE: Was It Worth It?" National Research Council (http://www.nap.edu/openbook.php?isbn=0309074487). This study, published in 2001, analyzed investments in 17 energy efficiency R&D activities between 1978 and 2000 costing a total of $1.566 billion (p.23) and representing about one fifth of energy efficiency program spending in that time frame. The NRC found overall net economic returns of about $30 billion (p.29) . This is a public return 20 times greater than the cost of the investment within the time period considered. In addition, the NRC calculated net environmental benefits worth $3–20 billion for these activities. As is the case with many diverse R&D investment portfolios, most of the benefits were generated by few—in this case, 3 of 17—activities assessed (p. 29).

[3] The ORNL analysis can be found on the web (http://weatherization.ornl.gov/pdf/CON-493FINAL10-10-05.pdf). The benefit/cost ratio in the study is 1.34—the 1.53 ratio cited above uses the same calculations with energy cost data updated for 2006.

MESA DEL SOL SOLAR PROJECT

Question. Mesa del sol.—Mr. Karsner, part of your responsibilities include increasing the Federal Government usage of renewable energy. I have been made aware of Federal procurement rules that prevent Kirtland Air Force Base from signing a long term power purchase agreement beyond 10 years. We have a site in New Mexico, located between Mesa del sol and Kirtland AFB that has been identified as an ideal site for a 100 MW concentrating power plant with a molten salt storage reservoir. However, procurement rules prevent the base from entering into a contract beyond 10 years, well short of the useful life of the plant, which has a big impact on the economics of the deal. First, do you believe these procurement limitations are having an impact on the deployment of clean energy technology?

Answer. It is true that the Government-wide authority for utility purchases is limited, in most instances, to 10 years. That authority was created for traditional utility purchases and is not well-suited to the type of renewable energy projects that would require a substantial initial capital investment.

Question. If Congress were to change the requirement to allow Federal agencies to enter into longer term power contracts, do you believe this would have a positive impact on the commercial deployment of renewable energy technology? Would you support this change?

Answer. The Federal Government should lead by example in its use of renewable energy. To do so, we should assess whether there are legal impediments to its use. If so, the administration stands ready to work with Congress to develop workable solutions.

CONCENTRATING SOLAR POWER

Question. Recently Sandia National Lab announced a world record for solar to energy conversion. On January 31, 2008, a sterling concentrating solar array located at Sandia Thermal Test Facility achieved a world record of 31.25 percent net efficiency rate. Despite the promising performance, your budget maintains a wide disparity between funding for photovoltaic research ($137 million) and concentrating solar research. ($19 million). Based on economic and technology performance with concentrating solar technology, why the large disparity in funding? How will the Department facilitate the commercial deployment with such low levels of funding?

Answer. The Department believes that it has struck an appropriate balance between photovoltaic (PV) and concentrating solar power (CSP) technology funding. CSP's advantages include a lower cost than solar PV technology, as well as the capability to store thermal energy for later use. PV, however, remains the focus of most of DOE's solar program funding for several reasons.

Primarily, PV can provide energy solutions for the entire Nation, not just the Southwest. Also, PV technology faces more challenges to be cost competitive with conventional electricity sources. It has a significantly larger and more diverse industry base with Federal R&D support needs in multiple technology areas (e.g., crystalline silicon, thin films, multi-junction cells) at various links in the supply chain (e.g., semi-conductor devices, PV modules, inverters). Significant R&D advances will be needed to achieve the aggressive Solar America Initiative PV electricity goal, to be cost-competitive nationwide with grid electricity by 2015.

PLUG IN HYBRID TECHNOLOGY

Question. There is no doubt that we must improve our battery technologies across a broad range energy sources that rely on storage as a key component. In my opinion, energy storage is one of the most important pieces currently missing in our energy puzzle. What is EERE currently doing to advance battery technologies?

Answer. In fiscal year 2008, DOE's Office of Energy Efficiency and Renewable Energy (EERE) is providing approximately $48.2 million to support long-term research, applied research, and technology development of advanced batteries for electric, hybrid-electric and plug-in hybrid vehicle (EV, HEV and PHEV) applications. EERE's applied research is focused on developing advanced materials for the next generation of energy storage technologies that offer the potential for significant improvements over existing batteries. In fiscal year 2009, DOE plans to award battery contracts focusing on improving battery performance through the development of manufacturing technology. This approach is expected to improve performance attributes such as cycle life, while simultaneously fostering domestic manufacture of advanced battery technology and reducing production cost.

In addition to battery research, EERE is providing $22 million in support of modeling, simulation and testing of PHEVs in fiscal year 2008. Activities include laboratory and closed track testing, and real-world monitored fleet evaluations.

Question. When do you believe we can have large scale deployment of plug-in hybrid cars and what public policies changes are needed to achieve this objective?

Answer. The Department is working to achieve faster market penetration of plug-in hybrids (PHEVs) by developing technological and cost improvements to battery and electric drive components. The Department's goal is to reduce the high-volume production cost of lithium ion batteries to $300/kW by 2014, which, along with other improvements, could help PHEVs become cost competitive.

Lower costs help enable industry make the decision to commercialize, but ultimately greater market penetration is dependent on automakers as they make production decisions over the next several years, and by investments in battery manufacturing. GM plans to introduce its Chevy Volt PHEV in 2010, but we expect that there will be significant incremental cost that may prevent large-scale deployment. Other manufacturers have been non-committal on dates for commercially offering PHEVs.

Consistent and durable policies have been critical to the rapid uptake of hybrids, and will be critical to PHEVs as well. Automakers, suppliers, and battery manufacturers may also be eligible to apply for the Department's Loan Guarantee Program under title XVII of the Energy Policy Act of 2005, which lowers the financial risk of private enterprise in moving the successful results of research investments from the laboratory to the commercial marketplace. The Department is currently soliciting up to $10 billion in loan guarantees for innovative energy efficiency, renewable energy, and advanced transmission and distribution technologies in fiscal year 2008.

BUILDING TECHNOLOGIES

Question. I know that it is the goal of the Building Technologies program to spur commercial production of Net-Zero Energy Homes by 2020. I believe that building technologies can play a very significant role in reducing our Nation's energy consumption. How do you expect this program to have nationwide effectiveness when numerous States do not even have a building code?

Answer. The Department's Building Technologies Program goal of achieving commercially viable Net-Zero Energy Homes by 2020 is a research and development effort involving building industry leaders, many of whom recognize the inherent value in building homes that perform significantly beyond State and/or national model codes. While State and national building codes set the minimum levels of performance, our zero energy building-related efforts do not rely on the existence of codes in a jurisdiction, in moving "beyond code." Codes require a minimum level of construction and energy efficiency below which houses should not be built. While there is substantial value in State adoption, implementation, and enforcement of building energy codes for the Nation, it is important for all housing can benefit from advances in building energy codes. We can encourage the construction of a significant number of Net-Zero Energy Homes by 2020.

To reduce energy consumption and to help U.S. home builders and buyers make informed decisions about efficiency and distributed energy, the Department has developed activities to encourage a robust market demand for more efficient homes through national and regional consumer education efforts. Combined with market forces (i.e. energy prices) and acceptance (i.e. consumer demand), builder training and codes can work in concert to drive standard practice toward net-zero energy homes over the long term for broader deployment of energy efficient technologies.

QUESTIONS SUBMITTED BY SENATOR DIANNE FEINSTEIN

Question. Mayor Villaraigosa and the city of Los Angeles are interested in the green technologies funded by EERE. What is the best way for the Appropriations Committee to assure that EERE's funding is spent in a way that rewards the best ideas of local government?

Answer. The proven way to ensure funds are allocated to the best ideas is the competitive solicitation process. The Department offers a number of resources for local governments, including programs in the Solar Technologies Program (Solar America Cities), Vehicle Technologies Program (Clean Cities), Building Technologies Program (Building America), and the Wind and Hydropower Technologies Program (Wind Powering America). In addition, cross-cutting resources are available such as the State Energy Program formula and competitive grants, and the Technical Assistance Project supported by the Department's national laboratories and funded by the State Energy Program. Funds for Solar America Cities and State Energy Program-competitive grants are awarded competitively to applicants through a rigorous merit review process. Funds provided to local governments through the State Energy Program-formula grants are allocated according to a method determined by the

individual State. The Technical Assistance Project (TAP) requires an application process and proposal review to determine eligibility for assistance. TAP helps States with individualized, short-term assistance in areas that are not covered by other DOE programs. Projects are limited to $5,000 or between 30–60 hours of staff time. Funding is used to cover staff time and travel for laboratory experts and is not distributed directly to the applicant.

Question. According to a recent study by McKinsey and Company, one of the most cost effective opportunities to reduce greenhouse gas emissions is in household electronics. Specifically, the growing use of electricity in televisions and computers is a matter of great concern. What can EERE or Congress do to reduce this energy use?

Answer. DOE is actively engaged in establishing energy efficiency standards for consumer electronics. The Energy Independence and Security Act recently prescribed efficiency standards for the most common class of external power supplies which become effective July 1, 2008. In addition, the Department is currently in the beginning phases of initiating a rulemaking on battery chargers and external power supplies, which is scheduled for completion by July 2011. This rulemaking will address the energy use associated with a wide variety of products including laptop computers, cell phones, power tools, and printers, among others.

In addition, the Energy Independence and Security Act of 2007 (EISA 2007), Public Law 110–140, authorizes DOE to incorporate standby mode and off mode energy consumption into all new or revised standards adopted after July 1, 2010 (for residential products). The Department is now working to revise certain test procedures to account for standby mode and off mode energy consumption in accordance with the deadlines in EISA 2007. When in place, these energy efficiency standards have the potential to greatly reduce energy consumption and greenhouse gas emissions.

DOE and the Environmental Protection Agency jointly administer the ENERGY STAR program to promote more efficient products, including consumer electronics. The Federal Government generally is required to purchase energy efficient products, including ENERGY STAR-labeled products, and has led in the procurement of low standby power devices.

Question. I was pleased to see EERE ask for money to fund geothermal research this year. Please describe exactly how these funds will be spent, and for what purpose.

Answer. The mission of the Department's Geothermal Technology Program is to conduct research and development (R&D) on Enhanced Geothermal Systems to advance the technology as an economically competitive contributor to the United States energy supply. Enhanced Geothermal Systems (EGS) are engineered reservoirs created to produce energy from geothermal resources deficient in hot water and/or permeability. If EGS development is successful, the technology may be deployable nationwide as opposed to conventional geothermal technology that is limited to the western United States.

The Department issued a competitive solicitation on June 18, 2008, for awarding industry cost-shared EGS projects. Two topic areas are listed in the solicitation: component R&D technologies that address key aspects of reservoir creation, management, and utilization, and demonstration projects that will test and validate stimulation techniques for improving well productivity. The EGS-related R&D in the areas of reservoir stimulation, fracture mapping, and fluid circulation will also have applicability for expanding conventional (i.e., hydrothermal) fields.

IMPACT OF TAX CREDITS FOR RENEWABLE ENERGY AND ENERGY EFFICIENCY

Question. I have worked with my Senate colleague Olympia Snowe to extend existing tax credits for renewable energy and energy efficiency. Please describe what impact these tax credits are having in the market place. Please identify the amount of new investment in renewable energy and energy efficiency that has resulted as a result of these tax provisions. Please estimate the job impacts if Congress allowed these credits to expire at the end of 2008.

Answer. While the Department is unable to quantify the exact amount of investment in energy efficiency and renewable energy directly resulting from these tax provisions, the past 10 years demonstrate a strong correlation between the intermittent availability of the 1-year production tax credit (PTC) extension and the volume of investment in renewable energy sources such as wind power. The tax policy has likely spurred investment; however, American Wind Energy Association data show that expirations of the Federal PTC in 1999, 2001, and 2003 were followed by drops in new wind installations in 2000, 2002, and 2004.

With the tax credit in effect in 2007, the United States led the world in new wind installations with over 5,300 MW installed.[4] This growth translates into approximately $9 billion (real 2007 dollars) invested in wind project installations.[5] While there are no studies on the exact number of jobs directly associated with the tax credit, increased demand has led to increased manufacturing jobs in the wind industry, which may compete with other energy sectors.

QUESTIONS SUBMITTED TO DAVID G. FRANTZ

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

TIMETABLE

Question. Mr. Frantz, it has been over 90 days since the President signed the Consolidated Appropriations Act providing the Department with $38.5 billion in loan guarantee authority. This bill directed the Department to develop a plan to execute the program and to send this report to Congress for review within 45 days. When can we expect the Department to send this proposed plan to Congress? When do you expect to put a solicitation out on the street for bids and how soon do you expect to make awards?

Answer. On April 11, 2008, the Department of Energy submitted an "fiscal year 2008 Implementation Plan." The Consolidated Appropriations Act, 2008, requires that DOE wait for a period of 45 days from submission of the Implementation Plan to Congress prior to issuing a new loan guarantee solicitations. The Implementation Plan outlines the Department's plans to issue loan guarantee solicitations in two stages this summer for up to $38.5 billion for projects that employ advanced technologies that avoid, reduce, or sequester emissions of air pollutants and greenhouse gases. These planned solicitations will mark the second and third rounds of solicitations for the Department's Loan Guarantee Program, which encourages the development of new energy technologies and is an important step in paving the way for clean energy projects.

LOAN GUARANTEE POTENTIAL

Question. Mr. Frantz, I have noticed from your bio you have over 35 years of experience in project finance in the energy sector and served 10 years as the Director of Project Finance for OPIC. That is quite an extensive amount of experience. Can you please explain what the financial advantage the loan guarantee program provides to the investors of these alternative energy projects? What is the cost savings of receiving Federal assistance?

Answer. One of the goals of the Department of Energy's title XVII Loan Guarantee Program is to encourage the commercial use in the United States of new or significantly improved energy-related technologies. There are a number of financial advantages that the loan guarantee program provides to investors of these types of alternative energy projects. Primarily, without a loan guarantee, investors in an innovative energy project may not have the financing necessary to establish the project, thereby potentially denying the commercial scale up of their respective technologies due to the unavailability of alternative debt financing.

While the Department's loan guarantee program offers clear benefits to alternative energy project investors, there is no measurement of the aggregate cost savings of participating in the program. In fact, energy investors might not even be permitted to proceed to full commercialization due to the unavailability of alternative financing. Each project supported by a loan guarantee will be evaluated on its particular strengths and weaknesses to determine the risk factor associated with the project. Depending on this risk assessment, each project will be levied a credit subsidy cost and other fees that will determine the ultimate cost to the project sponsors.

CREDIT SUBSIDY MODEL

Question. Mr. Frantz, I understand that the Department has been working to perfect its credit subsidy model, which is the risk calculation of each loan. Getting this model correct is important as it sets the level of payment each borrower is required to pay under the EPACT title 17 loan program and will have an impact on the scor-

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[4] See Annual Report on U.S. Wind Installation, Cost, and Performance Trends: 2007, U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (May 2008) http://www.nrel.gov/docs/fy08osti/43025.pdf.

[5] Id.

ing of our bill by the Congressional Budget Office. What is the status of the credit subsidy model and how confident are you that this will provide an accurate risk analysis of each loan to ensure taxpayers are not on the hook for bad technology loans? What other agencies have reviewed this model for accuracy?

Answer. The Department has been working for several months to develop the credit subsidy cost model and is confident that once completed it will allow the Department to accurately calculate the subsidy costs of title XVII loan guarantees. It will not be made publicly available. The Office of Management and Budget must review and approve credit subsidy cost estimates. We expect it to be completed in the near future.

STAFFING OF LOAN GUARANTEE OFFICE

Question. Mr. Frantz, in your testimony you state that you have 16 people on your staff to execute the $40 billion loan guarantee program. This sounds like an immense challenge. Can you explain how this compares to similar loan guarantee programs at other Federal agencies?

Answer. There are presently 16 members of the staff which is an adequate number to prosecute the 16 successful applicants under the 2006 solicitation representing an allocation in excess of $4 billion. This staff is also adequate to initiate the proposed solicitations for fiscal year 2008 which is presently planned for $38.5 billion. This staff is presently inadequate to prosecute the results of the fiscal year 2008 solicitation. The Loan Guarantee Program Office (LGPO) has requested in its fiscal year 2009 administrative budget $19.9 million with a planned staff of 35 full-time employees (FTEs), augmented by independent contractors as necessary to handle the workload associated with the fiscal year 2008 solicitations. The organizational plan of the LGPO is based upon years of experience by the existing LGPO staff at the Overseas Private Investment Corporation.

CURRENT INVESTMENT CLIMATE

Question. Mr. Frantz and Mr. Karsner, the clean energy technologies being developed by the Department can only be effective if they are commercially deployed. Can you please describe the financial environment for renewable energy technologies and the financial barriers facing these technologies? How has the credit crisis impacted investment in these sectors?

Answer. The two principal goals of the title XVII Loan Guarantee Program are to encourage commercial use in the United States of new or significantly improved energy related technologies and to achieve substantial environmental benefits, with a reasonable certainty of repayment. In general, debt capital, a key component of an optimally financed project and the kind of financing the loan guarantee program encourages, flows to what is perceived to be the least risky investment. While many renewable energy projects can represent both a sound investment to investors and a benefit to the public through environmental benefits, debt financing will often instead flow to projects in industries that have a long and established history of low risk. The credit crisis only magnifies the barriers to financing of advanced renewable energy projects, both making capital less available for all project finance deals, but also encouraging the flight of capital to established industries and technologies and away from the type of projects supported by the Department's Loan Guarantee Program.

SUBCOMMITTEE RECESS

Senator DORGAN. This hearing is recessed.

[Whereupon, at 11:21 a.m., Wednesday, April 2, the subcommittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

WEDNESDAY, APRIL 9, 2008

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:33 a.m., in room SD–192, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Murray, Domenici, Bennett, and Craig.

DEPARTMENT OF ENERGY

STATEMENT OF HON. JAMES A. RISPOLI, ASSISTANT SECRETARY FOR ENVIRONMENTAL MANAGEMENT

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. Calling the hearing to order. This is the Senate Appropriations Subcommittee on Energy and Water Development. The hearing today is an oversight hearing on the fiscal year 2009 budget request for the Office of Environmental Management and the Office of Civilian Radioactive Waste Management.

We're here to take testimony from the two program offices that I just indicated. One is the Government's clean up of the cold war legacy and the other is the ultimate disposal of nuclear waste. This year's budget request of $5.5 billion for the Environmental Management Program represents the fourth straight year that President Bush has reduced the clean up budget and the strain is showing.

The fiscal year 2009 request is down $167 million from fiscal year 2008. And that's down $1.75 billion from 2005. It's no coincidence that at the same time the White House has cut this budget, the U.S. Government's third largest liability, the environmental clean up liability has grown by 25 percent to $342 billion.

Mr. Rispoli has indicated that this program will not and cannot meet the legally mandated clean up milestones because there's not enough money. We've learned that EM will miss 23 legal milestones and lay off, we believe, upwards of 600 people solely because of a lack of funding. In his statement before the House Energy and Water Subcommittee last month, Mr. Rispoli estimated that the EM program may need $900 million more to meet all of its requirements in 2009.

In spite of the shortfall in this particular area, the Department of Energy has submitted a budget to the Congress that is $1.1 billion higher than in 2008. The Office of Science has proposed an increase of $750 million. National Nuclear Security Administration increase of almost $300 million. Even Mr. Sproat's office has an increase of over $100 million in 2009. I might also say that with respect to water funding, the Bureau of Reclamation and the Corps of Engineers, the President requests a $1 billion cut in funding in this year.

The legal requirement of mandating the clean up is something that we ought not take lightly. It seems to me, with its budget recommendations, the Department shrugs its shoulders and wrings its hands and talks about hard decisions. But frankly, I don't think it is the right decision to decide that we're not going to meet our mandated requirements on clean up.

The legal milestones that are mentioned in the 2009 budget for Mr. Rispoli, are milestones that were negotiated long ago. And they are subject to some technical problems that make some of them unachievable. But that's true for some. It is not true for all the requirements. The fact is the administration is not asking for the funding to meet 23 milestones that are perfectly achievable in 2009, milestones for which we have made a commitment.

I wanted to point out that with this clean up budget work on contaminated soil and ground water around the EM complex will not be dealt with for decades to come. Meanwhile the EM will literally spend millions of dollars propping up old buildings hoping that they will stay up long enough to be torn down safely. That seems Byzantine to me.

If anyone thinks that the under funding of the EM is the right decision I would point out that the EM is becoming the choke point on modernizing both the National Nuclear Security Administration's and the Office of Science's complexes. Both organizations have announced, for example, ambitious plans to bring about technological capability into the 21st century at Oak Ridge, Tennessee. Yet both programs are being stymied because Environmental Management doesn't have in its base line the $5 billion needed to tear down and clean up Oak Ridge by 2015.

Mr. Rispoli, I want to recognize your hard work over the last 3 years in trying to get the cost and scope and schedule of 80 clean up projects under control. I think that's been good work. And I want to recognize that.

But I must say that I'm very disappointed that that work has not been rewarded by the Office of Management and Budget and the White House. In the budget that you and I know, in the Appropriations request, you and I know, is far short of what you need to do your job. For all of your effort, the administration and the Office of Management and Budget have sent us recommendations to cut your budget by $1.75 billion over the last 4 years even as the responsibilities and the commitments have grown.

Today we'll hear from Mr. Sproat on the status and the progress of the Yucca Mountain disposal site. His request for $495 billion is $108 million above the 2008 appropriation. Mr. Sproat and his organization have a lot of work ahead of them. They have a legal

mandate to attempt to develop a disposal site for both civilian reactor fuel and defense nuclear waste.

Mr. Sproat, I know you recognize your program has a lot of challenges and some problems to overcome before it can claim victory. My understanding is that the first is getting your license application to the Nuclear Regulatory Commission. I understand you intend to submit that in just a few months, perhaps no later than June 30, of this year. But that will, I'm sure, be scrutinized and challenged by many who hold the position that Yucca Mountain is not the right solution for our Nation's nuclear waste program.

I want to thank both of you for coming today. These are complicated programs, and important programs that Congress has to think through carefully. The White House and the Budget Office have given us their evaluation, and now it is our turn to evaluate. We appreciate the work that both of you do, and we appreciate both of you being here today. Senator Domenici.

OPENING STATEMENT OF SENATOR PETE V. DOMENICI

Senator DOMENICI. Thank you very much, Mr. Chairman. And thanks to our two witnesses.

Mr. Rispoli, you have the difficult job of cleaning up the contaminated sites and disposing the nuclear waste throughout the complex. This budget, however, is not up to the task. It simply provides insufficient resources to do the job.

In fact this budget request is one of the lowest I've seen during my tenure as chairman or ranking member. More than a decade is the amount of time that I have spent watching these budgets. And never have I seen one that misses the mark so much. Well below 2005–2006 when the Congress provided an excess of $7 billion for environmental clean up efforts.

And when those budgets were in that ballpark, your Department was doing excellent work at re-prioritizing and doing some exciting things. Included in that was the closure of Rocky Flats, a rather important and outstanding achievement. But you're not going to have outstanding achievements with budgets as small as this one.

As a result of these low funding levels it appears that the Department is resorting to creativity to cover its shortfalls. I have begun to hear about "acceleration" strategy, similar to those of your predecessors. You promised immense savings by accelerating clean ups in order to dramatically shorten the overall clean up schedule.

I understand that things like this must be tried. And I welcome an opportunity to hear from you how you intend to do that. I'm still waiting to see the savings on the closure of Rocky Flats materialize in investments in plutonium missions at Los Alamos.

While I don't believe there is any substitute for providing adequate funding for major clean up sites. I can't blame you for trying to find ways to prioritize clean up based on risk. If we would have done that from the beginning and stuck with it, we'd be much further along than we are now. But it's very difficult to change horses in midstream, especially not to have the money for ordered clean ups, court ordered agreements.

I'll just take a minute on New Mexico because you will hear much about this unless we're able to find some money. Your budget again fails to provide adequate funding to my State for milestones

negotiated between the DOE and State of New Mexico. You're aware of that.

Each year the gap grows. And I have to do everything within my power, seek the help of the chairman to try to find the shortfall. This year I'm not confident that we will be able to find $100 million needed to clean up, in compliance with the agreement you negotiated with New Mexico. I hope you can tell me something to the contrary on the witness stand.

Now let's talk a minute about nuclear waste with you. You've done a great job. You're a very enthusiastic leader and that's what we needed. Sandia took a very big job when they agreed to use their personnel and their expertise to try and get you a document that could be filed for a license.

With regard to Yucca Mountain. Everybody knows that I strongly favor nuclear power and expanding its use as an emissions free source of load generation. However, I believe the current strategy limiting our policy option to a permanent repository for the disposal of spent fuel is deeply flawed. I believe this path will prove to be the highest cost solution. And it fails to take advantage of recycling, which would maximize our energy resources and minimize our waste requirements.

Nobody in the world is putting spent fuel rods underground as a way of getting rid of waste. Nobody is even planning to take spent fuel rods and putting them in a repository for any long period of time as a means of disposing of waste. Why? Because spent fuel rods are loaded with energy.

Only 3 percent of the energy has been used and 97 remains. And that's foolhardy to build a plan as we have if it would have even worked, if we would have gotten it through the Congress. To put spent fuel rods away has almost reached a point where it's unfathomable.

I would like to say to the chairman and for this record that we have to pursue a comprehensive policy on waste. And I will be introducing legislation, Mr. Chairman. I will show it to you and share it with you, which will provide our country with an alternative pathway to address commercial spent fuel and not letting our policy to Yucca Mountain, Yucca only approach.

My legislation will authorize a portion of the nuclear waste fund to support the development of spent fuel storage and reprocessing facilities. Some of these funds would be used by DOE to renegotiate spent fuel storage agreements with local communities to store and recycle spent fuel to utilize untapped energy and to minimize the waste volumes. I will also propose the Government be a full partner and sharing in the cost of developing the model licenses for commercial reprocessing facilities. Such model approaches would apply to existing as well as any more advanced recycling approaches. Should these facilities become available, DOE should be authorized to enter into long-term service contracts with private entities like to construct and operate reprocessing facilities.

Mr. Sproat, I know that you have worked hard to manage Yucca. And the people at Los Alamos who work with you deserve every credit for taking something that was more gone than breathing life into it. The question now is, is it adequate for our country, or not. Should we proceed with it, or not?

And I have just stated as best I could in a minute and a half what I think we should do. And obviously I will be ready with a full bill soon. Thank you very much, Mr. Chairman.

Senator DORGAN. Senator Bennett?

STATEMENT OF SENATOR ROBERT F. BENNETT

Senator BENNETT. Thank you, Mr. Chairman. Assistant Secretary Rispoli and Director Sproat, I appreciate your taking the time to come before the committee. I come in listening to Senator Domenici talk about clean up.

It will come as no surprise to you that I want to talk about clean up. Once again the project in Utah to renew uranium meltings from Moab and I know your staff is doing the best you can to keep us up to date on this. I simply want to make a few observations on this so that no one thinks that I've forgotten about it or that we've lost track of it.

I'm pleased that you recently amended the record of decision to include trucking as a way of moving this material. It creates some problems in the State of Utah. But we will resolve those problems, primarily the need to have a bigger road.

We will respond to that. It gives us additional flexibility than the pure railroad solution of how to move the tailings. And I'm glad to see us go down that road.

Now as you remember I strongly objected to the Department's timeline of 2028 as the date for completing this project. And with the support of this subcommittee and the Defense subcommittee, we directed the Department to finish the project by 2019. I simply want to make it clear, again, that this is not a wish. This is a Congressional mandate and the Congress has spoken. And 2019 is the date.

Now as part of the mandate the Appropriations Committee gave you 180 days from the date the President signed the bill to prepare a report on the funding requirements you will need to meet the date of 2019. And I assume that you're anxiously working on that report. And I look forward to receiving it sometime this summer when it's finished.

Now this project started out with a cost of $80 million when I first came to the Senate and it first came to my attention. The current price tag attached to it is $800 million. So it's gone up. It's a neat symmetry. It's gone up 10 times in 10 years.

Now I hope we don't have that same kind of acceleration. But I do think we probably will see some additional acceleration and we need to know in advance as much as we can know. We need to have accurate figures as quickly as we can get them so that we can appropriate accordingly.

So, I look forward to working with you on the project. And want to be as helpful as I can. I appreciate the efforts that you have put into that. And with that parochial opening statement, Mr. Chairman, I have nothing further.

Senator DORGAN. Senator Bennett, thank you very much. We will hear now from the Honorable James Rispoli. Mr. Rispoli, you may proceed. Your entire statements for both of you will be part of the permanent record. And we would ask that you summarize.

STATEMENT OF HON. JAMES A. RISPOLI

Mr. RISPOLI. Thank you, Mr. Chairman. Good morning, Mr. Chairman, Senator Domenici, Senator Bennett, members of the subcommittee. I also understand that a group of students from Jamestown in the State of North Dakota is here with us today. And I just thought I would mention that and welcome them. This is a great opportunity, I think, for these students to see a part of the appropriations process that's absolutely vital.

Senator BENNETT. Could you speak up a little, Mr. Rispoli?

Mr. RISPOLI. I think it's important to——

Senator BENNETT. That's better.

Mr. RISPOLI [continuing]. For this group of students from Jamestown, North Dakota to be here today because they get to see a part of the appropriations process that is so vital to the way our Government operates. So I welcome the students from Jamestown.

Senator DORGAN. Mr. Rispoli, I did not know that they were in the room. But let me ask those from Jamestown to stand up and wave at us.

They are all experts on the issue of waste disposal, and environmental management. They must be, I think you're with the Close Up groups. So we welcome you here.

I know I'm meeting with a Close Up group later today. So that must be the group. We welcome all of them here.

Mr. Rispoli, thank you.

Mr. RISPOLI. Well I would be remiss then, Mr. Chairman, by not pointing out that our budget person, Cindy Rheaume here is also from the great State of North Dakota.

Senator DORGAN. Well, Cindy, welcome. Would you like to testify for a while?

Mr. RISPOLI. So clearly the State of North Dakota is well represented in the room today. I'm pleased to be here and would like to note this year marks the 20th year since the EM program was first established. Clearly a lot has been accomplished and a lot more needs to be done.

When I first appeared before this subcommittee 2 years ago, I pledged that safety would remain our first priority. I've stated that no milestone is ever worth an injury to our workforce. Today I'm pleased to report that worker injuries have been reduced by 50 percent during the past 3 years and that our injury rate is less than 10 percent of that in the commercial waste disposal and construction industries. I think that's very, very notable for the people that are doing the work for all of us and for our country.

Also, after I was sworn into this position, I set about to refine all of our cost and schedule baselines which guide every project. During the past 18 months, all, that is all, EM projects, both line item and clean up have undergone independent audits to verify their costs and schedules as valid and reasonable. Today our project estimates and assumptions for the entire EM portfolio, I believe can be viewed with far greater confidence than ever before.

At that time I also stated that our goal was for the cost and schedule performance of at least 90 percent of our projects to be on target or better than on target. In July 2005, 17 of our projects

were not on cost or on schedule. That is only 51 percent of all projects at that time were on target.

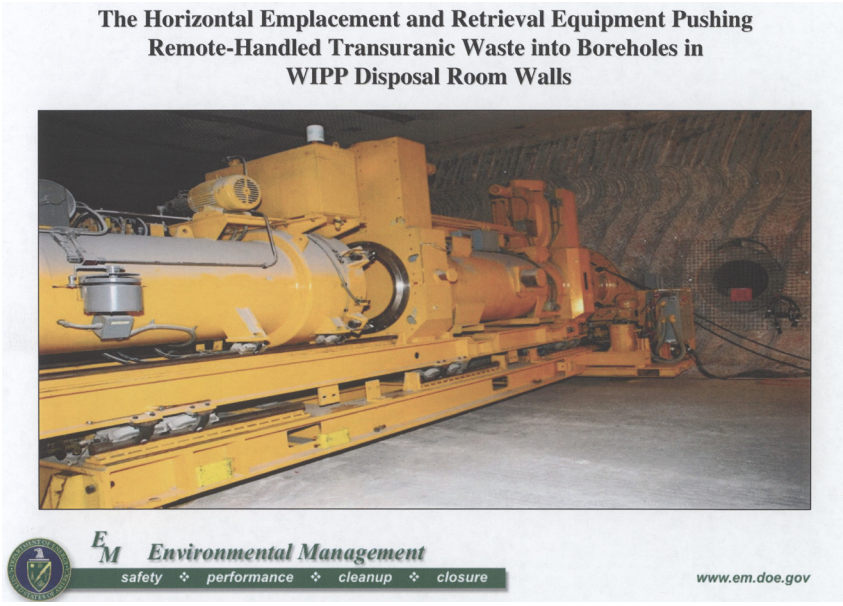
Today our portfolio, which currently numbers more than 65 projects, consistently meets that 90 percent goal. And we actually track this regularly. We are up near 100 percent on cost, on schedule with the entire portfolio, which I think is a notable accomplishment for all the people that work in this program.

Turning now to our fiscal 2009 budget request, our request is for $5.53 billion. And it continues to be based on the principle of prioritizing risk reduction across the entire complex.

Let me address an issue that I know has caused concern to several Members of Congress and that is that this request has broken with past understandings related to the Department's clean up budget strategy. I would like to quote part of testimony from my predecessor, Assistant Secretary Jessie Roberson before this subcommittee in 2003 and 2004. She testified that after a period of accelerated funding peaking in fiscal year 2005 and here I quote, "we anticipate funding will then decline significantly to about $5 billion in 2008." Viewed from this perspective and with that quote in mind, our fiscal 2009 budget is about a half billion dollars more than what she projected 5 years ago.

The administration recognizes that with the budget before you as you all have noted, some of the milestones contained in our clean up agreements are in jeopardy of being missed. It's important to note that other milestones are in jeopardy due to technical reasons regardless of funding. As a result we had to make very careful decisions regarding our priorities. The regulatory agreements that guide our work have been and remain important measures of progress. The Department's strategies continue to focus on clean up that will produce the greatest environmental and safety benefit and the largest amount of risk reduction.

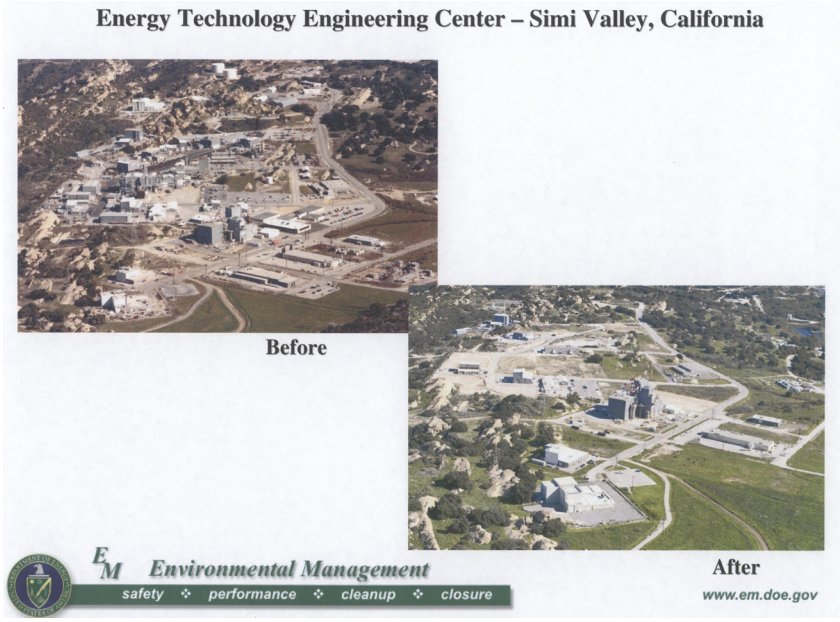
I would like to just take a minute to share. I believe you all have photographs before you, but just share a couple of those with you. The first photograph is actually from Senator Domenici's home State. It's the underground of the Waste Isolation Pilot Plant. And it's, I think, a very good photo of the remote-handled waste placement machine that places the remote-handled waste into the horizontal bore holes in the walls.



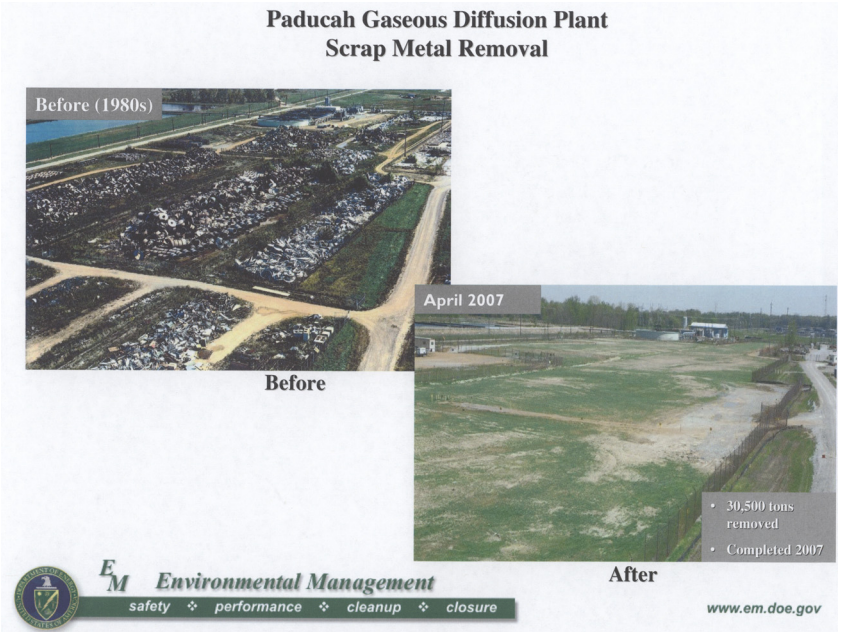
The second photograph is the 300 Area of Hanford. And this photograph shows by the "X's" through the buildings in the photograph how many of the buildings have actually been taken down. It's an amazing accomplishment. A total of 140 structures have been safely removed just in this area alone.

The third photograph is a photograph of the Energy Technology Engineering Center in California. And this is another example of

a before and after shot that shows that more than 250 buildings have been taken down in that location.



The fourth slide is before and after at Paducah, Kentucky that shows a huge metal waste pile. A blight on the entire area that has been totally removed. Enough metal equal to the displacement of a World War II battleship.



And the last slide is of DOE contractors of Idaho removing transuranic waste under a structure, while the structure provides the safety so that this waste does not become airborne and then migrate off the site.

Mr. Chairman, I'm proud of the progress our 34,000 contractors and Federal employees have made in recent years. And the wise and secure foundation we have built for the future. This subcommittee has provided the critical guidance that has enabled us to accomplish the successes we've had to date.

PREPARED STATEMENT

I look forward to working with you in my remaining time at the Department. And I thank you for supporting our efforts to reduce risk to our citizens, our communities and our Nation. Thank you and I'm happy to answer your questions.

[The statement follows:]

PREPARED STATEMENT OF HON. JAMES A. RISPOLI

Good morning Mr. Chairman, Senator Domenici, and members of the subcommittee. I am pleased to be here today to answer your questions on the President's fiscal year 2009 budget request for the Department of Energy's Office of Environmental Management (EM). I want to thank the subcommittee for your support of the EM program.

The year 2009 will mark 20 years since the EM program was first established just as the cold war was coming to an end. While the budget we are considering today is oriented toward the future, I think it is appropriate to begin today by considering how much this program has accomplished since its creation.

At that time, nearly 50 years of nuclear weapons production and energy research had left a legacy of enormous amounts of waste and environmental contamination at more than 100 sites across the country. The extent of the risk to our citizens and communities was literally unknown, and certainly many of the processes and technologies to reduce that risk had not yet been invented.

Since then, we have closed 86 of 108 sites nationwide. The national "footprint" of the Department's nuclear complex and its accompanying risks has been drastically reduced, and eliminated altogether from many States. We have packaged and safely stored all of the Nation's excess plutonium inventory. We have pioneered new technologies that have allowed us to make progress retrieving millions of gallons of tank waste, and to safely dispose tens of thousands of cubic meters of transuranic waste. In fiscal year 2006 and fiscal year 2007 alone, we demolished approximately 500 buildings (nuclear, radioactive, and industrial) as part of our decontamination and decommissioning (D&D) projects. And finally, we have made great strides in protecting groundwater using innovative treatment systems.

Today marks likely the final time that I will be testifying before you regarding our program's budget request. When I first assumed the position of Assistant Secretary for Environmental Management in August 2005, I set out to institute a rigorous project management system, and, above all, to continue to emphasize safety and risk reduction. I sought to refine and independently verify our project baselines—the estimates of scope, schedule and cost that guide every project—to ensure that they are realistic and executable. I will discuss our successes in this area as well as our ongoing challenges.

The fiscal year 2009 budget request is once again built on the principle of prioritizing risk reduction across the entire complex for which EM is responsible, supported by our four guiding tenets of safety, performance, cleanup and closure. The budget request totals $5.528 billion, a decrease of $167 million from the fiscal year 2008 appropriation. With 90 percent of our budget addressing mission activities at our cleanup sites, more than half of fiscal year 2009 funding will go towards our highest-risk activities of stabilizing tank waste, nuclear materials and spent nuclear fuel; another one-quarter of the budget will be devoted to cleaning up contaminated soil, groundwater, and excess facilities, and about 14 percent going to manage wastes streams related to those cleanup activities. The remaining 10 percent covers mission activity support, including costs for program oversight provided by our Federal personnel, and technology development.

Mr. Chairman, let me point out that the administration recognizes that EM's fiscal year 2009 budget request of $5.528 billion is based on, and would implement, an environmental management approach under which the Department would not meet some of the milestones and obligations contained in the environmental agreements that have been negotiated over many years. It is also important to recognize

that some upcoming milestones will be missed regardless of the approach that is chosen and its associated level of funding.

Moreover, some of the relevant agreements were negotiated many years ago, with incomplete knowledge by any of the parties of the technical complexity and magnitude of costs that would be involved in attempting to meet the requirements. This incomplete knowledge, coupled with other issues including contractor performance, overly optimistic planning assumptions, and emerging technical barriers, also have impeded the Department in meeting all milestones and obligations contained in the environmental compliance agreements.

In planning its environmental cleanup efforts and developing the budget for those activities, the Department seeks to focus on work that will produce the greatest environmental benefit and the largest amount of risk reduction. The Department strongly believes that setting priorities and establishing work plans in this way is the most effective use of taxpayer funds and will have the greatest benefit, at the earliest possible time, to the largest number of people.

In determining these priorities, the Department works closely with the Federal and State regulators, and will seek the cooperation of those entities in helping evaluate needs and focus work on the highest environmental priorities based on current knowledge, particularly where doing so necessitates modification of cleanup milestones embodied in prior agreements with the Department.

MANAGING OUR PRIORITIES

When I appeared before this subcommittee 2 years ago, I pledged that safety would remain our first priority. All workers deserve to go home as healthy as they were when they arrived at the job in the morning. No milestone is worth any injury to our workforce. I am pleased to say that EM's safety performance continues to be outstanding. As a result of collaborative efforts by DOE and our contractors, worker injuries have been reduced by 50 percent during the past 3 years. Currently EM's injury rate is less than 10 percent of comparable commercial waste disposal and construction industries.

Another priority we discussed 2 years ago was my goal of making EM a high-performing organization by every measure. This goal has required us to look critically at every aspect of how we plan, procure, execute and manage every project under our jurisdiction, and how we align every dollar the taxpayers provide to achieving environmental cleanup goals.

On the subject of our management practices, in September 2005, Congress asked NAPA to undertake a management review of EM, including an assessment of EM's human capital. NAPA's study, conducted over a period of 18 months, was very interactive; we opened our operations to NAPA for scrutiny and in turn have embraced and implemented nearly all of NAPA's proposals.

Most of all, we were gratified that NAPA concluded in its final report issued this past December that EM, "is on a solid path to becoming a high-performing organization." We know we have much remaining to be accomplished, but we take NAPA's conclusion as a sign that we are, in fact, headed in the right direction with regard to how we function as an organization.

A budget is only as good as its planning basis. Our request is developed from our project baselines that define the scope, cost, and schedule for each project, and I have much to report to you in this area. When I assumed this position, I was concerned that the accepted baselines for many of our projects were unrealistic. The reasons for this included overly aggressive assumptions in the technical and regulatory arenas, increasing costs of materials and simple underperformance.

Since that time, our sites have undergone an independent review to verify the reasonableness of the scope, cost, and schedule for each project. This review also documented assumptions and associated risk management plans that supported baseline development. As a result, all near-term baselines up to 5 years have now been independently reviewed and verified, while long-term cost ranges have been determined to be reasonable. As we move forward in the fiscal year 2009 budget process, I believe that the subcommittee can view near-term cost assumptions associated with our projects with greater confidence than ever before.

The majority of EM sites do, in fact, include baselines with completion dates beyond 2013. Through a collaborative process with our field sites, EM is seeking to define aggressive but achievable strategies for accelerating cleanup of distinct sites or segments of work that involve multiple sites. Moreover, it is important to note that EM's site cleanup activities are managed as one integrated national program; the work and risks associated with each site are inherently interrelated with that at other sites. Thus, we continue to evaluate and implement cross-site risk priorities and cleanup activities.

In 2005, we set out to integrate proven project management tools into our business processes, and address our shortcomings in project management by using DOE and industry-standard business management tools. I stated to you in 2006 that our goal was for at least 90 percent of our projectized portfolio to perform on-target, or better than on-target regarding cost and schedule. I am pleased to report that we now consistently meet that goal—in excess of 90 percent of our portfolio, currently numbering more than 65 independently audited projects, consistently performs within cost and schedule targets.

As an "acquisition" organization, EM accomplishes its mission through procurement and execution of our projects. Since the contract serves as the principal agreement governing how a project is executed between DOE and the contractor, contract and project management must be seamlessly managed in parallel. To oversee this process, about 18 months ago, we implemented an organizational structure, including the creation of a Deputy Assistant Secretary for Acquisition and Project Management. This position integrates the two functions of procurement planning and project management, helping us to professionalize the procurement process so that we learn from, and improve upon, each contract experience. Moreover, it provides us with strong management oversight after the contract is awarded. We are striving to make EM nothing short of a "Best-in-Class" organization for project and contract management and engineering and technology.

The fiscal year 2009 Technology Development and Deployment Program will be highly focused and concentrate its investments in EM high priority cleanup areas, including radioactive tank waste, soils and groundwater remediation, and deactivation and decommissioning excess facilities. Best-in-class performers, including other Federal agencies, the national laboratories, the university system, and private industry will be utilized to conduct the Technology Development and Deployment scope.

The EM program has always required a strong technology component to accomplish its mission, one that is focused on developing and deploying technologies to enhance safety, effectiveness, and efficiency. As we look ahead to our cleanup work, we face the ongoing challenge of maturing and integrating technology into first-of-a-kind solutions. An Engineering and Technology Roadmap has been developed to address this need. The Roadmap identifies the technical risks the EM program faces over the next 10 years, and strategies to address the risks. EM's validated baselines are a powerful tool that allows EM managers to identify the points at which new knowledge and technology can be efficiently inserted into EM cleanup projects to address risks.

BUDGETING FOR OUR PRIORITIES

Before I discuss the fiscal year 2009 budget request, allow me to draw attention to the significant cleanup progress achieved recently. We have:

—Completed stabilization and packaging for all plutonium residues, metals, and oxides and begun consolidation of all of these materials at the Savannah River Site (SRS);
—Produced for disposition more than 2,500 cans of vitrified high-level waste from highly radioactive liquid wastes;
—Completed retrieval and packaging for disposal of more than 2,100 metric tons of spent nuclear fuel from K-basins at Hanford to protect the Columbia River;
—Shipped more than 50,000 cubic meters of transuranic (TRU) waste from numerous sites to the Waste Isolation Pilot Plant (WIPP) for permanent disposal, including 25,000 out of a planned 30,000 drums from SRS;
—Disposed of nearly one million cubic meters of legacy low-level waste and mixed low-level waste;
—Eliminated 11 of 13 high-risk material access areas through material consolidation and cleanup;
—Cleaned up the Melton Valley area at the Oak Ridge Reservation and continued decontamination and decommissioning of three gaseous diffusion buildings at Oak Ridge; and
—Disposed of more than 8,500 tons of scrap metal from Portsmouth.

The program has made significant progress in shifting focus from risk management to risk reduction. This focus on measurable risk reduction continues to be the guiding principle behind the development of our fiscal year 2009 budget request.

To strike the balance that allows EM to continue achieve risk reduction and pursue cleanup goals, we propose funding the following risk reduction and regulatory activities in priority order:

—Stabilizing radioactive tank waste in preparation for treatment (about 32 percent of the fiscal year 2009 request);

—Storing, stabilizing, and safeguarding nuclear materials and spent nuclear fuel (about 18 percent of the fiscal year 2009 request);
—Disposing of transuranic, low-level, and other solid wastes (about 14 percent of the fiscal year 2009 request); and
—Remediating major areas of EM sites, and decontaminating and decommissioning facilities (about 26 percent of the fiscal year 2009 request).

FISCAL YEAR 2009 BUDGET REQUEST

The Department's fiscal year 2009 budget request for the Office of Environmental Management is $5.528 billion. The request consists of three appropriations, Defense Environmental Cleanup, Non-Defense Environmental Cleanup, and the Uranium Enrichment Decontamination and Decommissioning Fund.

For fiscal year 2009, EM's funding priorities to best address our environmental cleanup challenges are:

—Conducting cleanup with a "Safety First" culture that integrates environment, safety and health requirements, and controls into all work activities to ensure protection to the worker, public, and the environment;
—Establishing a disposition capability for radioactive liquid tank waste and spent nuclear fuel;
—Securing and storing nuclear material in a stable, safe configuration in secure locations to protect national security;
—Transporting and disposing of transuranic and low-level wastes in a safe and cost-effective manner to reduce risk;
—Remediating soil and groundwater in a manner that will assure long-term environmental and public protection; and
—Decontaminating and decommissioning facilities that provide no further value to reduce long-term liabilities while remediating the surrounding environment.

Examples of milestones and planned activities for fiscal year 2009 by site-specific categories are:

Idaho

—Meet requirements in the Idaho Settlement Agreement to ship stored contact-handled and remote-handled transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP).

The Idaho National Laboratory will continue characterizing, treating, packaging, and transporting of contact-handled and remote-handled TRU waste to WIPP.

—Continue construction of the sodium-bearing waste treatment facility to support tank waste retrievals.

The overall objectives of this project are to treat and dispose of sodium-bearing tank wastes, close the tank farms tanks, and perform initial tank soil remediation work. Construction and operation of the sodium-bearing waste treatment facility will reduce potential risk to human health and the environment by preventing the potential migration of contamination into the Snake River Plain Aquifer, which is a sole-source aquifer for the people of Southeastern Idaho.

—Complete the transfer of all EM-managed spent nuclear fuel to dry storage.

EM will continue to promote the safe and secure receipt and dry storage of spent fuel to protect the Snake River Plain Aquifer.

Los Alamos National Laboratory

—Promote soil and water remediation.

The Los Alamos National Laboratory (LANL) Soil and Water Remediation Project scope includes identification, investigation, and remediation of chemical and or radiological contamination attributable to past Laboratory operations and practices. In order to support the project scope, in fiscal year 2009 EM plans to: complete required groundwater monitoring within eight watersheds, install four regional aquifer monitoring wells, complete four soil cleanups, including Material Disposal Area R in Technical Area-16, and continue remediation of tanks at the Material Disposal Area A in Technical Area-21.

—Continue TRU waste shipments to WIPP.

The Solid Waste Stabilization and Disposition Project includes the treatment, storage, and disposal of legacy TRU and mixed low-level waste generated between 1970 and 1999 at LANL. The end-state of this project is the safe disposal of legacy waste from LANL. In fiscal year 2009, EM plans to continue characterization and certification of TRU waste for shipment to WIPP and continue services and safety-related activities to maintain the waste inventories in a safe configuration and within allowable Material-at-Risk limits established for the site.

Moab

—Complete necessary transportation upgrades and tailings handling infrastructure and initiate movement of uranium tailings off the Moab site.

The relocation of the mill tailings at the Moab site to a Department of Energy constructed disposal facility near Crescent Junction, Utah, is necessary. In fiscal year 2009, EM plans to complete the rail upgrades between Moab and Crescent Junction and begin transporting tailings to Crescent Junction from Moab. Moreover, the Record of Decision has been amended to allow the tailings to be transported by either truck or rail. In addition, EM will continue disposal cell excavation at Crescent Junction.

Oak Ridge

—Continue decontamination and decommissioning (D&D) of K–25 Process Building.

The gaseous diffusion plant comprises one of the largest complex of buildings in the world. In fiscal year 2009, EM will continue to vent, purge, and drain, characterize, remove of high risk equipment and carry out required foaming activities for the east and north wings of the K–25 process building. Demolition of the west wing of the K–25 process building will be conducted.

—Complete final design for the Uranium-233(U–233) down-blending project and begin Building 3019 modifications.

The U–233 inventory in Building 3019 will be down-blended as expeditiously as possible to reduce the substantial annual costs associated with safeguards and security requirements and to address nuclear criticality concerns raised by the Defense Nuclear Facilities Safety Board (DNFSB).

—Process and ship contact-handled and remote-handled TRU waste to WIPP.

Approximately 300 cubic meters of contact-handled TRU debris and 100 cubic meters of remote-handled TRU debris will be processed for disposal at WIPP.

—Decontaminate and decommission (D&D) the Y–12 National Security Complex and Oak Ridge National Laboratory (ORNL).

Remediation of the Corehole 8 plume at ORNL and of mercury contamination at Y–12 will be performed. The on-site disposal cell for receipt of D&D debris and cleanup waste will be expanded.

Paducah

—Initiate operations of the Depleted Uranium Hexafluoride (DUF_6) Conversion Facility.

The DUF_6 conversion facility will convert depleted uranium hexafluoride into a more stable form, depleted uranium oxide, which is suitable for reuse or disposition. The depleted uranium oxide will be sent to a disposal facility or reused, the hydrogen fluoride by-products will be sold on the commercial market, and the empty cylinders will be disposed of or reused.

—Complete disposition of legacy waste.

The Paducah Gaseous Diffusion Plant is responsible for some of the waste streams that were generated by the United States Enrichment Corporation's operation of the Plant. The disposition of this legacy waste will reduce risk and storage costs and is critical to accelerating site cleanup.

—Reduce risk through focused cleanup of soil and waste.

The completion of characterization and disposition of recently discovered soil and rubble piles along the river and closure and disposition of all DOE Material Storage Areas will also aid in lowering the risk to human health and the environment.

Portsmouth

—Initiate operations of the DUF_6 Conversion Facility.

Similar to Paducah, the DUF_6 conversion facility will convert depleted uranium hexafluoride into a more stable form, depleted uranium oxide, for reuse or disposal. The depleted uranium oxide will be sent to a disposal facility or reused, the hydrogen fluoride by-products will be sold on the commercial market, and the empty cylinders will be disposed of or reused.

—Complete cold shutdown activities in the former gaseous diffusion operations facilities and award the D&D contract.

The transition of the Gaseous Diffusion Plant from cold shutdown to decontamination and decommissioning will continue. In addition, Portsmouth plans to complete X–701B oxidation injection system groundwater field treatment activities.

Richland

—Complete shipping of special nuclear materials from the Plutonium Finishing Plant (PFP).

The PFP complex consists of several buildings that were used for defense production of plutonium nitrates, oxides and metal from 1950 through early 1989. As part of the PFP cleanup, Richland's goal is to complete shipments of special nuclear materials off-site to the Savannah River Site and procure additional casks to support completion of the shipping campaign by the end of fiscal year 2009.

—Enhance groundwater remediation at the Central Plateau and along the Columbia River.

Over 50 years of weapons production at the Hanford site has left the groundwater contaminated by carbon tetrachloride, chromium, technetium 99, strontium, and uranium. EM is dedicated to protecting the groundwater resources at Hanford as well as the Columbia River, through deployment of innovative technologies in fiscal year 2009 to address all of the contaminants in the vadose zone and groundwater, with supporting investigations such as installation of new wells for monitoring and characterization, and geophysical logging to provide additional subsurface information on contaminant distribution.

—Cleanup of waste sites and facilities along the Columbia River Corridor including K-East Basin D&D.

The K Basins project is a high priority risk reduction activity due to its close proximity to the Columbia River. To date, we have completed the removal, packaging, and transportation of approximately 2,100 metric tons of degrading spent nuclear fuel, removal of an estimated 44 cubic meters of radioactively contaminated sludge, and the basin water is now being pumped out. In fiscal year 2009, the K-East basin will be completely demolished. The end-state of the K Basins cleanup will mean the removal of more than 55 million curies of radioactivity from near the Columbia River.

—Retrieve suspect contact-handled and remote-handled TRU waste from burial grounds and continue to ship to WIPP.

The Hanford Site contains thousands of containers of suspect contact-handled and remote-handled TRU waste, low-level waste, and mixed low-level waste. Activities planned in fiscal year 2009 are to retrieve 1,100 cubic meters of suspect contact-handled and remote-handled TRU waste from the low-level burial grounds, continue certification of transuranic waste, and dispose of on-site generated low-level and mixed low-level wastes at the mixed waste disposal trenches.

River Protection

—Manage the tank farms in a safe and compliant manner until closure.

The radioactive waste stored in the Hanford tanks was produced as part of the Nation's defense program and has been accumulating since 1944. To protect the Columbia River, the waste must be removed and processed to a form suitable for disposal and the tanks must be stabilized. To reach these goals, EM plans to enhance the Single-Shell Tank Integrity Program, continue to develop retrieval technologies and retrieve waste from approximately one tank per year, and continue to evaluate supplemental treatment technology, and interim pre-treatment capabilities.

—Advance in Waste Treatment and Immobilization Plant construction.

The Waste Treatment and Immobilization Plant (WTP) is critical to the completion of the Hanford tank waste program by providing the primary treatment capability to immobilize the radioactive tank waste at the Hanford Site. The WTP complex includes five facilities: the Pretreatment Facility, the High-Level Waste Facility, the Low-Activity Waste Facility, the Balance of Facilities, and the Analytical Laboratory. In fiscal year 2009, EM plans to continue construction of all of these facilities to achieve approximately 55 percent completion, while maintaining the viability of other supplemental treatment options. The end-state of this project will be the completion of the WTP hot commissioning and transfer of the facilities to an operations contractor to run the plant.

Savannah River

—Continue consolidation and disposition of special nuclear materials.

The receipt, storage, and disposition of materials at the Savannah River Site allows for de-inventory and shutdown of other DOE complex sites, providing substantial risk reduction and significant mortgage reduction savings to the Department. In fiscal year 2009, the Savannah River Site will complete the receipt of surplus plutonium from the Hanford Site, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory. Also in fiscal year 2009, EM plans to operate H-Canyon/HB-Line to disposition special nuclear materials and begin processing of Savannah River Site's spent nuclear fuel in H-Canyon.

—Reduce radioactive liquid waste.

The mission of the tank waste program at Savannah River is to safely and efficiently treat, stabilize, and dispose of approximately 37 million gallons of legacy ra-

dioactive waste currently stored in 49 underground storage tanks. In fiscal year 2009, planned EM activities include: continue operation of Actinide Removal Project, Modular Caustic-Side Solvent Extraction Unit, and the Defense Waste Processing Facility, continue the construction of the Salt Waste Processing Facility; and prepare sludge batches in support of continued high-level waste vitrification. Activities are planned to free up additional tank space, such as treatment of organic waste in the 1.3 million gallon Tank 48 to return the tank to useful service.

Waste Isolation Pilot Plant

—Continue safe shipment, receipt, and disposal of contact-handled and remote-handled TRU waste.

WIPP in Carlsbad, New Mexico, is the Nation's only mined geologic repository for the permanent disposal of defense-generated TRU waste. In fiscal year 2009, the budget request supports up to 21 contact-handled TRU and up to 5 remote-handled TRU shipments per week from across the DOE complex.

CONCLUSION

Mr. Chairman, I am proud of the progress the EM program has made in recent years, both in terms of meeting the Nation's cleanup priorities, and in building the foundation for future efforts. I respectfully submit EM's fiscal year 2009 budget request and am pleased to answer your questions.

Senator DORGAN. Mr. Rispoli, thank you very much. Finally we will hear from Mr. Sproat. Mr. Sproat, you may proceed.

STATEMENT OF HON. EDWARD F. SPROAT III, DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

Mr. SPROAT. Good morning, Senator and good morning, members of the committee. And thank you very much for the opportunity to come this morning to address you about my office, the Office of Civilian Radioactive Waste Management and the President's 2009 request for the Yucca Mountain program.

But I'd like to start off with just recapping what I told this committee last year at this time in terms of what we planned to do in fiscal year 2008 with the President's budget request for fiscal year 2008, which was $494.5 million. I told the committee at that time that with that money in this fiscal year we intended to deliver the license application for Yucca Mountain to the Nuclear Regulatory Commission no later than June 30, of this year. I also told the committee that we would certify the licensing support network the major litigation support database that the NRC requires by December 2007. I also said that we would complete the supplemental environmental impact statement.

I said we would deliver the report to Congress, that Congress requires on a need for a second repository. And I said we would revise and issue to file an environmental impact statement for the Nevada rail line in fiscal year 2008.

Now as the committee is very much aware, we ended up receiving from Congress $386.1 million or $108 million less than the President requested. And we received that at the end of the first fiscal quarter, or the first quarter of the fiscal year. Obviously it presented significant management challenges to my management team.

However, we have put in place significant improvements in the management approaches, management processes for our office. And I'm very pleased to be able to report to the committee that despite the $108 million reduction in appropriations, we will meet or beat all of the deliverables schedules that we told this committee that we would provide at this time last year. So we are on schedule.

And we will deliver a high quality docketable license application to the Nuclear Regulatory Commission for the repository during the month of June of this year.

Now one of the things I would like to point out to the committee is that with that $108 million reduction from the President's request in fiscal year 2008, on top of the $100 million reduction from fiscal year 2007 we are not able to maintain the best achievable date for opening a repository of March 2017. That date is no longer achievable. And I'll talk a little bit in a minute about what we're doing to provide the committee a better understanding and a better forecast of when a repository could be open and under what conditions.

So let me turn to our fiscal year 2009 appropriation request, which is $494.7 million or essentially a flat request compared to the President's request for fiscal year 2008. One of the things the committee may not or may be aware when I talked to you last year, I talked about, within the context of the best achievable date for opening a repository, what the cash flows, projected cash flows, were required to do that; to open by 2017.

And that cash flow included a projected budget request of $1.2 billion for fiscal year 2009. And as the committee will note, we have not requested anywhere near that amount for fiscal year 2009. And we have limited our budget request to an amount that we need to support the license application review and defense in front of the Nuclear Regulatory Commission and to maintain certain critical path design activities, but we will not be able to maintain all of the critical path activities needed to support a 2017 opening date with this budget request.

And the reason that we haven't requested that $1.2 billion is that based on our experience and the difficulties that this committee is very much aware of in the appropriations process that we've gone through in fiscal year 2007 and fiscal year 2008. We believe it's unrealistic to expect Congress to authorize a significant increase in my program's funding that's required to open the repository in the shortest possible time. Therefore what we are doing is we're rebaselining this program in terms of a new set of assumptions that assumes essentially flat funding during the license application defense process and then ramping up after the Nuclear Regulatory Commission gives the Department a construction authorization in 2011 or 2012.

So, just turning back to fiscal year 2009 with the budget request that's in front of you, we intend to defend the license application that we'll be submitting to the Nuclear Regulatory Commission. We'll begin some detailed design for the repository facilities itself. We're going to complete some of the contour mapping for the Nevada rail line. And we're going to continue with developing the Federal capability to actually oversee construction and operation of this repository as well as further development of the security and safeguards programs needed to run a high level waste repository under the Federal Government.

So, let me just close by addressing the issue of what is it going to take to actually be able to build this repository? It's very clear that under any scenario of recycling or non-recycling, we still will need a deep geological repository for both the defense level waste

and spent nuclear fuel and that funding required to build a repository will be at levels significantly higher than historical funding levels that this program has received in the past.

And that without a dependable funding source from the Nuclear Waste Fund, which was originally intended, it really becomes impossible to provide a new firm date to the committee as to when the repository could be open. And I'd like to remind the committee, based on my discussions with you last year at this time, that for each year beyond 2017 that we defer opening a repository, it's an additional half a billion dollars of potential taxpayer liability associated with the Government's non-performance on taking commercial spent nuclear fuel. And that our forecast that if we were opening a repository in 2017, that liability number was approximately $7 billion and that would grow at about $500 million a year beyond that date.

PREPARED STATEMENT

In summary what I'd like to say is that we have made substantial progress on this program over the last 2½, 3 years. I have a very high confidence level in the management team that I'll leave behind after I leave Government service to move this program forward. And that it is vitally important to this country that under any scenario of either open fuel cycle, closed fuel cycle, that we have a deep geologic repository. And I would respectfully request this committee to give serious consideration to the President's request to fund this program at the requested levels for fiscal year 2009.

Thank you very much. I'd be pleased to answer whatever questions the committee may have.

[The statement follows:]

PREPARED STATEMENT OF HON. EDWARD F. SPROAT III

Mr. Chairman and members of the committee, I am Edward F. Sproat III, Director of the Department of Energy's (DOE) Office of Civilian Radioactive Waste Management (OCRWM). I appreciate the invitation to appear before the committee to discuss the President's fiscal year 2009 budget request for my office which has the responsibility to design, license, construct, and operate the Nation's repository for the disposal of spent nuclear fuel and high-level radioactive waste, as defined in the Nuclear Waste Policy Act (NWPA) of 1982, as amended.

When I came to this committee last year, I outlined a number of specific deliverables that OCRWM would achieve in fiscal year 2008, assuming appropriation of the President's request of $494.5 million, including:

—Submit a License Application for a Construction Authorization for a geologic repository for disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain to the Nuclear Regulatory Commission (NRC) by June 30, 2008;
—Certify DOE's Licensing Support Network collection in accordance with NRC requirements and regulations by December 21, 2007;
—Complete the Supplemental Environmental Impact Statement (EIS) for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain;
—Perform the analysis and deliver the report to Congress required by the NWPA on the need for a second repository; and
—Complete the final EIS for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain.

Despite the President's request of $494.5 million, the Congress appropriated $386.4 million for OCRWM in fiscal year 2008, a reduction of $108.1 million from the President's request. This large reduction, which occurred well into the fiscal year, contributed to significant management challenges, and following the fiscal

year 2007 appropriation which was approximately $100 million less than the President's request, caused a reduction in force of approximately 900 personnel from the program. The cumulative impact of these significant appropriation reductions is that DOE is no longer able to maintain the best achievable opening date of March 2017 that I presented to the committee last year. However, because of significant improvements we have made in management practices and processes, we will be able to complete all of the deliverables for fiscal year 2008 that I promised the committee last year on or near schedule, including the submittal of the License Application to the NRC this June.

FISCAL YEAR 2009 BUDGET REQUEST AND KEY ACTIVITIES

The President's fiscal year 2009 budget request for this program is $494.7 million. The committee will note that this amount is significantly less than the $1.2 billion for fiscal year 2009 that I presented to the committee last year as the amount needed to achieve the best achievable opening date of March 2017. This fiscal year 2009 funding request reflects what the administration sees as the realities of the effects of the current discretionary spending budget caps on this program. Because the funding mechanism established by Congress for the program when it established the Nuclear Waste Fund is not currently available to offset appropriations for this program, we have limited our budget request to an amount that is needed to support the process to attain a Construction Authorization from the NRC and to continue some of the other critical path activities. We believe that unless Congress addresses the funding mechanism issue for this program by acting affirmatively on the proposed legislation this administration has sent to Congress, it is unrealistic to expect Congress to appropriate the significant increases in funding needed to open the repository in the shortest possible time (i.e., by 2017). We are therefore re-baselining the Program schedule and budget authority cash flow projections to reflect what we expect to be flat funding until the NRC issues the Construction Authorization. I will provide this revised information to the committee when it is completed.

Fiscal year 2009 will be the first year of a multi-year license defense process. Following an acceptance review by the NRC, it is anticipated that the NRC will docket the License Application, thus beginning the formal licensing phase that is anticipated to last 3 to 4 years. In fiscal year 2009, our objectives are to:

—Defend the License Application for the repository before the NRC;
—Begin detailed design for the facilities required for receipt of spent nuclear fuel and high-level radioactive waste at the repository;
—Continue essential interactions with State, local, and tribal governments needed to support national transportation planning;
—Complete efforts to finalize the contour mapping and the layout of the rail line to support land acquisition and complete a right-of-way application for the Nevada rail line;
—Continue design and licensing work on the Transportation, Aging and Disposal (TAD) canister system;
—Continue staffing and training the OCRWM organization so that it has the skills and culture needed to design, license, and manage the construction and operation of the Yucca Mountain project with safety, quality, and cost effectiveness; and
—Continue planning and designing a compliant and well-integrated safeguards and security, safety, and emergency management program.

In addition, the budget request also includes funds for the following activities:

—Funding for payments-equal-to-taxes to the State of Nevada and Nye County, Nevada, where Yucca Mountain is located. Our fiscal year 2009 request also includes oversight funding for the State of Nevada, affected units of local government and an affected tribe, as well as funding for the University System of Nevada and Nye County, Nevada, and Inyo County, California for independent scientific studies;
—Funding for cooperative agreements with State regional groups and other key parties involved in transportation planning; and
—Funding for Program direction which supports Federal salaries, expenses associated with building maintenance and rent, training, and management and technical support services, which include independent Nuclear Waste Fund audit services, independent technical and cost analyses, and University-based independent technical reviews. We also have included funding to begin the upgrade of obsolete data storage systems which house the scientific data collected over the years of this program; this significant asset is now at risk of loss.

IMPLICATIONS OF NON-ACCESS TO THE NUCLEAR WASTE FUND

The NWPA establishes the requirement that the generators of high-level nuclear waste must pay for its disposal costs. As a result, the Nuclear Waste Fund was created and is funded by a 1 mil per kilowatt-hour fee on all nuclear generation in this country. As of today, the Fund has a balance of approximately $21.0 billion which is invested in U.S. Treasury instruments. The Government receives approximately $750 million per year in revenues from on-going nuclear generation and the Fund averages about 5.5 percent annual return on its investments. At the present time, due to technical scoring requirements, appropriations for the Yucca Mountain repository have a significant negative impact on the Federal budget deficit. Specifically, the monies collected are counted as mandatory receipts in the budgetary process, while spending from the Nuclear Waste Fund is scored against discretionary funding caps for the Department. In legislation the administration submitted to the 109th Congress and has submitted again to this Congress, the President proposes fixing this problem by reclassifying mandatory Nuclear Waste Fund receipts as discretionary, in an amount equal to appropriations from the Fund for authorized waste disposal activities. Funding for the Program would still have to be requested annually by the President and appropriated by the Congress from the Nuclear Waste Fund.

Sustained funding well above current and historic levels will be required if the repository is to be built. Funding at current levels in future years will not be adequate to support design and the necessary concurrent capital purchases for repository construction, transportation infrastructure, and transportation and disposal casks. The development of a credible schedule for the program is highly dependent upon a steady and reliable funding stream.

The Department estimates that U.S. taxpayers' potential liability to contract holders who have paid into the Nuclear Waste Fund will increase from approximately $7.0 billion to approximately $11 billion if the opening of the repository is delayed from 2017 to 2020. The calculation of potential costs to taxpayers is a complex matter that depends on a number of variables that change year to year, however, on average the liability will increase $500 million annually. The Department has not attempted to calculate precisely what these costs would be if the opening of the repository were delayed beyond 2020. There will also be added costs associated with keeping defense waste sites open longer than originally anticipated. The Department has not yet estimated those costs. It can be seen, however, that each year of delay in opening the repository has significant taxpayer cost implications, as well as the potential for delaying construction of needed new nuclear power plants. Therefore, the administration believes it is in the Country's best interest to expedite construction of the repository and the transportation infrastructure necessary to bring both defense and commercial spent nuclear fuel and high-level waste to Yucca Mountain.

SUMMARY

In summary, the President's fiscal year 2009 budget request will provide the needed funds to defend the License Application for a Construction Authorization of a geologic repository for disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. The significant reductions in appropriated funding for fiscal year 2007 and fiscal year 2008, however, have negated the Department's ability to meet the March 2017 best achievable opening date. Each year's delay beyond the March 2017 date will result in increased potential taxpayer liability to utility contract holders as well as increased costs for storage at defense waste sites across the country. I respectfully urge the Congress to consider and pass the President's fiscal year 2009 budget request for the OCRWM.

EM BUDGET SHORTFALLS

Senator DORGAN. Mr. Sproat, thank you very much. Mr. Rispoli and Mr. Sproat, I was just observing to Senator Domenici that some while ago, some years ago, former Congressman Mike Parker was working for the Corps of Engineers representing the administration as an appointee. He came to Congress and in a disarming moment of candor, he said that we don't have enough money in the budget to do what we need to be doing. The next morning he was fired.

I understand your role here today. Your role here today is to come up and defend the administration's budget. I understand that.

But, Mr. Rispoli, your job is to clean up the mess from all of these nuclear weapons plants that were spread around the country. The plants have created an environmental hazard that's dramatic. So we've got to clean them up and the job of Environmental Management is to clean up all those plants.

Hanford, for example, my colleague from Washington is here. And the fact is we have made agreements and reached agreements on milestones to clean them up. And the fact is this budget doesn't even allow you to reach the milestones that have been previously agreed to. Is that not the case?

Mr. RISPOLI. Senator, that is the case for there are milestones in jeopardy both for budget reasons as well as for other technical reasons. So yes, that is the case. And that has been acknowledged actually in the President's budget that was submitted to the Congress.

Senator DORGAN. I don't understand why a portion of it is missing from the milestones that we've contractually agreed to meet. We've said here's what we're going to do. And then we don't ask for the money for it. Is it because it's less important than something else?

And, as I have indicated your budget has decreased $1.75 billion over the last 4 years even as the cost of all of this has grown substantially. I mentioned earlier that the President proposes $1 billion less in water projects for this committee, the Corps of Engineers, and Bureau of Reclamation. We're not going to do that.

I assume that someone downtown understands that we have an obligation to meet these milestones. And so there must be delivered under funding hoping we'll put the money back in, in order to meet our contractual obligations. Is there currently a proposal that you'll be laying off up to 600 people because of the lack of funding?

Mr. RISPOLI. Mr. Chairman, there would be approximately that number of people that could be looking at work force adjustments. It doesn't have to be that high. We're evaluating alternatives with several of our site managers now to see whether or not we can smooth out and minimize any reductions. It's not the pure number that we worry about. It's the loss of the skill.

We have people that are very, very skilled and experienced at what they do. And we don't think it's healthy for the program to have perturbations that have sharp drops and then have to try to hire people back.

Senator DORGAN. Yes. I complemented you Mr. Rispoli in my opening because I think this is a tough job. And you've tried very hard and in many areas have succeeded, but I think it is unfair to you and the people that are engaged in your mission not to have the funding that will allow us to meet what we have already obligated ourselves to do. You know, we're going to have to try to think through that here on the subcommittee.

YUCCA MOUNTAIN LICENSE APPLICATION

Mr. Sproat, the license application that you are submitting. You're going to be submitting that before June 30. How has the

2008 budget that we passed impacted the content of the license application you're submitting this year?

Mr. SPROAT. It has not impacted the content or the quality of the license application that we'll be submitting primarily because we recognize that is the highest priority the program had. It's on the critical path to repository construction. And so we diverted resources from other parts of the program to make sure that we had the right people and retained the right people in scientific expertise and engineering expertise needed to put together a high quality license application to meet our commitment date of submitting that by June 30, of this year.

Senator DORGAN. If you submit a license application for Yucca Mountain and the Nuclear Regulatory Commission ultimately authorizes construction, can the Department of Energy begin construction of the repository without any changes to existing law and can DOE begin transporting and disposing of nuclear waste in the repository without changes to existing law?

Mr. SPROAT. No, Senator, there will be additional changes required. Specifically, the Nuclear Regulatory Commission would not give the Department a construction authorization until Congress had legislated land withdrawal for the geologic repository operations area or GROA, around the Yucca Mountain site, even though it's federally owned land to withdraw the land, similar to what was done with the Waste Legislation Pilot Project in New Mexico. Congressional legislation is required so that the Secretary of Energy can show to the Nuclear Regulatory Commission that the Department has total ownership and control of that land in perpetuity.

Senator DORGAN. Do you agree with Senator Domenici's implied suggestion in his opening statement that a Yucca only policy is leading us into a box canyon of sorts?

Mr. SPROAT. What I would say is I think the primary thrust of the Senator's point is that there is a lot of residual energy in commercial spent nuclear fuel. And to put it directly underground as waste or dispose of that energy content doesn't make sense, I think is a very valid point.

What I would say, though, is this is not an either/or question. That under any scenario, even if we go to fuel recycling of spent nuclear fuel, there is high level nuclear waste residual from that. And we currently have a significant inventory of high level nuclear waste from the Defense Program and the naval spent nuclear fuel from the naval reactors that needs to go into a deep geologic repository regardless of what we do with the commercial spent nuclear fuel inventory.

Senator DORGAN. Senator Domenici?

SPENT FUEL DISPOSAL

Senator DOMENICI. Mr. Chairman, thank you for laying the question directly before Mr. Sproat. Let me make sure the record is clear from my standpoint. Your statement that even if we go, we have a recycling facility, and I would assume we're both talking when you say recycling, we're talking about the French model perhaps. There is, the British have one too.

But let's talk about the French model. If in fact that was used, the residual, the ultimate waste to be disposed of is nothing like spent fuel rods, right?

Mr. SPROAT. That is correct.

Senator DOMENICI. It is much less toxic in terms of its half-life, right?

Mr. SPROAT. That is correct.

Senator DOMENICI. It is far less in quantity than the quantity that is the spent fuel rod quantity, right?

Mr. SPROAT. Well, Senator, in terms of the high level waste, that's correct. However there are additional waste streams out of the recycling process greater than Class C waste and there are significant volumes of that that are produced.

Senator DOMENICI. Yes, but the point that I make is that you don't need a Yucca Mountain type repository for most of the waste that is part of the residual of recycling. In fact, you could if you wanted to without any question, you could put it in the salt of Carlsbad, most of it.

Mr. SPROAT. Under, if the law was changed to allow that, yes. However——

Senator DOMENICI. But wait, I'm not talking about WIPP, I'm talking about salt.

Mr. SPROAT. While salt is a great medium for storage of high level waste and for isolation from the environment, and the Germans are using salt beds, the problem is, is that under current U.S. regulations, under the Nuclear Waste Policy Act, retrievability is a requirement. In other words——

Senator DOMENICI. I understand.

Mr. SPROAT. Salt is not a medium that makes retrievability very easy.

Senator DOMENICI. We're not going to ask the Congress to authorize the building, Mr. Chairman, of a recycling facility and leave all the other laws in place. We would change the law at the same time that you were referring to. There's no need to have the ultimate waste that would come from recycling, that small amount of modest level waste. It's not a high. There's no need to have it retrievable. That law was——

Mr. SPROAT. That's correct.

Senator DOMENICI. The reason for that law was we were putting in the ground very valuable sources of energy and it was stupid to put it in and lock it up because someday we might find that we take it out, like they are in Russia. They use it. But they recycle it and use it or in any event that's the answer to your question.

I want to thank you very much for what you've done for the country. And I'll ask you the questions. You could not have done this, you could not be where you are without the good people at Los Alamos. Is that correct?

Mr. SPROAT. At Los Alamos and Sandia.

Senator DOMENICI. Sandia is the leader.

Mr. SPROAT. Sandia National Laboratory is our lead lab on the post closure scientific analysis. They're the ones who have integrated all the 20 plus years of scientific data and put together the analysis that's contained in the licensing application. They've done an outstanding job.

Senator DORGAN. Mr. Chairman, would you yield on that point? I complemented Mr. Rispoli. Let me also say I neglected to say how much I appreciate the work of Mr. Sproat. That's a tough job that you took on and I appreciate it very much.

Mr. SPROAT. Thank you, Senator.

Senator DOMENICI. Thank you, Mr. Chairman. I tell you that when he told me some time ago he would get it done. And when those troops up there at Sandia said they'd get it done, I said you won't. The first time I wanted to scream at you all and you were right. You did it.

Mr. SPROAT. Thank you.

Senator DOMENICI. So far. We'll see what they say over there.

MISSED COMPLIANCE AGREEMENTS MILESTONES FINES

Mr. Rispoli, let me just get square on record so we'll know. Who will pay the fines, fines that may ensue in New Mexico for the failure to meet the court agreed time on clean up at Los Alamos. You know they have an environmental man who imposes hearty fines. Are you all going to pay or do you expect the laboratory at Los Alamos to pay it?

Mr. RISPOLI. In the past the fines have been paid either by the Department or by the contractor that operates the activity depending upon the basic reason for missing the milestone or violation of the agreement. If it were, for example, purely a budget driven reason then I would expect the United States Government would pay for it from our budget. If on the other hand, a milestone were missed because of some technical difficulty or a different interpretation, for example, of the requirement, then typically the contractor would wind up paying for that fine.

Senator DOMENICI. As a result of this budget can you tell me how many of the milestones you anticipating missing and the resulting delays this may have on project completion? And since that's a very big number, would you just do that on Los Alamos, please?

Mr. RISPOLI. At Los Alamos, we would expect to miss because of budget, three milestones. And we anticipate that the cost to accomplish those three milestones would be about $100 million. I would also point out that at any given time, we are tracking over 1,500 milestones in our program. At any given time over 1,500, typically 250 a year.

And that does not include some intermediate milestones that the sites also track because they're so small that they are just on their schedules. So, yes, we will be looking at milestones throughout the complex. But I do want to state for the record that we basically renegotiate milestones rather regularly, as there are technical difficulties or in some cases the regulator can't review the documents fast enough.

Senator DOMENICI. Yes.

Mr. RISPOLI. So I just wanted to point out that it's a huge number of milestones that we deal with. And that for the number missed, we basically try to do that as best we could from a risk prioritization method.

Senator DOMENICI. Now, let's stay with the one in Los Alamos. It's—if you miss the milestone there is there any serious risk if the milestone is reset in that particular clean up project?

Mr. RISPOLI. If we are in jeopardy of missing milestones we do, in all cases, attempt to negotiate, meet with the regulator to see whether they would have us reprioritize the resources we have. So without answering specifically to any of the milestones that we're looking at this year, we would always dialogue with the regulator to see whether we should do some that we thought would be a lower priority but perhaps in their view would be a higher priority. And I will state that we do that across-the-board with the regulators in all our States.

Senator DOMENICI. So this serious risk at Los Alamos, that would be readjusted.

Mr. RISPOLI. Yes, sir.

Senator DOMENICI. With others in mind.

Mr. RISPOLI. That is correct, Senator.

Senator DOMENICI. Can you keep us posted on that?

Mr. RISPOLI. Yes, we can.

Senator DOMENICI. Through the committee if you'd like so the chairman could know also.

Mr. RISPOLI. Yes, we can.

Senator DOMENICI. Thank you, Mr. Chairman.

Senator DORGAN. Senator Craig.

Senator CRAIG. Thank you, Mr. Chairman. Mr. Rispoli, let me pick up where Senator Domenici left off. You're obviously calculating the potential for fines with milestones missed. So, system wide, how much would that figure be if there was a refusal to renegotiate? You just simply missed a milestone, paid the fine. Have you calculated that?

Mr. RISPOLI. We've run numbers for the milestones that are in jeopardy. We don't know that all of them would be missed. And in fact we're in the process of renegotiating some now.

Senator CRAIG. Ok.

Mr. RISPOLI. But if all were missed it would approach $10 million, if all were missed.

Senator CRAIG. Ten million dollars?

Mr. RISPOLI. It would approach that number, yes, Senator.

Senator CRAIG. You know you're down $94 million in the Idaho clean up. And, you know, I guess my sadness there is you've done so well. And I mean that as a compliment.

And you ought to be complimented for it because you have done well. And Idaho has recognized it and applauded it. And it's given the lab a level of recognition that is very, very important.

We were never a weapons lab. We don't have the kind of legacies, if you will, that some do. But we do have legacies. We've obviously got the legacy of Rocky Flats.

And we're also very proud. We cleaned up Rocky Flats where we did that by moving it out of Idaho. And we're going to miss a milestone or two in Idaho. At least that's what we're being told could be the consequence of this $94 million reduction.

So, Mr. Chairman, when you talk about frustrations as Senator Domenici and I do, I mean, that's all part of it. Also as you know, I've been pushing to take lab waste, move it over to EM and I understand the frustration of that. I understand there's going to be a response coming forward sooner rather than later.

What if Congressman Mike Simpson and I just simply legislated it? Just said here it is. Now the argument is you won't take it because there isn't any money.

But at the same time the other side of the lab has a different mission than EM. It is an EM problem, ultimately. So why don't we just line it up appropriately and if you can't do it because of money then what would be wrong with us just in a conference report of a report simply saying, here it is. It doesn't change the status of it. It just simply changes your responsibility in relation to it.

Mr. RISPOLI. Senator Craig, I might mention that we actually put out a call to all departmental elements including the Office of both Nuclear Energy, NNSA, and the Office of Science. All of them have proposed transfer to EM of both facilities and materials. And we are evaluating that now.

Sometime during this summer we should know. We need to be able to put a dollar amount on it.

Senator CRAIG. Yes.

Mr. RISPOLI. Or a range, a dollar range. We don't really even know yet what that would be until we finish the evaluation of what's been proposed. It's actually over 200 facilities and a lot of materials that are still in those facilities.

Senator CRAIG. Well, if you can get that done by this summer, you'll probably beat us legislatively because we're at a bit of a stall out here. And at the same time remember that money is not necessarily the treater. Because you've already demonstrated you're willing to cut back or have to cut back budgets on EM and not meet milestones.

So what we're talking about in Idaho is doing this. Now this does not cost money. And nor has it changed the status of the need. It has simply changed who handles it.

Mr. RISPOLI. Yes, sir.

Senator CRAIG. I don't see that as a money issue. I see that as an appropriate realigning in relation to responsibilities. Am I wrong?

Mr. RISPOLI. I understand. And I don't disagree. I think what this will enable us to do by assembling it all and quantifying it and putting a cost range, it will enable us to include it in our multiyear program.

You can only take two points of view. One is that you pretend it's not there. And the other is that you recognize it is there and work it into your program.

Senator CRAIG. Sure.

Mr. RISPOLI. And we take the view that we want to recognize what's there and incorporate it into our program, quantify how long it will take and what the cost is. So that's the approach we're taking.

Senator CRAIG. Well, that's—it's important we do that. And let me say again, thank you. Work well done, a great reputation out in Idaho for the clean up that's underway. I'm saddened that all of a sudden we are consciously intending to miss milestones at a time when we're trying to build credibility and reputation as it relates to DOE's responsibility and handling of it.

Very quickly, Mr. Chairman, Yucca Mountain. Listen to what the Director has just said. There is a legacy out there that has to be dealt with.

You need to come to Idaho and look at our lab and look at the phenomenal volume of military waste we have there. We store almost all of the Navy's nuclear waste. It's cladding is such that it must be stored. It cannot be recycled.

Now there is a responsibility. There is a national responsibility that that be handled in a permanent way. I understand the politics of Yucca Mountain.

But I complement Mr. Sproat for doing exactly what he said he could do and he's delivering. And we have an obligation, I believe, to carry forward to determine. We may be recycling.

And I agree with Senator Domenici, we ought to. The commercial spent fuel ought to be moved into a recycling mode. But following that there will remain a need for a permanent, deep, geologic repository for certain types of waste of the waste stream of clean up and also our military waste. We have—we're now mostly bringing in about of its wet storage into dry storage.

But I'll invite you to Idaho. There are a lot of shiny little vessels out there that are a great history that we're very proud of, our nuclear navy. And we have every reason to be proud of it. But we have every responsibility to take care of that waste stream.

My position on Yucca Mountain simply cannot change, nor will it change as long as I'm here. And afterwards as an advocate for the industry there will be a need for a type of repository that Yucca Mountain or something like it will demand. Even a contemporary new nuclear industry 50 years out fully bound to recycling.

Where do we then finalize the last of that legacy? You do it in a permanent storage facility. In the case of what we're doing at Yucca Mountain, we've moved that along in under tremendous political odds. And I think the Director needs to be complemented in that work. And I thank you.

Thank you, Mr. Chairman.

Senator DORGAN. Senator Murray.

ENVIRONMENTAL MANAGEMENT FISCAL YEAR 2009 BUDGET REQUEST

Senator MURRAY. Thank you very much, Mr. Chairman. And I, of course, thank you both for the work you've done. However, I've heard the word sad used about this budget request. I almost can't believe the low budget request for Environmental Management, and I just think it's disgraceful.

There's an ongoing debate here on Capitol Hill right now about the cost of war in Iraq and Afghanistan. And we're still talking about cleaning up the waste that was left over from World War II and the cold war. This is the fourth year in a row that the administration has requested a budget lower than a year before. And the second year Congress has received a budget from the administration that is clearly non-compliant to meet the milestones across the States.

You know this is not a partisan issue. It's not a regional issue. It really is a moral and a legal obligation that the Federal Government has to clean up and properly store dangerous waste across the country.

Mr. Rispoli, several years ago, before you were working on this issue, there was an agreement to work on these clean up problems with a plan that was called Accelerated Clean Up, which really called for a focus on cleaning up and closing the less complicated sites so that we could shrink the total size of the complex. But it left a lot of serious issues out there. And the funds that were no longer needed to clean up those smaller sites were then supposed to be used for the larger sites without a reduction in the overall EM spending.

Now working with my colleagues on the Senate Budget Committee this year we worked hard and we passed a budget that increases EM by about $500 million. But that is only the start of the work that needs to be done this year to properly address the portion of the funds that are needed. We cannot continue to have the administration send us declining budgets and expect miracles to occur here in Congress to add funding and then veto those appropriation bills because they're over the President's budget request. It just can't happen.

So, Mr. Rispoli, I just have to ask, are you proud of this budget?

Mr. RISPOLI. I think, Senator, any budget process is difficult. I think it's true that in all the programs that you evaluate as Members of the Senate, you probably see most of them that could use more than they have. But at some point——

Senator MURRAY. But these are meeting legal obligations.

Mr. RISPOLI. These are to address milestones that have been negotiated over many, many years. I think we are in dialogue with all of the States. As I indicated, to address from a relative risk standpoint, which of them need to be done and which can be postponed a bit, if you will.

I would point out for example at Hanford at the beginning of this administration there was $1.2 billion per year going to Hanford. Now there's $2 billion per year going to Hanford. Even as——

Senator MURRAY. Overall complex, the big plants being built. At it's river corridor clean up, it's a complex site. These are expectations that happen to be in my State, but the country needs this cleaned up. This is a nuclear waste site.

Mr. RISPOLI. Yes, we agree with that. And with respect to the river corridor, I think we are making tremendous head way with ground water. I'm sure——

Senator MURRAY. I'll ask you about that in a minute, but let me go back. Do you think this budget request is adequate for EM overall?

Mr. RISPOLI. The President's budget in writing as submitted to the Congress acknowledges that the budget request will result in putting milestones at jeopardy both for budget reasons and for technical reasons.

Senator MURRAY. It almost feels like there's this little conversation going on in the White House where they send over a budget request that's less than adequate in many, many ways, knowing that we're going to do our job because we represent States that are going to have disasters if those sites aren't cleaned up, and we're going to add the additional dollars. Then there's another room in the other part of the White House where they're saying veto every appropriation bill that's over the administration's request. Those

two rooms better start talking to each other because we have potential disasters coming.

I'm not just saddened by this budget request, I'm angered by this budget request. We have an obligation to clean up these sites.

EM FISCAL YEAR 2009 BUDGET PRIORITIES

Let me ask you about the river corridor closure. That is a project that is performing well. It's ahead of schedule, and it's on budget. The workers have made great progress, decommissioning and demolishing the buildings in the 300 areas that cocoon the reactors along the Columbia River, cleaning up the burial sites.

That sounds really successful to me. Yet the budget, this budget, that you sent us cuts that funding by $77 million. I do not understand why we're going to pull the rug out from under a high performance project.

Now, you said you increased groundwater funding by $60 million. But I have to ask, how do you expect the workers to get at the ground water when the buildings are still sitting on top of those sites?

Mr. RISPOLI. Senator, I think we are paying a lot of attention to groundwater. We are focusing on the highest priority locations as are shown on this map of the Hanford reservation. There's also a photo before you that shows that in the 300 Area alone we've taken down over 200——

Senator MURRAY. I know that. But until we take those buildings down we can't get to the ground water. So undercutting that project by $77 million means we can't get to the ground water.

Mr. RISPOLI. What we are prepared to do is negotiate with the State. And if the State believes it's a higher priority for us to shift funds to tear down buildings, we can certainly discuss that with them. But I do believe that the commitment that the Secretary has shown to the Waste Treatment Plant, one of the largest public works——

Senator MURRAY. That's not fair to dump it on the State. When the administration asks for $77 million less for river corridor closure what it truly means is that there will have to be layoffs this summer. Once the appropriation bill is written with additional dollars it will be too late. Somehow we're supposed to find these people again a few months later and hire them back.

These jobs are dangerous. And we have to have, as you said a few minutes ago, people who are highly skilled doing them. I don't understand how we can manage these complex jobs that are out there and just say we'll negotiate with the State. This is in my State, but this is a national project.

Mr. RISPOLI. Senator, with all due respect I wasn't meaning to dump anything on the State. I think we, and the State, have a very, very formidable challenge in Washington. I think we recognize that Hanford is probably the most significantly contaminated site we have.

And I believe that it's important that we and the State work together. We have over 10,000 workers there just in the environmental program that are residents of that State, working very, very hard to deliver the good work that they're delivering. I think

the reality is that when your needs exceed the budget amounts you have to use some sort of a prioritization.

Senator MURRAY. When our needs exceed our budget amounts, somebody over in OMB decides a random budget amount and then says anything above that is just a need someplace. These are clean up sites. This is nuclear waste. These are projects that are highly complicated.

Mr. Chairman, I just think we're playing with fire here the way these have been volleyed back and forth. I'm out of time. I do have some other questions, but I will wait until the next round.

Senator DORGAN. Well, Senator Murray, I understand your passion and concern. I share it. I don't know whether you were here when I mentioned about former Congressman Mike Parker. But when he showed up and expressed dissatisfaction with the President's budget he lost his job the next morning. So I guess neither of us probably expects someone from the administration to come and say that they're short of money.

But it's pretty clear to me that this budget, Mr. Rispoli, does not give you the resources that had previously been committed to be spent to meet milestones. And if we live in a State, as Senator Murray does, where we have very substantial clean up obligations, there's every reason to be angry about that. When the Government makes commitments, the Government should keep its commitments.

And there's plenty of money for other priorities of the administration, but this apparently is less a priority. I think that we're going to have to, as a subcommittee, try to determine how we allocate our resources this year. It's hard to do. As I indicated we're short of money in a wide range of areas given the President's budget request. But we're going to work hard to try to reallocate this funding to meet the obligations that we believe we have.

Senator Murray, if you wanted to ask additional questions I'd be glad to recognize you.

Senator MURRAY. Well I appreciate that and I know that you need to move on. I did have some questions about the VIT plants and supplemental treatment. I would like to submit them and I really would appreciate a response back.

On a good note, the B reactor is open for tours. I know we're getting great response out there at the site. I understand that the 2,064 seats were filled in less than 24 hours. In my State we would say those tickets sold out faster than a rock concert, even if they're free.

I do think that the B reactor is an important piece of history and I hope that we can continue to work with all of you to make it more available for the public. It's an important site, and it's an important part of our history, good, bad and ugly. I think it's important that future generations see what some of the people sacrificed there, what they gave up and the ingenuity that this country came to at a time of great importance.

I will submit my other questions for the record and thank you very much.

Senator DORGAN. Senator Murray, thank you very much. I want to mention, Mr. Rispoli, before you testified I had an opportunity to view these photographs and what the photographs demonstrate

to me is that money spent on this clean up is very important. When we clean up a site, that's real progress and real value.

So this isn't a debate about money that has little consequence. The expenditure of the money and the completion of the clean up is a very significant event. And you show some of that in these photographs. Although it looks like you took one of the photographs during the winter and the comparison in the spring, which gives it a slightly different look, Mr. Rispoli. But nonetheless, I think that this is very helpful to the committee. And we appreciate your work.

Let me say to both of you, we likely will be back in touch with you as we move toward a mark up to solicit additional information about both of these programs and priorities because we're going to have to find a way to sift through the President's recommendations and come up with a set of recommendations that represent what the committee feels the appropriate priorities are.

ADDITIONAL COMMITTEE QUESTIONS

I would like to ask at this time that the subcommittee members submit any additional questions they have for the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO HON. JAMES A. RISPOLI

QUESTION SUBMITTED BY SENATOR PATTY MURRAY

THREE HANFORD PROCUREMENTS

Question. Mr. Rispoli, my understanding is that the decisions regarding the award of two of the pending Hanford contracts—Central Plateau and Tanks Farm Operations have been delayed again. Additionally, there seems to be an indication the Mission Support Contract will be awarded last rather than first as originally expected. There is much uncertainty with these three large contracts yet to be decided and I'm looking forward to the day when Hanford has a full complement of Federal managers and all the major contracts awarded and running with adequate funding. With cleanup schedules and funding as tight as they are I would certainly like to see teams in place that have solid track records of staying on time and on budget.

Having the Mission Support contract in place prior to awarding the Central Plateau and Tank Farm Operations would seem to offer an efficiency and ease of transition for the workers. Would you please explain the reason behind the order of the award of the contracts?

Would you please provide an outline of the timing of the three contract awards and when they would be in place and running?

Answer. With the recent award of the Tank Operations Contract on May 29, 2008 and the Plateau Remediation Contract on June 19, 2008 and the Mission Support Contract on track for a projected award in July–September 2008 time frame as originally forecasted, this next generation of contracts will continue the important cleanup work conducted on the Hanford Site Central Plateau.

The order of award is based on the uniqueness of each procurement, the evaluation process leading up to award along with the Department's efforts to minimize disruption to ongoing work while improving overall efficiency. Maintaining the cleanup momentum is one of several important considerations to the Department. Impacts are minimized given the specific scope of work contained in each of the three new contracts, detailed contract requirements for each contract transition, and a 90-day transition period that provides the flexibility to overlap each of the contract transition periods. Departmental planning for contract transition has considered the logical alternatives for contract award sequence, and can support award of the three contracts in any sequence

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

LANL CLEANUP

Question. Secretary Bodman has testified earlier this year that the fiscal year 2009 EM budget is short across the board, and that there will be missed milestones. In particular, it has come out in subsequent testimony that the funding for environmental cleanup work at Los Alamos National Laboratory is short $100 million for fiscal year 2009. Who will pay for the expected fines that LANL will get from the State of New Mexico? Will it come out of planned cleanup dollars, further exacerbating the problem? As a result of this budget, can you tell me how many of the milestones you anticipating missing and the resulting delays this may have on project completion?

Answer. It is important to recognize that some milestones and obligations would have been missed regardless of the budgetary approach and the level of funding that was chosen. This is primarily the result of the relevant agreements having been negotiated years ago with incomplete knowledge by any of the parties of the technical complexity and magnitude of costs that would be involved in attempting to meet the requirements. Moreover, the cleanup program continues to be impacted by various safety, contract administration, project management, regulatory, legal, technical, economic, and other significant challenges. Consequently, isolating funding as the only issue placing some of the Department's cleanup milestones in jeopardy given the other confounding factors would be inaccurate and misleading.

When a milestone is missed, whether a fine or penalty is imposed is left to the discretion of the Department's regulators. Once imposed, who pays a fine or penalty depends on whose actions are responsible for missing the milestone. In the past, some fines for missed milestones have been paid by the Department, others by contractors. There is no separate appropriation for fines and penalties. Therefore, fines and penalties paid by the Department come out of cleanup budgets.

Of the seven Los Alamos National Lab compliance milestones scheduled for completion in fiscal year 2009, EM anticipates that three are at-risk based on the program's expected performance through fiscal year 2008. Since none of these milestones are on critical path to project completion, their delay will not result in an extension to the project completion date.

RENEGOTIATE LANL CONSENT ORDER

Question. A recent newspaper story reported that Ron Curry of the New Mexico Environmental Department believed that Department of Energy actions seem to indicate that the Department wants to renegotiate and weaken the terms of the clean up agreement between the Department and the State. Is there any truth to this statement?

Answer. No. The Department does not intend to renegotiate or weaken the terms of the 2005 Order on Consent. Rather, we have proposed, within the existing structure of the Consent Order, priorities with a goal of arriving at mutually agreeable opportunities to complete cleanup.

MISSED MILESTONES NATIONWIDE

Question. It is my understanding that this budget puts at risk three milestones at Los Alamos for fiscal year 2009. How many milestones nationwide do you estimate will be missed under this budget and how much funding will it take for Congress to add to recover these milestones?

Answer. It is important to recognize that some milestones and obligations would have been missed regardless of the budgetary approach and the level of funding that was chosen. This is primarily the result of the relevant agreements having been negotiated years ago with incomplete knowledge by any of the parties of the technical complexity and magnitude of costs that would be involved in attempting to meet the requirements. Moreover, the cleanup program continues to be impacted by various safety, contract administration, project management, regulatory, legal, technical, economic, and other significant challenges. Consequently, isolating funding as the only issue placing some of the Department's cleanup milestones in jeopardy given the other confounding factors would be inaccurate and misleading. Of the approximately 120 compliance milestones scheduled for completion in fiscal year 2009, EM anticipates that 32 are at risk based on the expected progress through fiscal year 2008.

WIPP

Question. Today, the Waste Isolation Pilot Plant is operating at full capacity, processing an average of 26 waste shipments per week. This throughput is helping to ensure that sites such as Idaho National Laboratory and Los Alamos National Laboratory meet State-mandated milestones for the removal of TRU waste. Your fiscal year 2009 budget proposes $211.5 million for WIPP, a 10 percent decrease from the fiscal year 2008 level. This cut will reduce the rate of waste shipments to WIPP. Slowing waste transfers to WIPP means that the material will remain where it was created and delivery milestones will be missed. Mr. Rispoli, why did you propose this reduced funding level? How many State-mandated milestones will be missed? Will there be impacts on storage facilities at Los Alamos and Idaho National Laboratories?

Answer. The EM fiscal year 2009 request reflects the Department's priorities to focus on risk reduction while maximizing regulatory compliance. As noted in the budget request, the proposed fiscal year 2009 funding would allow WIPP to support a disposal capability of 26 waste shipments per week: 21 shipments per week of contact-handle transuranic waste and 5 shipments per week of remote-handled transuranic waste. We do not currently anticipate missing any State-mandated milestones in fiscal year 2009 at any of our sites based on the WIPP program's expected performance through fiscal year 2008. There will be no adverse compliance impacts at the Idaho National Laboratory because the Department is ahead of schedule in meeting the Idaho Settlement Agreement milestones and the Site Treatment Plan targets for processing and shipping transuranic (TRU) waste. At Los Alamos National Laboratory, there are no State-mandated milestones specific to transuranic waste operations, and no adverse storage conditions are expected.

LOS ALAMOS NATIONAL LABORATORY—NATIONAL ACADEMY STUDY ON GROUNDWATER PROTECTION

Question. At the request of the Office of Environmental Management the National Academy of Sciences initiated a study of groundwater protections activities at Los Alamos National Laboratory, which was published last year. ("Plans and Practices for Groundwater Protection and the Los Alamos National Laboratory.") Their recommendations include: completing the characterization of disposal sites; performing additional modeling to understand potential pathways between watersheds and adding monitoring locations in the southern area of the site (and near the San Ildefonso Pueblo lands). Mr. Rispoli, has any decision been taken to act upon these recommendations? What is the status of these efforts? Has money been requested in the fiscal year 2009 budget to support this work?

Answer. Yes, the EM program has developed an implementation plan for the 17 recommendations in the National Academy of Sciences study. Of the 17 recommendations, 13 describe work that has already been done or is ongoing. Funding for these activities has been requested in the fiscal year 2009 budget.

SCIENCE AND TECHNOLOGY

Question. In the "Science and Technology Needs for DOE Site Cleanup" workshop held last year, it was mentioned several times that current EM cleanup contracts actually serve as a barrier to new technology deployment. What is being done within EM to incentivize contractors to deploy new technologies to improve upon the efficiency and effectiveness of future cleanup contracts?

Answer. The Office of Environmental Management is committed to further developing and utilizing an array of contract structures that will provide for the safe and efficient cleanup of our sites, and where appropriate, incentivize our contractors to deploy new and/or innovative technologies and approaches. Our major contracts are structured to incentivize the successful completion of defined mission objectives. As such, our incentives are geared toward rewarding results achieved and not the methods by which those results are achieved. The result of this approach is that our private sector contractors are incentivized to utilize their ingenuity and creativeness, including the use of new and/or innovative technologies, as appropriate, in bringing forth the best solutions to our cleanup challenges.

In addition, and on a more specific level, we have recently issued guidance for using a new project management tool, the Technology Readiness Assessment (TRA). The TRA process, as adapted for environmental cleanup, is a tool for understanding, and mitigating, the complexity and risks associated with implementing first-of-a-kind technologies required for the safe and efficient cleanup of our sites. Rigorous application of this tool within the framework of our incentive contracts will enable

our contractors to substantially reduce the risk associated with deploying new and/or innovative technologies.

Question. If additional funding is not secured to enable Los Alamos to meet the milestones prescribed in the Consent Agreement that would result in a 2 year delay in the cleanup milestone, will this have a measurable impact on nearby populations? What impact will this have on the cost of cleanup?

Answer. The budget request provides funding that makes any measurable impact on nearby populations very unlikely. The LANL site is extensively monitored, with thousands of environmental samples routinely analyzed for measurable contamination that could potentially impact nearby populations. These results are reported annually in site monitoring reports. While the potential for accidents cannot be completely eliminated, the Department believes that these risks are also very low. Administrative and engineered controls and operational safety protocols all contribute to the continued protection of the local populations.

The Environmental Management program's goal is to meet the terms of the consent Agreement and finish cleanup at the earliest possible juncture in a cost-efficient manner.

QUESTIONS SUBMITTED TO HON. EDWARD F. SPROAT III

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

IMPLEMENTATION OF E&W DIRECTION TO CONSOLIDATE SPENT FUEL

Question. The fiscal year 2008 Consolidated Appropriations Act, Public Law 110–161, which contains the Energy and Water Division, directed the Department "to develop a plan to take custody of spent fuel currently stored at decommissioned reactor sites." This language is borne out of frustration over the lack of options being considered for addressing out commercial spent fuel options. What is the status of this report and can you please explain to me what options you are considering?

Have you reached out to the communities interested in hosting the GNEP facilities as the public law directs?

Answer. The Department is preparing a report that will discuss what is required to develop an interim storage facility for the acceptance of spent nuclear fuel from decommissioned nuclear reactor sites; we expect to release the report this summer. The report will consider siting options at an existing Federal site, at one or more existing operating reactor sites, or at a competitively-selected interim storage site. While the Office of Civilian Radioactive Waste Management (OCRWM) has not yet reached out to the communities interested in hosting the Global Nuclear Energy Partnership, the report will take into account information the Department has acquired through the efforts of the Office of Nuclear Energy to reach out to such communities.

LICENSE APPLICATION

Question. You appear to have high confidence that DOE's Yucca Mountain license application will be of high quality. However, the Department has had numerous problems with quality assurance in the past. Please describe what standards you have put in place to ensure the application will be of the highest quality and how, during the transition from one administration to another, we can be assured the standards will be maintained.

How long do you estimate it will take the NRC to take to review and approve the license for Yucca Mountain?

Answer. The Department has taken several steps to build quality into the development of the License Application (LA) and we are proud of that work. Specifically, the Department followed a rigorous, disciplined process that included development of the LA in four phases, final LA completeness and accuracy verification reviews, and independent quality control checks and validation. In addition, the Office of Quality Assurance conducted oversight activities in parallel with LA development. Review and approval of the LA was required by all organizations at each of the four phases of development, and senior management from the Federal and contractor staffs were fully integrally and involved in LA preparation and development.

Section 114 of the Nuclear Waste Policy Act requires that the Nuclear Regulatory Commission (NRC) issue a final decision on construction authorization for all or part of a repository within 3 years of the date of submission of the application, except that the Commission may extend the deadline by not more than 12 months if the NRC submits to the Secretary and the Congress a written report explaining the

reason for its failure to meet the deadline. We expect that the NRC will meet its mandated statutory time frame.

YUCCA MOUNTAIN NEXT STEPS

Question. Beyond the resources required for DOE to support NRC review of its license application, have you identified additional activities that should be funded in order to position the Department to begin construction of the repository in a timely and efficient manner should a Construction Authorization be received from NRC? Have any such activities been included in your fiscal year 2009 budget request?

Answer. Beyond funding to participate in the licensing proceeding, the fiscal year 2009 budget request includes funding adequate to execute the minimum set of critical activities which are sufficient to continue to make forward progress on the program. Activities to be funded include continued detailed design for facilities required for the receipt of spent nuclear fuel and high-level radioactive waste; continued essential interactions with State, local, and tribal governments needed to support national transportation planning; completion of efforts to finalize the contour mapping needed to finalize the layout of the rail line in pursuit of land acquisition and completion of a right-of-way application for the Nevada rail line; continued design work on the transportation, aging and disposal canister system; staffing and training of the OCRWM organization so that it has the skills and culture required to design, license, and manage the construction and operation of the Yucca Mountain Project; and planning for a compliant and well-integrated safeguards and security, safety, and emergency management program for the disposal, transportation, and management of spent nuclear fuel and high-level radioactive waste.

Question. When the Yucca Mountain Development Act of 2002 authorized DOE to go ahead and proceed into the licensing process for Yucca Mountain, the Department originally planned to submit a license application to NRC in 2004. This of course has been delayed. It is my understanding that, during the extended period that we have been waiting for the now forthcoming license application you have had significant and regular pre-application interactions with the NRC. Can you comment on what you have learned from these interactions in terms of types and extent of questions you might expect from NRC during their review of your application?

How has what you have learned informed your planning in terms of the resources that will be required for DOE to be in a position to respond to NRC questions in a timely manner?

Also, given this knowledge, what is your level of confidence that, provided you get the resources you believe are required for DOE to be responsive to NRC's review (and NRC's funding requirements are similarly met), that the review can be completed in the 3 to 4 years called for in the Nuclear Waste Policy Act?

Answer. We believe that the pre-licensing interactions have helped the NRC to better understand DOE's approach to demonstrating compliance with the applicable regulations. Also, in some instances these interactions have led the Department to revise its approaches to better meet NRC's expectations. We are not in a position to speculate on the type of questions that may result from the NRC's review of the LA.

The Department's planning relating to the resources that will be necessary to support the licensing proceedings has been informed by past interactions with the NRC, the Department's experience in preparation of the LA, and the Department's experiences in supporting regulatory proceedings and/or litigation in connection with major Federal projects. Subject to the availability of the requested funding, the Department believes that with the submittal of a high quality LA and the available technical Federal and contractor staff that the Department will be able to respond to NRC requests for additional information in a timely manner.

The Department is confident that, assuming receipt of the requested funding, that we will be able to respond to NRC requests for additional information in a manner such that NRC will be able to complete their Safety Evaluation Report within 18 to 24 months. This will support timely issuance by the NRC of a decision regarding construction authorization within the 3 to 4 year time frame.

Question. As you know there is now considerable interest in recycling used nuclear fuel. It is my understanding that recycling removes many of the radioactive constituents from the used fuel and processes them into waste forms having reduced volume as compared to what is originally in the used fuel. Can you comment on the ability of the Yucca Mountain repository to safely dispose of the waste forms that might result from recycling and how this might impact the amount of material that could be stored in the Mountain?

Answer. Until the current law is changed, recycling of spent nuclear fuel will have no effect on the amount of waste that can be disposed of in Yucca Mountain. This

is because the Nuclear Waste Policy Act of 1982, as amended, sets a limit of 70,000 metric tons of heavy metal (MTHM) based on the original uranium content of the fuel. Therefore, regardless of the amount of volume reduction or radionuclide transformation that takes place by recycling, only the amount generated by the original 70,000 MTHM can be placed in the repository. If the law were to be changed to lift that limit, the high-level waste products from recycled fuel in amounts greater than 70,000 MTHM could be disposed of in Yucca Mountain.

The Department is in the process of evaluating the benefits of recycling spent nuclear fuel; however, it is premature to analyze how the various waste forms resulting from recycling might impact the amount of material that could be stored in Yucca Mountain. Further technical information on the characteristics of the waste form is required before such analyses can be performed. Studies prepared for the Global Nuclear Energy Partnership have indicated that the recycling initiative can potentially produce a waste form with less volume and lower heat generation.

NEW NUCLEAR PLANTS

Question. What are the implications of the recent announcements of nuclear power plant license submittals with regard to the Yucca Mountain license application and the utility contracts?

Answer. The recent announcements of nuclear power plant license application submittals to the NRC will not impact the License Application for Yucca Mountain, which is being prepared based upon the current statutory limit of 70,000 MTHM. The announcements similarly will have no impact on the Department's existing utility spent fuel disposal contracts, which were executed in the 1980s.

Notwithstanding the above, the Nuclear Waste Policy Act of 1982, as amended, requires that any applicant seeking a license to construct and operate a new nuclear plant must have entered into a contract with the Secretary of Energy for disposal services, or that the Secretary affirms that such a person be in good faith negotiations with the Secretary for such a contract. In view of the announcements of applications for new nuclear plants, the Department is considering execution of appropriate contracts with interested utilities.

SUBCOMMITTEE RECESS

Senator DORGAN. So we appreciate both of you coming to the Senate today and appreciate your testimony. This hearing is recessed.

[Whereupon, at 10:38 a.m., Wednesday, April 9, the subcommittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

THURSDAY, APRIL 10, 2008

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:30 a.m., in room SD–124, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Murray, Johnson, Landrieu, Reed, Domenici, Bennett, Craig, and Bond.

DEPARTMENT OF DEFENSE—CIVIL

DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS—CIVIL

STATEMENT OF HON. JOHN PAUL WOODLEY, JR., ASSISTANT SECRETARY OF THE ARMY FOR CIVIL WORKS

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. We'll call the hearing to order. This is a hearing of the Appropriations Subcommittee on Energy and Water Development. This is a hearing on the fiscal year 2009 budget request for the U.S. Army Corps of Engineers and the Bureau of Reclamation.

I want to say to my colleagues and to the witnesses, as well, that we have three votes in the Senate starting—I believe—at 10:45, which means we would have to leave the room here about 5 till 11. My hope is that we can finish this hearing in about an hour and a half, otherwise we will need about a 40 to 45 minute recess during those votes.

So, I'm going to truncate my opening remarks, and I only point that out—not to disadvantage anybody—but hope that perhaps we can complete the hearing in an hour and a half.

Today the subcommittee will take testimony on the budget for 2009 for the U.S. Army Corps of Engineers and Department of Interior.

Testifying for the Corps will be John Paul Woodley, the Assistant Secretary of the Army for Civil Works, as well as Lieutenant General Robert L. Van Antwerp, Chief of Engineers for the U.S. Army Corps of Engineers.

Testifying for the Interior will be Kameron Onley, Deputy Assistant Secretary of the Department of the Interior, and Robert Johnson, Commissioner of the Bureau of Reclamation.

General, this is your first opportunity to appear before the committee, I believe. And since assuming—at least, since assuming the command of the Corps of Engineers. We welcome you here, I look forward to working with you on many water resource problems that we have across this entire country, and in particular, I hope you'll familiarize yourself—I know you will—with the special water issues we have in North Dakota, the continuing flood in Devil's Lake that is causing a lot of difficulty and the management of the Missouri River System.

You know, and I know that I've been highly critical of the management—or the mismanagement—of the Missouri River System, but you and I will talk about that at a later time.

The President proposes a fiscal year 2009 budget for the Corps of Engineers of $4.74 billion, which is $851 million below the fiscal year 2007 enacted $5.59 billion. When you take a look at the Corps of Engineers and the Bureau of Reclamation sitting in front of us today, the proposal is to reduce funding by almost $1 billion.

I must say, I don't think the committee is going to do that, I don't think that represents the country's urgent need, but I understand that you come here supporting the President's budget.

I do think—I made the point yesterday when Senator Domenici was here, I remember that former Congressman Parker once came to the Congress. And apparently Senator Bond asked him the question, and Congressman Parker—in a moment of careless candor, said, "Yes," he thought the budget was short of what is needed, and the next morning he was fired.

So, I understand the four of you are here to support the budget sent to us by the President, but I do want to say—investment in water resources is unbelievably important for this country. And we're doing, I think, 950 water projects in the country of Iraq, paid for by the American people, right now—950 water projects in Iraq—and we come to this table with the proposal that we should cut $1 billion from water project investment in this country. I personally think that's misplaced priorities.

I will not go down the list, in total, I'm going to truncate my opening statement and put the entire statement in the record—I was going to talk some about the President's comments about earmarks. As you know, most of this subcommittee's earmarks are for ongoing projects, and if we didn't do them, they wouldn't get done.

So, I will truncate, again, that comment, as well.

I will just say to my colleagues who just arrived, that we're going to try to finish this hearing in an hour and a half, because we have three votes starting at about that period of time. If we could finish this hearing at that time, I'd appreciate it.

Let me call on my colleagues for very brief opening statements, if I might.

First, Senator Domenici.

OPENING STATEMENT OF SENATOR PETE V. DOMENICI

Senator DOMENICI. Yes, thank you, Mr. Chairman.

I just wanted to indicate that this will be my last hearing of this type, and the—it has been a rather exciting experience working on this committee.

You are the 11th Chief of Engineers, and Commissioner Johnson, you are the 15th Commissioner of Reclamation that I've had the pleasure of working with, so I think that makes me a—probably, I hold a record that won't be broken for awhile.

Senator DORGAN. Senator Domenici, does that reflect how long you've been here, or how much turnover there's been?

Senator DOMENICI. A little bit of both. I've been here, and some other departments for 36 years, and they've only had one or two leaders, or three. So this—it's quite a bit of turnover.

I have statements regarding both of your functions, and I have some statement here regarding the tax that was placed upon, in the Nusra Waterway, when I was a freshman Senator, believe it or not, that was my bill that put on the—that levied the tax.

Senator, I beat all of the powerhouses then, you know, this bill ran against the grain of Russel Long, and on the House side, Dingell, everybody—and it passed, nonetheless, and the tax was put on. And now it seems like it's not working, and the administration says they're going to send something else up to take its place, I don't think you've seen what they plan to put in, nor have I.

In my State, I want to say to you, General, you have made a commitment to join us there when we dedicate the Bosque in Albuquerque, we established quite a big park there among those beautiful cottonwood trees, and I certainly hope to see you there.

And Commissioner, we have one big job left with you, we have a wonderful building that is to house research entities that want to look into water research, and they can go there and rent space in this rather visionary idea that you could establish a place where they could come and do their research and rent space in a well-equipped building. And I hope we can work out the management aspects of that, and the—who's going to run it. And perhaps within a couple of months you'll have that worked out.

Senator DORGAN. Senator Murray.

STATEMENT OF SENATOR PATTY MURRAY

Senator MURRAY. Thank you very much, Mr. Chairman, for calling this hearing.

And thank you to all of the witnesses, I appreciate your attendance this morning to discuss these important topics.

I do have to leave in just a few minutes to chair a hearing of Transportation and HUD Subcommittee, so I won't be able to probably make it back for questions. I wanted to take this opportunity to raise a few items with you now, and I will be submitting questions for the record.

Secretary Woodley, and General Van Antwerp, I want to commend the three Army Corps of Engineers districts that directly work with Washington State, Seattle, Portland and Walla Walla Districts—they do great work for my State and the people who live there. The military and civilian staff both are responsive, and they've worked very well with my staff, and I appreciate that.

While I do have a great working relationship with those offices, it's often very difficult to make progress without adequate budgets

being sent from this administration. And I am deeply concerned by the $846 million in cuts to the budget from the fiscal year 2008 appropriated dollars. It seems to me this is just an annual game where the administration sends us short-sighted budget requests, expects Congress to fill in these important budget items, we send them back to them, and they veto them. It's a game that is playing with lives, and important projects and I resent it.

I want to comment, as well, on the newly proposed user fees for the navigation locks to fund the Inland Waterway Trust Fund. This would place a large burden on some river systems, more than others, and it makes no sense to me to abandon the established diesel tax and try to create this entire new bureaucracy. I don't understand why we don't work to update the current vehicle.

You know, for years now, I've been working with this committee and with you and the administration to deepen the Columbia River Channel, so we can allow larger ships and barges to carry millions of tons of cargo to domestic and international markets. I am pleased with the inclusion of funds to continue this effort, as the Columbia and Snake River System is a very important economic engine, of great importance to our country.

However, it seems really illogical to me that the Corps would invest so much in the river transportation system, and then try to implement a fee that could discourage those users away from the river system and back onto our roads and highways, which is a more expensive mode of transportation. So, I am deeply concerned about that.

Turning back to the severe budget cuts, and the projects left off the President's request—I do want to talk to you about a project in Centralia, Washington. We have been working with the Corps for many years on an important flood control project along the Chehalis River. This is a project that has been studied, reported, and finally authorized in the Water Resources Development Act (WRDA) bill that was passed by Congress last year, over a Presidential veto.

As I'm sure you are aware, there was a tremendous storm off the coast of Washington State, and in Oregon, last December. It caused tremendous flooding and damage—we haven't seen anything like that in my State for some time. The flooding shut down I–5, which is the main north/south freeway from Washington State all the way to California, for 4 days. The flooding overwhelmed the Chehalis River, the entire river basin, damaged homes, killed thousands of farm animals, destroyed local transportation infrastructure and it cost us millions—millions—in debris cleanup.

We still have people in Centralia and the surrounding areas who are still trying to pick up the pieces of their homes, businesses, and lives that were destroyed. I have been down there many times, and visited with the people and the local officials, and they are all really eager to find a way to prevent this from ever happening again.

I made a promise to those people to work here in Congress to get those funds—it's to an inexpensive project, it's authorized at $74 million on our side, $50 million on the State. But in the budget that we're discussing today, Mr. Chairman, there is zero dollars. We cannot continue to do this, and I'm—if I can't come back, I will

submit questions about this. I would like to ask you to come to my office and work with me on this.

But Mr. Chairman, I just reiterate—we can't keep having this administration send us budgets that don't adequately fund the projects that we've been working with them on.

Senator DORGAN. Senator Murray, thank you.

Senator Bond.

STATEMENT OF SENATOR CHRISTOPHER S. BOND

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

I certainly agree with the words of the chairman, and Ranking Member Domenici, and my colleague from Washington on the inadequacy of the budget, and also the admonition that, if you can't agree with this openly, you'll get canned. But we want you to know, and we want everybody else to know, how bad we think this budget is. And it's totally inadequate, and it's a great disappointment.

Just a few weeks ago, Missouri was hit with devastating floods that ruined homes, damaged farmland, took the lives of too many people. This disaster served as one more harsh reminder of the importance of our infrastructure, including flood control of our rivers. And a very special thank you to Chairman Dorgan, Senator Domenici, the subcommittee and the staff for their strong commitment to flood control. Let me give you one specific point.

Earmarks that were added by this committee are responsible for the recently completed construction of the Valley Park Project outside of St. Louis. This project was constructed just in time to protect 1,000 people, and almost $100 million in property, under flood water. Surely, we can agree that the extra $5 million earmarked by Congress to accelerate completion by 1 to 2 years on a project that cost almost $50 million, was well worth the effort and didn't come a moment too soon.

But again, this year OMB has put us in a funding predicament. I'm disappointed that the administration continues to frustrate and under fund our efforts to modernize our water infrastructure.

Despite the overwhelming and bipartisan support in Congress for the Water Resources Development Act, the President's budget does not provide money to update our Depression-era locks and dams. This is the most energy-efficient, economical way to transport commodities—both inputs coming up the river to agricultural areas, and the vitally important agricultural exports that go to the world market, that give us significant favorable balance of trade.

This budget, presented to us, does not address our crumbling infrastructure, and provides no means to fix it. We, as a committee, as a Senate, must work together to address our navigation channels, and flood control. We must invest in the structures to keep our citizens safe, and the river transportation networks working.

Given the flooding, and the disaster's impacts, Missourians need serious help to recover from the storms that we are enduring already this spring. Unfortunately, Missouri is not out of the woods yet, we have lakes near overflowing and levies weakened, and I looked at the weather map today, and it showed a solid sheet of rain all over the Midwest.

We're in a state of repair, and at the same time, we're still under severe storm watches. I look to this committee to aid in providing

supplemental funds for repair from the storms we've already had, and flood protection for storms Missouri continues to endure.

On a side note, I would express my appreciation to the Corps for their creativity that has spared Missouri an additional man-made flood in the spring rise. I realize that this year the Corps did their best to alleviate the insult to an already-flooded State and we're grateful.

However, in case any new reason is needed next year, you may be interested to know that the U.S. Geological Survey has completed peer-reviewed studies that a spring rise has no benefit to the pallid sturgeon. I wish somebody would understand that.

In any event, I regret that Senator Murray and I have another hearing, so I will not be able to join with the chairman in the discussion of the Missouri River policy, which is always an interesting subject. We have a couple of areas of agreement, and even those we can't get through.

But I look forward to working with you, Mr. Chairman, the committee and your staff, and I appreciate the good efforts of our witnesses here today, and please don't agree with me, because we need to keep your jobs.

Senator DOMENICI. But listen, Senator, if you can't stay and represent your interests, I'm just sorry for you.

Senator BOND. Well, Senator Domenici, you've heard these arguments so long you can—I deputize you to be my representative in the Missouri River basin.

Senator DOMENICI. I don't want that.

Senator DORGAN. We'll fix the Missouri River Management System, as soon as Senator Bond has left the room.

Senator BOND. That's right.

Senator DORGAN. Senator Johnson.

STATEMENT OF SENATOR TIM JOHNSON

Senator JOHNSON. Chairman Dorgan and Ranking Member Domenici, thank you for calling this meeting. I will truncate my remarks.

I'm very disappointed that the administration recommended cutting the VOR's Water and Energy Management and Development Account by 40 percent. This account funds several, ongoing regional and rural drinking water supply projects in my State. The Lewis and Clark Regional Water System and Mni Wiconi Rural Water System are the two largest. Their priority should be in completing these systems.

Failing to budget any Federal funds for the Lewis and Clark Project delays construction completion dates, and adds further costs as material prices continue double-digit annual increases.

The Corps of Engineers budget request falls short in prioritizing funds for the construction program. The shortcoming that I am hopeful that this committee will reverse, by providing additional resources for flood control and several works construction projects.

In reviewing the budget request, I do want to highlight a positive outcome. I'm pleased that the Corps continues to request funds for the Missouri River Recovery Program.

Chairman Dorgan, I'll conclude my statement at this point.

Senator DORGAN. Senator Johnson, Thank you very much.

Senator Bennett.

STATEMENT OF SENATOR ROBERT F. BENNETT

Senator BENNETT. Thank you very much, Mr. Chairman. I won't add to the litany that has been cited here. I do thank the witnesses for their appearance here, and I thank Commissioner Johnson for bringing along Robert Wolf—pardon me, Reed Murray, the Program Manager for the Central Utah Project Completion Act. That's very important to my State, and I appreciate his highlighting that by bringing that particular official along.

And, I too, have another hearing I have to go to, I apologize for that. But, I'm grateful to our witnesses for the great work that they've done in the State of Utah, and to you for calling this hearing.

Senator DORGAN. Senator Bennett, Thank you very much.

Senator Reed.

STATEMENT OF SENATOR JACK REED

Senator REED. Well, thank you very much, Mr. Chairman. I briefly just want to welcome the witnesses.

And particularly, General Van Antwerp who was a contemporary at West Point, it's good to see you here, Bob. And if you could pass on my great regards to Colonel Kurt Talken and Bobby Burn in the First District, they do a superb job, both the General and the Secretary—you should know that.

I will be going to other hearings, but I want to get back and talk about issues of the Fox Point Hurricane Dam, and also the Woonsocket Levy Project.

Thank you very much, gentlemen.

Thank you, Mr. Chairman.

Senator DORGAN. Secretary Woodley, we will begin with you, and then we will hear from General Van Antwerp, and then go to the Interior Department Secretary.

Secretary Woodley, your entire statement will be part of the full record, and you may summarize. You may proceed.

STATEMENT OF HON. JOHN PAUL WOODLEY, JR.

Mr. WOODLEY. Thank you, Mr. Chairman.

The President's budget for fiscal year 2009 annual Civil Works Program is $4.74 billion. In addition, the request includes $5.762 billion in fiscal year 2009 emergency appropriations for the Federal share of the additional funds needed to reduce the risk to the Greater New Orleans, Louisiana area, from storm surges that have a 1 percent annual chance of recurring.

The budget for the Annual Civil Works Program proposes performance criteria to allocate funds among construction projects. These criteria give priority for funding for the projects that yield the greatest returns to the Nation, based upon objective performance criteria.

The fiscal year 2009 construction performance criteria mirror those of the fiscal year 2008, except that priority is also accorded to projects that can be completed in fiscal year 2009.

For operation and maintenance of civil works projects, the fiscal year 2009 budget provides nearly $2.6 billion for the operation and maintenance account, and $163 million for the Mississippi Rivers and Tributaries Account.

As anticipated at this time last year, the fiscal year 2009 budget is based on enactment of proposed legislation to establish a lockage-based barge user fee, and to phase out the existing fuel tax. The proposed legislation was transmitted to the President of the Senate and the Speaker of the House of Representatives last Friday, April 4. Prompt enactment of this legislation is needed to address the declining balance in the Inland Waterways Trust Fund, which otherwise will run out of funds around the end of the 2008 calendar year.

The budget provides $185 million for the Corps of Engineers share of the South Florida Everglades Restoration Program, which is the most ever budgeted or appropriated for the Corps in 1 year for these activities.

The budget also provides $180 million for the Corps regulatory program, to protect wetlands and other waters of the United States. This is the same amount as in the budget and appropriation for fiscal year 2008, and represents a $55 million increase since 2001.

I'd like to turn now to the proposed budget for the emergency appropriation. The fiscal year 2009 budget proposes to authorize the New Orleans Area Hurricane and Storm Damage and Risk Reduction System to be constructed with the State of Louisiana, as a single, non-Federal cost share sponsor, and subsequently maintained and operated by the State. Based on statutory language proposed in the budget, the non-Federal sponsor would provide $1.5 billion for the non-Federal share of this work. The New Orleans area system would not only be higher, but also stronger than the pre-Hurricane Katrina system.

I'm pleased to announce, Mr. Chairman, that on March 31, 2008, the Department of Defense Inspector General issued a qualified audit opinion on both the 2006 and 2007 Civil Works Financial Statements. This is very significant, as it marks the first time a major component of the Defense Department has received an audit opinion of any kind, qualified or not.

This achievement by the Corps of Engineers demonstrates exceptional stewardship on behalf of the taxpayers, and non-Federal sponsors dollars, and the Army is extremely proud of the Corps.

In summary, at $4.74 billion, the fiscal year 2009 Army Civil Works budget does not do all of the good things that the Corps could accomplish in 2009. It does, however, provide resources for the Civil Works Program, to pursue investments that will yield very good returns for the Nation in the future.

Mr. Chairman, members of the subcommittee, this is the last time that I will have the privilege of appearing before the subcommittee to present the Army's Civil Works budget on behalf of President Bush. It has been a great pleasure and privilege to work with you.

PREPARED STATEMENT

And it would be remiss of me not to mention, also, the privilege I've had in working with the excellent staff that serves the subcommittee. I don't believe that any subcommittee or any committee of any body anywhere in the world is better served than by the professional and capable staff—and extremely knowledgeable staff—that this subcommittee has the privilege of employing.

[The statement follows:]

PREPARD STATEMENT OF HON. JOHN PAUL WOODLEY, JR.

Mr. Chairman and distinguished members of the subcommittee, thank you for the opportunity to testify before the subcommittee, and to present the President's budget for the Civil Works program of the Army Corps of Engineers for fiscal year 2009.

OVERVIEW

The fiscal year 2009 budget for Army Civil Works provides funding for development and restoration of the Nation's water and related resources within the 3 main Civil Works program areas, namely, commercial navigation, flood and coastal storm damage reduction, and aquatic ecosystem restoration. The budget also supports hydropower, recreation, environmental stewardship, and water supply services at existing water resources projects owned or operated by the Corps. Finally, the budget provides for protection of the Nation's regulated waters and wetlands; cleanup of sites contaminated as a result of the Nation's early efforts to develop atomic weapons; and emergency preparedness. The budget does not fund work that should be the responsibility of non-Federal interests or other Federal agencies, such as wastewater treatment and municipal and industrial water treatment and distribution.

Total discretionary funding for the fiscal year 2009 annual program is $4.741 billion. This is $130 million less than the fiscal year 2008 budget and $846 million less than Energy and Water Development appropriations for fiscal year 2008. Within the total Civil Works budget, $2.475 billion is for activities funded in the operation and maintenance (O&M) account. This is slightly higher than the funding level for operation and maintenance proposed in the President's fiscal year 2008 budget, which in turn was a substantial increase over prior budget or appropriation levels for comparable O&M activities.

The budget also provides $5.761 billion in an fiscal year 2009 emergency appropriations request for the Federal share of the additional funds needed to reduce the risk of storm surge damage to the greater New Orleans, Louisiana area. Based on statutory language proposed in the budget, the non-Federal sponsor would provide $1.527 billion for the non-Federal share of this work. This proposal is discussed further below.

A budget Five Year Development Plan (FYDP) is under development and will be provided to the relevant committees of Congress.

Enclosure 1 displays the current estimate for the distribution of new discretionary funding among eight appropriation accounts; eight program areas; supervision and general administration of the Civil Works program; policy direction and oversight by the Army Secretariat; and five funding sources, including the general fund of the Treasury and trust funds. Enclosure 2 is a crosscut between appropriation accounts and program areas.

PERFORMANCE-BASED BUDGETING

The fiscal year 2009 budget reflects a continuing maturation of the Army's performance-based approach to budgeting. Competing investment opportunities for studies, design, construction, and operation and maintenance were evaluated using multiple metrics. Objective performance criteria guided the allocation of funds among construction projects (see below).

The budget includes initiatives leading to the development of a more systematic, performance-based budget and improved asset management. For example, the budget allocates operation and maintenance funding among 54 geographic areas based on USGS sub-watersheds. This approach will improve the overall performance of Civil Works assets by enabling managers within each of these regional areas to focus on their key facilities and address emerging needs.

The focus on Civil Works program performance has a number of foundations. First, the 2004–2009 Civil Works Strategic Plan provided goals, objectives, and performance measures that are specific to program areas as well as some that are

crosscutting. A new Civil Works Strategic Plan is under development for 2009–2014. Second, each program area has been assessed using the Program Assessment Rating Tool (PART). Progress to improve the performance measures was made on several programs during the past year. Summaries of all completed civil works program assessments can be found on the administration's new website, www.ExpectMore.gov. The Civil Works Strategic Plan and the PART-based program evaluations are works in progress and will continue to be updated.

HIGHLIGHTS—WATER RESOURCES DEVELOPMENT ACCOUNTS

Studies and Design

The fiscal year 2008 budget provides $91 million for the Investigations account and $1 million for investigations in the Mississippi River and Tributaries account. The budget funds 65 studies and preconstruction engineering and design (PED) activities. We selected these for funding based on their likely performance. For instance, the projects funded for PED were those with benefit-to-cost ratios (BCRs) of 3.0 to 1 or higher.

Within this $91 million, $10 million is for studies and PED under the Louisiana Coastal Area ecosystem restoration program and $10 million more is for the science program that supports, and is an integral component of, this Corps effort to help protect and rebuild the ecosystem. In addition, $21 million is for other project-specific studies and design, $17 million is for research and development, and $33 million is for other coordination, data collection, and study activities.

The administration urges the Congress to support the President's budget for the investigations program, which limits the number of proposed projects funded at the study or design stage. The Corps has a very large backlog of ongoing construction work. Adding to the number of projects heading for a construction start or to their funding will delay the completion of ongoing projects and realization of their benefits to the Nation. The enactment of the Water Resources Development Act of 2007 (WRDA 2007) has heightened this concern.

The Civil Works budget includes $1 million to comply with the independent peer review requirements of section 2034 of WRDA 2007. This covers only the studies funded in the budget. If the Congress were to increase the number of studies or their funding, the Corps would likely need more than $1 million to comply with section 2034.

Independent review previously was funded through individual study line items as study costs shared with the non-Federal sponsor. Under WRDA 2007, the costs of independent review are now fully Federal. In future budgets, we expect to include these costs under individual study line items after studies requiring section 2034 independent review are identified and accounting codes are set up to distinguish the fully Federal independent review costs from the other study costs, which the non-Federal sponsor will share.

The fiscal year 2009 budget includes 2 new studies: The Investigations account includes $2 million for a high-priority study of the vulnerability of the United States to damage from flooding, including an assessment of the comparative risks faced by different regions of the United States. This study will provide background for a subsequent effort by policy officials to develop recommendations to improve existing Federal programs, authorities, and roles. The other new study is the Atchafalaya Basin Land Study in the Flood Control, Mississippi River and Tributaries account, for which the administration has repeatedly requested funding. I urge you to fund this study. It has a high priority because land acquisition is an important component of the overall flood damage reduction plan for this watershed. The fiscal year 2009 budget also specifically identifies $100,000 for Corps support to the efforts of the inter-agency committee on the Marine Transportation System, established by the President in the 2004 Ocean Action Plan. Costs to support the committee previously were included in the coordination with other agencies allocation in the investigations account.

Construction Program

The budget provides $1.402 billion in the Construction account and $76 million for construction projects in the Mississippi River and Tributaries account.

Many more construction projects have been authorized, initiated, and continued than can be constructed efficiently at any one time. The funding of projects with low economic and environmental returns and of projects that are not within Civil Works main mission areas has led to the postponement of benefits from the most worthy projects, and has significantly reduced overall program performance.

To remedy this situation and to achieve greater value to the Nation from the Civil Works construction program, the budget again proposes performance guidelines to

allocate funds among construction projects. The guidelines give priority for funding to the projects that yield the greatest returns to the Nation, based upon objective performance criteria. The fiscal year 2009 guidelines mirror those for fiscal year 2008, except that priority also is accorded to projects that can be completed in fiscal year 2009.

Under the guidelines, the budget allocates funds among construction projects based primarily on these criteria: BCRs; contribution to reducing significant risk to human safety or to dam safety assurance, seepage control, or static instability correction concerns; capability of high performing projects to be completed in fiscal year 2009 in order to bring significant benefits online; and the extent to which projects cost-effectively contribute to the restoration of nationally or regionally significant aquatic ecosystems that have become degraded as a result of Civil Works projects, or to a restoration effort for which the Corps is otherwise uniquely well-suited. The construction guidelines are provided in Enclosure 3.

The 79 construction projects funded in the budget consist of: 11 dam safety assurance, seepage control and static instability correction rehabilitation projects; 16 projects funded to address a significant risk to human safety (including 2 new deficiency correction projects); and 52 other projects (including 5 in the Mississippi River and Tributaries program).

Operation and Maintenance Program

The fiscal year 2009 budget proposes $2.475 billion for the operation and maintenance account and $163 million for maintenance activities in the Mississippi River and tributaries account. The total amount is $16 million higher than the fiscal year 2008 budget for comparable activities.

The budget emphasizes performance of existing projects by focusing on the maintenance of key commercial navigation, flood and storm damage reduction, hydropower, and other facilities. The proposed funding would enable the Army Corps of Engineers to carry out priority maintenance, repairs, and rehabilitations, and priority initiatives such as the development of asset management systems.

As in the fiscal year 2007 and 2008 budgets, the operation and maintenance program includes four activities that are directly related to the operation and maintenance of Corps projects, but previously were funded in the Construction program—compliance with the Endangered Species Act at operating projects; rehabilitation of existing projects; replacement of sand due to the operation and maintenance of Federal navigation projects; and construction of facilities, projects, or features (including islands and wetlands) to use materials dredged during Federal navigation operation and maintenance activities. The budget transfers responsibility for these activities to improve investment decisions on project operation and maintenance and better provide accountability and oversight for those decisions. For the inland navigation rehabilitation projects budgeted in the operation and maintenance account, one-half of the project funding would be derived from the Inland Waterways Trust Fund. Construction, replacement, and expansion of inland waterways projects continue to be budgeted in the Construction account.

Like the budgets for the past 2 years, the fiscal year 2009 budget proposes to allocate operation and maintenance funding on a regional basis. Last year, the budget proposed allocation of funding by 21 watersheds identified by the U.S. Geological Survey's watershed and sub-watershed identification system. This year, in order to more clearly identify the systems among which funding is allocated, the budget proposes to allocate funding among 54 systems. Within these 54 systems, the justification materials allocate funding for illustrative purposes to flood and coastal storm damage reduction, commercial navigation, hydropower, stewardship, recreation, and water supply program areas. Funding operation and maintenance using this framework will increase efficiency in the operation and maintenance of Civil Works projects. Managers in the field will be better able to properly maintain key infrastructure, adapt to uncertainties, and address emergencies, as well as other changed conditions over the course of the fiscal year, while complying with congressional direction for the appropriations.

HIGHLIGHTS—PROGRAM AREAS

The Army Civil Works program includes eight program areas; commercial navigation, flood and coastal storm damage reduction, environment, recreation, hydropower, water supply, emergency management, and the regulatory program. The budget also funds the supervision and general administration of the Civil Works program in the Corps headquarters and the eight division offices; and the policy direction and oversight for the program by the Office of the Assistant Secretary of the Army (Civil Works). Budget proposals for all areas are discussed below.

Flood and Coastal Storm Damage Reduction, and Emergency Management

The fiscal year 2009 budget provides $1.322 billion for flood and coastal storm damage reduction and $58 million for emergency management.

Among the 79 construction projects funded in the fiscal year 2009 budget, 50 are for flood and coastal storm damage reduction, including 11 dam safety and seepage control and static instability correction rehabilitations, 2 deficiency correction projects at St. Louis Flood Protection, Missouri and Wood River Levee, Illinois; and 29 other projects that address a significant risk to human safety or were selected based on their benefit-to-cost ratios.

The budget for the emergency management program includes $40 million in the Flood Control and Coastal Emergencies account to fund preparedness for flood and coastal emergencies and other natural disasters. This funding is needed in fiscal year 2009 to maintain and improve the Corps of Engineers ability to respond to disasters. Specifically, this funding would cover review and updating of emergency response plans, periodic exercises to test and evaluate plans, training, procurement of critical supplies and equipment, and pre-disaster coordination with State and local governments and other Federal agencies. The fiscal year 2009 budget reflects the strong belief of the Army in the importance of providing regular funding for emergency preparedness, rather than relying on supplemental appropriations to finance emergency preparedness. The emergency management program also includes $6 million for the National Emergency Preparedness Program and $12 million for facility protection, both of which are funded in the operation and maintenance account. We continue to fund facility protection as a remaining item in the operation and maintenance account. In the past, we allocated these costs among the eight program areas. This year, we included these costs instead under the emergency management program area.

The budget includes $14 million in multiple accounts for Actions for Change—a set of actions identified by the Chief of Engineers to aggressively incorporate the lessons learned from Hurricanes Katrina and Rita into the way the Corps plans, designs, constructs, and maintains its infrastructure. The program is being executed by four national teams. All actions are interrelated, but each of the four teams has one of the following focus areas: comprehensive systems approaches; risk-informed decisionmaking; risk communications; and professional and technical expertise. A common theme throughout the program is increased accountability for public safety. The Corps is working toward the goal of making these changes self-sustaining.

The fiscal year 2009 operation and maintenance account includes $10 million for the National Levee Inventory/Inspection and Levee Safety Program. These funds will be used to continue the national levee inventory, assessment, and database development that were begun with emergency supplemental appropriations of $30 million in fiscal year 2006. Funds also will be used for administrative and travel costs of the National Levee Safety Committee established pursuant to title IX of the Water Resources Development Act of 2007. Title IX broadened the authority under which the Corps conducts the levee inventory program and is being implemented under the ongoing levee inventory and inspection program. The national levee inventory is an interagency effort to improve management of the Nation's flood and storm damage reduction infrastructure. The results of the national project inventory and risk-based project assessments will be linked to the Federal Emergency Management Agency's ongoing flood mapping program, as well as to the Corps levee rehabilitation and inspection program.

The budget provides funding for all work currently planned to remedy the most serious (Action Class I and II) dam safety, seepage, and static instability problems at Corps dams. The planning, design, and construction of these projects are funded at the maximum amount that the Corps estimates that it can use efficiently and effectively.

The budget continues to support Federal participation in initial construction, but not in re-nourishment, at beach nourishment projects that provide storm damage reduction or ecosystem restoration outputs.

Commercial Navigation

The fiscal year 2009 budget provides a total of $1.892 billion for the commercial navigation program area.

The amount budgeted for inland waterway construction projects (construction, replacements, and expansions in the construction account, and rehabilitations in the operation and maintenance account) is about $326 million, which includes funding to continue 14 inland waterway projects; 3 seepage and static instability correction rehabilitation projects; completion of 5 projects; and continuation of construction on 5 other projects. Half of the funding for these inland waterways investments, about $167 million, would be derived from the Inland Waterways Trust Fund, reflecting

both concurrent financing of 50 percent of construction costs on most projects and rebalancing of the proportion where prior expenditures from the general fund of the Treasury exceeded 50 percent.

The fiscal year 2009 budget is based on enactment of proposed legislation to establish a lockage-based barge user fee and to phase out the existing diesel fuel tax for the inland waterways. The prompt enactment of such legislation is needed to address the declining balance in the Inland Waterways Trust Fund, which otherwise will run out of funds around the end of the 2008 calendar year, and to support ongoing and future inland waterways projects. The funding in the Inland Waterways Trust Fund, which comes from the diesel fuel tax, will not be sufficient after fiscal year 2008 to support needed levels of investment in these waterways.

Enactment of the administration's legislative proposal would ensure that the commercial users of the Corps locks continue to cover their share of project costs. The amount of the user fee would be tied to the level of spending for inland waterways construction, replacement, expansion and rehabilitation work. The proposed legislation will be transmitted to Congress shortly.

The budget includes $170 million to construct channel and harbor projects.

The budget focuses navigation operation and maintenance funding of $1.375 billion on those waterway segments and commercial harbors that support high volumes of commercial traffic, such as the heavily-used Mississippi and Ohio Rivers and the Illinois Waterway. The budget also funds maintenance of harbors that support significant commercial fishing, subsistence, safety, harbor of refuge, national security, or public transportation benefits.

The Corps continues development of techniques to identify and compare the marginal impacts on the Nation's waterborne commerce of varying maintenance levels for coastal channels and harbors. The fiscal year 2009 budget provides for $729 million to be appropriated from the Harbor Maintenance Trust Fund for operation and maintenance. The growth of the trust fund balance and ways to address this balance are being discussed within the administration. We will continue to work within the administration to develop policies to effectively use the Harbor Maintenance Trust Fund.

The budget continues the policy of funding beach replenishment, including periodic re-nourishment, where the operation and maintenance of Federal navigation projects is the reason for the sand loss on shorelines.

Environment

The fiscal year 2008 budget provides $511 million for environmental activities overall, including $286 million for aquatic ecosystem restoration. The costs of compliance with Biological Opinions at existing projects are not included in the above figures. The budget includes these costs as part of the joint operation and maintenance costs of the affected projects and allocates these costs among the program areas served by the projects.

Within the $286 million for aquatic ecosystem restoration, $185 million is for the Corps of Engineers share of the South Florida Everglades Ecosystem Restoration Program, which is the most ever budgeted or appropriated for the Corps in 1 year for these activities. This level of funding for the Corps is an increase of $54 million, or 41 percent, compared to the fiscal year 2008 enacted level. The increase reflects the program's priorities for 2009—which include more funding for the Modified Water Deliveries to Everglades National Park (Mod Waters) project, a key element of this effort that both the National Park Service and the Corps are funding (+$40 million); and funding to restore a 90 square mile area west of the Everglades known as Picayune Strand, which will provide habitat suitable for the endangered Florida panther and other species (+$24 million). The budget for this program also emphasizes continued construction of the Kissimmee River restoration effort; and studies and design work under the Comprehensive Everglades Restoration Plan, or CERP. Finally, the budget also continues construction of the Everglades and South Florida Ecosystem Restoration "Critical Projects," and the South Dade County (C–111) and West Palm Beach Canal (C–51 & STA 1–E) Central and Southern Florida (C&SF) projects.

The budget provides $20 million for the Upper Mississippi River System Environmental Management Program and $20 million for the Louisiana Coastal Area restoration effort, including $10 million for its important Science Program, which will assist the State and Federal managers of the LCA Ecosystem Restoration Program by providing science support aimed at improving implementation. The Science Program will inform and guide the program by reducing uncertainties and insuring that effective tools and processes are available for use by the project delivery team.

The budget includes $95 million for environmental stewardship. The Corps administers lands and waters covering 11 million acres, an area equal in size to the

States of Vermont and New Hampshire. Funded activities include shoreline management, protection of natural resources, support for endangered species, continuation of mitigation activities, and protection of cultural and historic resources.

The budget provides $130 million for the Formerly Utilized Sites Remedial Action Program (FUSRAP) to clean up contamination at sites resulting largely from the early atomic weapons program. This funding will enable completion of remedial action at one site (Linde Air Products Soil operable unit) and support continued progress toward completion of remedial actions at a number of other FUSRAP sites.

Regulatory Program

The fiscal year 2009 budget provides $180 million for the Corps Regulatory Program to protect wetlands and other waters of the United States. This is the same as the amount in both the budget and appropriations for fiscal year 2008, and represents a $55 million increase since 2001. The funding will be used for permit processing, enforcement and compliance actions, and jurisdictional determinations, including the significant additional field documentation, coordination and evaluation work associated with the Supreme Court's Carabell and Rapanos decisions.

Investing in the Regulatory Program has a win-win result, since it protects valuable aquatic resources while enabling over $225 billion in economic development to proceed annually. The Corps will also use the requested funding to develop and implement improvements such as electronic permit applications and data sharing with other agencies and the public, consistent with sections 2017 and 2040 of WRDA 2007.

Recreation

The fiscal year 2009 budget provides $270 million for recreation operations and related maintenance. The budget re-proposes the Corps of Engineers recreation modernization initiative, which first was developed as part of the fiscal year 2006 and fiscal year 2007 budgets. This initiative, which requires legislation to implement, would allow the Corps to upgrade and modernize its recreation facilities through an expansion of the current fee structure. It would also enable the Corps, working at the national, State, and local levels, to pursue voluntary public/private partnerships and other means to help finance the recreation program.

Hydropower

Hydropower is a renewable source of energy. The Civil Works program is the Nation's largest producer of hydroelectric energy. The Corps provides one-quarter of the Nation's hydroelectric power generation capacity and satisfies 3 percent of the Nation's total energy needs.

The fiscal year 2009 budget provides $319 million for hydropower. This investment will help to reduce the forced outage rate, which remains well above the industry average. In addition, the 4 ongoing replacement projects, once completed, will produce enough power to electrify 37,000 homes and reduce carbon dioxide emissions into the atmosphere by 190,000 metric tons.

Water Supply

On average, Civil Works projects provide 4 billion gallons of water per day to meet the needs of municipal and commercial users across the country. The budget includes $6 million for this program under the operation and maintenance account. These costs can be broken into 5 categories: costs to manage water supply contracts and to operate and maintain specific water supply facilities; ongoing water reallocation studies; the National Portfolio assessment of water reallocation possibilities; the allocated share of costs for compliance with the Endangered Species Act; and the allocated share of other project joint costs. The water supply program manages 307 water supply agreements that cover 7.2 million acre-feet of storage space in 136 of the Corps' multiple purpose reservoir projects. This storage space has an assigned repayment value of $9.8 billion. These costs are repaid directly to the U.S. Treasury by the water users. The opportunities that are being identified through the National Portfolio assessment to reallocate storage space in existing reservoirs can assist in addressing unmet demand for municipal and industrial water supply without building additional projects.

Management Expenses of the Army Corps of Engineers

The fiscal year 2009 budget provides $177 million for the Expenses account to cover the costs of the Army Corps of Engineers Headquarters, Major Subordinate Commands or Divisions, and national support Corps offices such as the Humphreys Engineer Center Support Activity, the Institute for Water Resources, and the Finance Center.

Army Secretariat Policy Direction and Oversight

The fiscal year 2009 budget includes $6 million for the Office of the Assistant Secretary of the Army (Civil Works). The Assistant Secretary of the Army (Civil Works) has oversight responsibility on behalf of the Secretary of the Army for all aspects of the Civil Works program of the Army Corps of Engineers; for the Army Cemeterial Expenses budget and program for Arlington National Cemetery and the Soldiers' and Airmen's Home National Cemetery; for reimbursable support by the Army Corps of Engineers for other domestic agencies; and for all international activities of the Army Corps of Engineers except those directly in support of U.S. forces overseas. This account finances the personnel and other direct costs of the Assistant Secretary's office in the energy and water development appropriation, consistent with recently enacted appropriations for this office.

PROTECTION OF THE METROPOLITAN NEW ORLEANS AREA

In addition to fiscal year 2009 regular appropriations for the Civil Works program, the fiscal year 2009 budget recommends enactment of fiscal year 2009 emergency appropriations of $5.761 billion for the remaining Federal share of the New Orleans Area Hurricane and Storm Damage and Risk Reduction System (HSDRRS), which is designed to reduce the risk to the greater New Orleans, Louisiana, area from storm surges that have a 1 percent annual chance of occurring and to improve internal drainage; to restore and complete construction of hurricane and storm damage reduction features in surrounding areas to previously authorized levels of protection; and to incorporate certain non-Federal levees into the Federal system. The fiscal year 2009 budget also proposes to authorize the HSDRRS to be constructed with the State of Louisiana as the single non-Federal cost-sharing partner and subsequently maintained and operated by the State. Pre-Katrina, the HSDRRS was built as a collection of separately authorized projects, designed with differing standards, subject to differing requirements for non-Federal cost-sharing, and managed by different local entities.

The new HSDRRS system will be not only higher, but also stronger than the pre-Hurricane Katrina system. Armoring of critical elements will improve resilience during storm events. New pump stations, water control structures, and floodgates will add perimeter protection to reduce the threat of storm surges from outfall canals and navigation channels. Completing the Southeast Louisiana urban drainage project within the geographic perimeter of the Lake Pontchartrain and Vicinity and West Bank and Vicinity projects will enhance the effectiveness of interior drainage systems.

Based on the proposed statutory language included in the President's budget, local entities would be responsible for 35 percent of the cost of the Southeast Louisiana project located within the geographic perimeter of the Lake Pontchartrain and Vicinity and West Bank and Vicinity projects, and for 35 percent of the increment of levee raises and other enhancements needed to the Lake Pontchartrain and Vicinity and West Bank and Vicinity projects above currently authorized levels to reduce the risk to the greater New Orleans area from storm surges that have a 1 percent annual chance of occurring. Local entities would also be responsible for 100 percent of the operation, maintenance, repair, replacement, and rehabilitation cost.

OTHER BUDGET HIGHLIGHTS

General Provisions

The budget includes proposed statutory language to authorize continuation of limits on reprogramming with certain proposed changes; to replace the continuing contract authority of the Corps with multi-year contracting authority patterned after the authority available to other Federal agencies; and to prohibit committing funds for ongoing and new contracts beyond the appropriated amounts available, including reprogramming.

Improved Cost Estimating

With my full support, the Chief of Engineers is undertaking several initiatives to strengthen the Corps performance in project cost estimating. The Chief will discuss these initiatives in detail in his statement.

WATER RESOURCES DEVELOPMENT ACT OF 2007

Upon passage of WRDA 2007 on November 7, 2007, the Chief of Engineers and I established a joint team to oversee the implementation of this lengthy, complex, and costly act. We have designated a senior Corps policy analyst to lead our joint

efforts. I meet at least bi-weekly with the joint WRDA implementation team to review and approve guidance for major policy and project provisions of WRDA.

The purpose of implementation guidance is to ensure a common understanding of the policies and procedures that will be used to meet the requirements of the law. Provisions that require development of implementation guidance are being identified and prioritized, and the writing of the guidance is underway. Implementation guidance for those provisions directly affecting work within the Divisions and Districts is being developed in consultation with the appropriate District, Division, and Headquarters Regional Integration Team. Due to the large number of provisions in the law, it will take time to issue guidance on each of the provisions. Priority for implementation guidance is being given to national policy provisions (mostly in title II) and to those project and program provisions where funds are currently appropriated.

Following are some examples of WRDA provisions receiving priority for implementation guidance:

—Section 2003—Written Agreements for water resources projects.
—Section 2027—Fiscal Transparency Report.
—Section 2031—Water Resources principles and guidelines.
—Section 2032—Water Resources Priorities Report.
—Section 2033—Planning.
—Section 2034—Independent Peer Review.
—Section 2035—Safety Assurance Review.
—Section 2036—Mitigation for fish and wildlife and wetlands losses.
—Title VI—Florida Everglades.
—Title VII—Louisiana Coastal Area.
—Title IX—National Levee Safety Program.

Working through the joint implementation team, we are making excellent progress in implementation strategies for the significant policy provisions and numerous individual project provisions.

PRESIDENT'S MANAGEMENT AGENDA

The Army Civil Works program is pursuing 5 Government-wide management initiatives, as are other Federal agencies, plus a sixth initiative on real property asset management. "Scorecards" for the Army Corps of Engineers and other Federal agencies can be found at the following website: http://www.whitehouse.gov/results/agenda/scorecard.html.

For the first quarter of the 2008 fiscal year, the scorecard rates the Corps status as red on one initiative, yellow on four, and green on one. I am pleased that the Corps is rated green on progress on all six initiatives. The Corps has worked diligently to achieve these ratings, and I am proud of their efforts. The Army is hopeful that the Corps of Engineers will receive an audit opinion in the very near future from the Inspector General of the Department of Defense for its fiscal year 2006 and 2007 Civil Works financial statements. This would be the first time ever that a major component of the Defense Department has received an audit opinion. The opinion is expected to be qualified, and it is anticipated that the auditors will recommend a number of areas that need improvement. With a qualified opinion in hand and this guidance from the DOD Inspector General, the Army has every expectation that the Corps can achieve an unqualified audit opinion on its fiscal year 2008 financial statements.

CONCLUSION

In developing this budget, the administration made explicit choices based on performance. The sustained level of O&M funding, transfer of activities from construction to O&M, emphasis on construction projects based on their returns, and focus on preparedness for flood, hurricane, and other natural disasters, for example, all reflect a performance-based approach.

At $4.741 billion, the fiscal year 2009 Army Civil Works annual budget provides the resources for the Civil Works program to pursue investments that will yield good returns for the Nation in the future. With the proposed $5.761 billion in fiscal year 2009 emergency appropriations, the Corps can also complete the Federal share of work necessary to significantly reduce the risk of storm surge damage to the greater New Orleans area.

This budget represents the wise use of funding to advance worthy, mission-based objectives. I am proud to present it.

Thank you, Mr. Chairman and members of the subcommittee, for this opportunity to testify on the President's fiscal year 2009 budget for the Civil Works program of the Army Corps of Engineers. This is the last time I will appear before this sub-

committee to present the Civil Works budget on behalf of President Bush. It has been my pleasure working with this subcommittee.

ENCLOSURE 1.—DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS—CIVIL WORKS ANNUAL BUDGET, FISCAL YEAR 2009 SUMMARY

	Amount
Requested New Appropriations for Annual Program by Account:	
Investigations	$91,000,000
Construction	1,402,000,000
Operation and Maintenance	2,475,000,000
Regulatory Program	180,000,000
Flood Control, Mississippi River and Tributaries	240,000,000
Expenses	177,000,000
Office of the Assistant Secretary of the Army (Civil Works)	6,000,000
Flood Control and Coastal Emergencies	40,000,000
Formerly Utilized Sites Remedial Action Program	130,000,000
TOTAL	4,741,000,000
Requested New Appropriations by Program Area:	
Commercial Navigation	1,892,000,000
(Inland and Intracoastal Waterways)	(931,000,000)
(Channels and Harbors)	(961,000,000)
Flood and Coastal Storm Damage Reduction	1,322,000,000
(Flood Damage Reduction)	(1,295,000,000)
(Coastal Storm Damage Reduction)	(27,000,000)
Environment	511,000,000
(Aquatic Ecosystem Restoration)	(286,000,000)
(FUSRAP)	(130,000,000)
(Stewardship)	(95,000,000)
Hydropower	319,000,000
Recreation	270,000,000
Water Supply	6,000,000
Emergency Management	58,000,000
(Flood Control and Coastal Emergencies)	(40,000,000)
(National Emergency Preparedness)	(6,000,000)
(Remaining Items Operation and Maintenance)	(12,000,000)
Regulatory Program	180,000,000
Oversight and Management	183,000,000
TOTAL	4,741,000,000
Sources of New Appropriations:	
General Fund	3,844,000,000
Harbor Maintenance Trust Fund	729,000,000
Inland Waterways Trust Fund	167,000,000
Disposal Facilities User Fees	1,000,000
TOTAL	4,741,000,000
Additional New Resources:	
Rivers and Harbors Contributed Funds	400,000,000
Coastal Wetlands Restoration Trust Fund	84,000,000
Permanent Appropriations	17,000,000
TOTAL	501,000,000

ENCLOSURE 2.—DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS—CIVIL WORKS ANNUAL BUDGET, FISCAL YEAR 2009

[Crosscut Between Appropriation Accounts and Program Areas]

	Navigation	Flood/Storm	Recreation	Aq. Ec. Restor.	Stewardship	FUS-RAP	Hydropower	Water Supply	Emerg. Mgmt.	Regul. Prog.	Ovrsgt/Mgmt	TOTAL
Investigations	20	36		35								91
Construction	487	627		245			43					1,402
Operation & Maint.	1,346	482	255	2	90		276	6	18			2,475
MR&T–I		1										1
MR&T–C	10	62		4								76
MR&T—O&M	29	114	15		5							163
FUSRAP						130						130
FC&CE									40			40
Regulatory										180		180
Expenses											177	177
Office of the ASA(CW)											6	6
TOTAL	1,892	1,322	270	286	95	130	319	6	58	180	183	4,741

ENCLOSURE 3.—DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS—CIVIL WORKS BUDGET FISCAL YEAR 2009 CONSTRUCTION PERFORMANCE GUIDELINES

Project Rankings.—All ongoing specifically authorized construction projects, including projects funded in the Mississippi River and Tributaries account, will be assigned based upon their primary purpose to one of the main mission areas of the Corps (flood and storm damage reduction; commercial navigation; aquatic ecosystem restoration) or to hydropower. Flood and storm damage reduction, commercial navigation, and hydropower projects will be ranked by their total benefits divided by their total costs (BCR), calculated at a 7 percent real discount rate. Aquatic ecosystem restoration projects will be ranked by the extent to which they cost-effectively contribute to the restoration of a nationally or regionally significant aquatic ecosystem that has become degraded as a result of a civil works project, or to a restoration effort for which the Corps is otherwise uniquely well-suited (e.g., because the solution requires complex alterations to the hydrology and hydraulics of a river system).

Projects Funded on the Basis of Their Economic and Environmental Returns.—Ongoing flood and storm damage reduction, commercial navigation, and hydropower construction projects with a BCR of 1.5 or higher and ongoing aquatic ecosystem restoration construction projects that are cost-effective in contributing to the restoration of a nationally or regionally significant aquatic ecosystem that has become degraded as a result of a civil works project or to a restoration effort for which the Corps is otherwise uniquely well-suited will receive at least the amount needed to pay estimated contractor earnings required under ongoing contracts and related costs. In allocating funds among these projects, priority will be given to those with the highest economic and environmental returns and to projects where the Corps can complete physical construction of the project and/or related administrative activities in the budget year.

Projects Funded to Address Significant Risk to Human Safety.—Flood and storm damage reduction projects that are funded to address significant risk to human safety will receive sufficient funding to support an uninterrupted effort during the budget year.

Projects With Low Economic and Environmental Returns.—Ongoing flood and storm damage reduction, commercial navigation, and hydropower construction projects with a BCR below 1.5 will be considered for deferral, except for flood and storm damage reduction projects that are funded to address significant risk to human safety. Likewise, ongoing aquatic ecosystem restoration construction projects that do not cost-effectively contribute to the restoration of a nationally or regionally significant aquatic ecosystem that has become degraded as a result of a civil works project, and do not cost-effectively address a problem for which the Corps is otherwise uniquely well-suited, will be considered for deferral.

New Starts and Resumptions.—The budget could include funds to start up new construction projects, or to resume work on ongoing construction projects on which the Corps has not performed any physical work under a construction contract during the past 3 consecutive fiscal years, only if the project would be ranked that year in the top 20 percent of the ongoing construction projects in its mission area. The term "physical work under a construction contract" does not include activities related to project planning, engineering and design, relocation, or the acquisition of lands, easements, or rights-of-way. For non-structural flood damage reduction projects, construction begins in the first fiscal year in which the Corps acquires lands, easements, or rights-of-way primarily to relocate structures, or performs physical work under a construction contract for non-structural project-related measures. For aquatic ecosystem restoration projects, construction begins in the first fiscal year in which the Corps acquires lands, easements, or rights-of-way primarily to facilitate the restoration of degraded aquatic ecosystems including wetlands, riparian areas, and adjacent floodplains, or performs physical work under a construction contract to modify existing project facilities primarily to restore the aquatic ecosystem. For all other projects, construction begins in the first fiscal year in which the Corps performs physical work under a construction contract.

Other Cases.—Projects will receive the amount needed to ensure that they comply with treaties and with biological opinions pursuant to the Endangered Species Act, and meet authorized mitigation requirements. Dam safety assurance, seepage control, and static instability correction projects that are funded in the construction program will receive the maximum level of funding that the Corps can efficiently and effectively spend in each year.

Senator DORGAN. Secretary Woodley, thank you very much for your testimony.

Next we will hear from Lieutenant General Van Antwerp. General.

STATEMENT OF LIEUTENANT GENERAL ROBERT VAN ANTWERP, CHIEF OF ENGINEERS

General VAN ANTWERP. Thank you, Mr. Chairman, distinguished members of the committee.

Senator DORGAN. Is that turned on, by the way?

General VAN ANTWERP. I didn't push it hard enough, there I am. I'm with you.

Thank you, Mr. Chairman, distinguished members of the subcommittee.

I'm the 52d Chief of Engineers, I guess if you were there for all of us, you'd be over 200 years old, and you're still a young man. You've worked with 11 Chiefs, I'm proud to be the 11th or 12th, here.

Senator DOMENICI. Young man?

General VAN ANTWERP. The President's budget is a performance-based budget. It reflects a focus on projects and activities that provide the highest returns—economic, environmental, and address significant contributions to safety.

It allocates funding for 79 projects overall, it includes 11 dam safety projects, 16 life safety, and it completes 12 projects in fiscal year 2009.

The greatest part of the budget, as expected, supports the Nation's navigation network. We are an expeditionary Corps, we have about 800 people deployed today, we have 4 districts in-theater, Gulf Region Division, with the north, central and the south districts, and a district in Afghanistan. So, we covet your prayers for our folks deployed, and who are doing the heavy lifting every day overseas.

PREPARED STATEMENT

We have a commitment to being good stewards of what you give us for continuous improvement, and I would just like to thank you for the opportunity to appear before you today, and I look forward to your questions.

Thank you, sir.

[The statement follows:]

PREPARED STATEMENT OF LIEUTENANT GENERAL ROBERT VAN ANTWERP

Mr. Chairman and distinguished members of the subcommittee: I am honored to be testifying before your subcommittee today, along with the Assistant Secretary of the Army (Civil Works), the Honorable John Paul Woodley, Jr., on the President's fiscal year 2009 budget for the United States Army Corps of Engineers' Civil Works Program.

My statement covers the following 4 topics:

—Summary of fiscal year 2009 Program budget;
—Construction Program;
—Cost Engineering Improvements; and
—Value of the Civil Works Program to the Nation's Economy, and to the Nation's Defense.

SUMMARY OF FISCAL YEAR 2009 PROGRAM BUDGET

Introduction

The fiscal year 2009 Civil Works budget is a performance-based budget, which reflects a focus on the projects and activities that provide the highest net economic

and environmental returns on the Nation's investment or address significant risk to human safety. Direct Program funding totals $5.242 billion, consisting of discretionary funding of $4.741 billion and mandatory funding of $501 million. The Reimbursed Program funding is projected to involve an additional $2 billion to $3 billion. In addition, the budget requests $5.761 billion of emergency funding for continuing efforts to improve storm protection for the greater New Orleans area.

Direct Program

The budget reflects the administration's commitment to continued sound development and management of the Nation's water and related land resources. It proposes to give the Corps program managers more flexibility to properly maintain our key facilities. The budget incorporates objective performance-based metrics for the construction program, funds the continued operation of commercial navigation and other water resource infrastructure, provides significant funding for the regulatory program to protect the Nation's waters and wetlands, and supports restoration of nationally and regionally significant aquatic ecosystems, with emphasis on the Florida Everglades and the Upper Mississippi River. It also would improve the quality of recreation services through an expanded fee structure and stronger partnerships, in support of modernization. Additionally, it emphasizes the basic need to fund emergency preparedness activities for the Corps as part of the regular budget process.

Reimbursed Program

Through the Interagency and Intergovernmental Services Program we help non-DOD Federal agencies, State, local, and tribal governments, and other countries with timely, cost-effective implementation of their programs. Rather than develop their own internal workforce to oversee large design and construction projects, these agencies rely on Corps of Engineers capabilities. Such intergovernmental cooperation is effective for agencies and the taxpayer by using the skills and talents that we bring to our Civil Works and Military Program missions. The work is principally technical oversight and management of engineering, environmental, and construction contracts performed by private sector firms, and is totally financed by the Agencies we service.

Currently, we provide reimbursable support for about 70 other Federal agencies and several State and local governments. Total reimbursement for such work in fiscal year 2009 is projected to be $2.0 billion to $3.0 billion. The exact amount will depend on assignments received from the agencies.

CONSTRUCTION PROGRAM

The goal of the construction program is to produce as much value as possible for the Nation from available funds. Our fiscal year 2009 budget of $1.478 billion (including $76 million under the Mississippi River and Tributaries program) furthers this objective by giving priority to the continued construction and completion of those water resources projects that will provide the best net returns on the Nation's investment for each dollar invested (Federal plus non-Federal) in the Corps primary mission areas. The budget also gives priority to projects that address a significant risk to human safety, notwithstanding their economic performance. Under these guidelines, the Corps allocated funding to 79 construction projects, including 11 other dam safety assurance, seepage control, and static instability correction projects, 16 projects that address a significant risk to human safety, and 52 other projects.

The budget uses objective performance measures to establish priorities among projects and, through a proposed statutory change in Corps contracting practices, would also increase control over future costs. The performance measures used include the benefit-to-cost ratios for projects with economic outputs; and, for aquatic ecosystem restoration projects, the extent to which the project cost-effectively contributes to the restoration of a nationally or regionally significant aquatic ecosystem that has become degraded as a result of a Civil Works project or to an aquatic ecosystem restoration effort for which the Corps is otherwise uniquely well-suited. The selection process also gives priority to dam safety assurance, seepage control, static instability correction, and to projects that address a significant risk to human safety. Under each of these criterions, resources are allocated based on performance. This approach significantly improves the realization of benefits to the Nation from the Civil Works construction program and will improve overall program performance by allowing the Nation to realize the benefits of the projects with the best net returns (per dollar invested) sooner.

Maintenance Program

The facilities owned and operated by, or on behalf of, the Corps of Engineers are aging. As stewards of this infrastructure, we are working to ensure that its key features continue to provide an appropriate level of service to the Nation. Sustaining such service poses a technical challenge in some cases, and proper maintenance is becoming more expensive as this infrastructure ages.

The operation and maintenance (O&M) program for the fiscal year 2009 budget includes $2.638 billion (including $163 million under the Mississippi River and Tributaries program), with a focus on the maintenance of key commercial navigation, flood and storm damage reduction, hydropower, and other facilities. Specifically, the operation and maintenance program supports completed works owned or operated by the Corps of Engineers, including administrative buildings and laboratories. This program includes, for example, significant funding for our efforts in the Columbia River Basin and Missouri River Basin to support the continued operation of Corps of Engineers multi-purpose projects by meeting the requirements of the Endangered Species Act. Other work to be accomplished includes dredging, repair, aquatic plant control, removal of sunken vessels, monitoring of completed coastal projects, and operation of structures and other facilities, as authorized in the various River and Harbor, Flood Control, and Water Resources Development Acts.

COST ENGINEERING IMPROVEMENTS

The Corps has implemented some cost engineering improvements in an effort to ensure the development of quality project estimates in support of our Civil Works customers and partners for the successful accomplishment of projects. Three initiatives have been implemented that will provide more reliable project recommendations at the feasibility phase of the project by developing project cost contingencies using a standard cost risk analysis program. Cost risk analysis is the process of identifying and measuring the cost impact of project uncertainties and risks on the estimated total project cost.

The first initiative mandates that the National Planning Centers of Expertise coordinate with the Cost Engineering Directory of Expertise at the Walla Walla District for independent review of cost estimates, and include contingencies in all decision documents requiring Congressional authorization. This approach will provide consistency in business practices and in the use of cost engineering tools.

The second initiative, which went in effect on October 1, 2007, requires that Corps project delivery teams conduct a cost risk analysis to develop contingencies for Civil Works total project cost estimates of all decision documents requiring Congressional authorization for projects exceeding $40 million.

The third initiative requires that project managers and their project delivery teams use project risk management principles and methods in developing a project risk management plan that includes a risk assessment and analysis and a risk response plan to support the cost risk analysis. Together the project risk management plan along with the cost risk analysis will produce a defensible assessment of the Civil Works total project cost estimate. This gives the management team an effective tool to assist in managing the planning study and will assist decisionmakers in making project recommendations.

The Corps will be incorporating lessons learned into its cost estimating practices on an ongoing basis. Our goal is to improve the accuracy of our cost estimates much earlier in the development of a proposed project—at the project formulation stage—in order to provide greater assurance in determining whether the alternatives that we are exploring are highly cost-effective.

VALUE OF THE CIVIL WORKS PROGRAM TO THE NATION'S ECONOMY AND DEFENSE

We are privileged to be part of an organization that directly supports the President's priorities of winning the global war on terror, securing the homeland and contributing to the economy.

The National Welfare

The way in which we manage our water resources can improve the quality of our citizens' lives. It has affected where and how people live and influenced the development of this country. The country today seeks economic development as well as the protection of environmental values.

Domestically, Corps of Engineers personnel from across the Nation continue to respond to the call to help re-construct and improve the hurricane and storm damage reduction system for southeast Louisiana. The critical work they are doing will reduce the risk of damage from future storms to people and communities.

The budget also includes a 2009 Emergency Appropriation in the amount of $5.761 billion for the Federal Share of additional funds needed to provide risk reduction from hurricane and storm surges for the greater New Orleans, Louisiana, area. These funds will be used to restore and complete construction of hurricane and storm damage risk reduction features into the Federal System. The budget also proposes that the existing systems be authorized as a single, integrated project, and that cost-shares of this re-authorized project be made consistent with cost-shares that are applied nationally.

Research and Development

Civil Works Program research and development provides the Nation with innovative engineering products, some of which can have applications in both civil and military infrastructure spheres. By creating products that improve the efficiency and competitiveness of the Nation's engineering and construction industry and providing more cost-effective ways to operate and maintain infrastructure, Civil Works program research and development contributes to the national economy.

The National Defense

Internationally, the U.S. Army Corps of Engineers continues to support the mission to help Iraq and Afghanistan build foundations for democracy, freedom and prosperity.

I also want to recognize the many Corps of Engineers civilians—each of whom is a volunteer—and Soldiers who are providing engineering expertise, quality construction management, and program and project management in other nations. The often unsung efforts of these patriotic men and women contribute daily toward this Nation's goals of restoring the economy, security and quality of life for all Iraqis and Afghans.

In Iraq, the Gulf Region Division has overseen the initiation of more than 4,300 reconstruction projects valued in excess of $6.5 billion. More than 500 projects valued at $2.6 billion are ongoing. These projects provide employment and hope for the Iraqi people.

In Afghanistan, the Corps is spearheading a comprehensive infrastructure program for the Afghan national army, and is also aiding in important public infrastructure projects.

CONCLUSION

The Corps of Engineers is committed to staying at the leading edge of service to the Nation. We're committed to change that ensures an open, transparent, and performance-based Civil Works Program.

Thank you, Mr. Chairman and members of the subcommittee. This concludes my statement.

Senator DORGAN. General, thank you very much, we appreciate your testimony as well.

DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

STATEMENT OF KAMERAN ONLEY, ACTING ASSISTANT SECRETARY FOR WATER AND SCIENCE

ACCOMPANIED BY:

ROBERT W. JOHNSON, COMMISSIONER

REED MURRAY, DIRECTOR, CENTRAL UTAH PROJECT COMPLETION ACT OFFICE

ROBERT W. WOLF, DIRECTOR, PROGRAM AND BUDGET, BUREAU OF RECLAMATION

Senator DORGAN. Secretary Onley.

Ms. ONLEY. Mr. Chairman and Mr. Domenici and members of the subcommittee, thank you for the opportunity to appear before you in support of the President's fiscal year 2009 budget request for the Bureau of Reclamation and the Central Utah Project Completion Act.

With me today is Bob Johnson, the Commissioner of the Bureau of Reclamation, and we also have Reed Murray, the Director of the Central Utah Project Completion Act Office with us here, if you have any questions on that program.

I've submitted written testimony which presents a detailed summary of the Department's appropriation request. Today I'd like to highlight the 2009 Water for America initiative, and touch briefly on Reclamation and the Central Utah Project request before turning to Commissioner Johnson for more detailed discussion on the Reclamation request.

The Department of the Interior's mission is complex and multifaceted. Our program and mission stretch from the North Pole to the South Pole, and across 12 time zones, from the Caribbean to the Pacific Rim. Nearly every American lives within a 1 hour drive of lands or waters managed by the Interior Department.

Our 2009 budget of $10.76 billion, benefits every American each day, in some way. The 2009 budget continues investments that Congress provided in 2008 for our top priorities. The 2009 budget also addresses other nationally significant issues within a budget that maintains the President's commitment to fiscal restraint.

The 2009 budget builds on our 2008 budget, which charted a course for excellence for our national parks, broadened our planning horizons to achieve healthy lands while securing energy for the Nation, and puts the needs of Indian country center stage. We continue these commitments, and are also proposing four new initiatives in 2009, to address water crisis, managing our oceans, reverse the dramatic decline in wild birds, and protect our borders. These initiatives have addressed some of the most critical issues facing this Nation.

The Water for America initiative would ensure that communities have a reliable water supply for the 21st century. Last year, the National Science and Technology Council reported that abundant supplies of clean, fresh water can no longer be taken for granted.

Our water scarcity is not just a problem for the West; it is a problem for the Nation. We are seeing prolonged droughts and water conflicts in such areas as the Southeast, where people are used to having unlimited water.

Through this initiative, the Bureau of Reclamation and the U.S. Geological Survey will help communities secure reliable water supplies through information, technologies and partnerships.

With regard to the programs under the jurisdiction of this subcommittee, the 2009 request for the Bureau of Reclamation and the Central Utah Project Completion Act is $961.3 million. I will defer to Commissioner Johnson to discuss the details of the Reclamation request, but note that the 2009 proposal of $919.3 million supports managing, developing and protecting water and related resources in an environmentally and economically sound manner.

Reclamation continues to strive for the highest levels of service to the American people, and for the highest levels of management excellence.

The request for the implementation of the Central Utah Project Protection Completion Act is $42 million. The majority of the fiscal year 2009 funding will continue to continue construction of the Utah Lakes System, the last component of the Central Utah Project which, when complete, will provide much-needed water for Salt Lake and Utah counties.

The Central Utah Project anticipates ongoing construction of the Spanish Fork Canyon Pipeline, the return of two more of the high lakes in the Uinta Mountains, and natural conditions, and implementation of the East Juab Water Efficiency Project, to conjunctively use ground water and surface water.

While here, I would be remiss if I did not mention, the Department strongly supports the President's $50 million request that is pending before this subcommittee for the Army Corps of Engineers work to implement the modified waters delivery to Everglades National Park, which Congress authorized in 1989. Mod waters is intended to restore the natural flow of water to Everglades National Park and thereby restores park habitat which has been adversely affected by the operations of the last 5 decades of Army Corps Central and Southern Florida Project.

The funds for the Army Corps, when combined with the funds requested for the National Park Service, will allow to continue the work on this project and bring it closer to completion. We have just completed—with the Corps of Engineers—an evaluation of a key component related to bridging in the Tamiami Trail, U.S. Highway 41, which serves as the barrier to restore flow. We appreciate your favorable support for this project, which is supported by the State of Florida, and is a necessary prerequisite for the Everglades restoration work.

In summary, the Department's 2009 budget will continue efforts to improve our national parks, protect our wildlife in its habitat, and make investments in Indian country for safe communities and Indian education. In addition, we will help communities address

water and supply needs, conserve wild birds and ocean resources, improve the safety of public lands along the border for employees and visitors, and continue to address other ongoing mission priorities.

PREPARED STATEMENT

I appreciate the strong support from this committee has given to both the Department—to the Department, and in particular, the Bureau of Reclamation, and to the Central Utah Project, and I look forward to working with you to advance the goals of these programs.

Thank you.

[The statement follows:]

PREPARED STATEMENT OF KAMERAN ONLEY

Mr. Chairman, Senator Domenici, and members of this subcommittee, it is a pleasure to appear before this subcommittee today to discuss the President's 2009 budget for the Department of the Interior and to update you on our progress in implementing our 2008 programs.

The Department of the Interior's mission is complex and multifaceted. Our programs and mission stretch from the North Pole to the South Pole and across 12 time zones, from the Caribbean to the Pacific Rim. Our extensive mandate rivals any Government agency in its breadth and diversity—and its importance to the everyday lives of Americans. In a recent poll of Federal agencies, the Department of the Interior received the highest rating for its public service.

Nearly every American lives within a 1 hour drive of lands or waters managed by the Interior Department. With 165,000 facilities at 2,400 locations, Interior is second only to the Department of Defense in managed assets. The Department's law enforcement agents, over 4,000, comprise the third largest civilian law enforcement presence in the Federal Government.

Approximately 31 million people in the West rely on drinking water provided through water systems managed by the Department. Interior irrigation systems deliver water to farmers who generate over half of the Nation's produce.

The lands and waters we manage generate one-third of the Nation's domestic energy production. Managing these areas, Interior generates $18 billion annually in revenues that exceeds Interior's $10.7 billion appropriated budget.

Interior fulfills special responsibilities to Native Americans as the manager of one of the largest land trusts in the world—over 10 million acres owned by individual Indians and 46 million acres held in trust for Indian Tribes. In addition to lands managed in trust, the Department manages over $3.3 billion of funds held in over 1,800 trust accounts for approximately 250 Indian tribes and over 370,000 open Individual Indian Money accounts. Interior also operates one of only two school systems in the Federal Government, the Bureau of Indian Education school system. The Department of Defense operates the other.

OVERVIEW OF THE 2009 BUDGET

The 2009 budget request for current appropriations is $10.7 billion, $388.5 million or 3.5 percent below the level enacted by Congress for 2008, excluding fire supplemental funding, but $59 million above the amount requested in the 2008 President's budget. Permanent funding that becomes available as a result of existing legislation without further action by the Congress will provide an additional $6 billion, for a total 2009 Interior budget of $16.7 billion. Including permanent funding and excluding 2008 fire supplemental funding, the 2009 budget for Interior is slightly above 2008 amounts.

The 2009 request includes $9.8 billion for programs funded within the Interior, Environment and Related Agencies Appropriation Act. Excluding fire supplemental funding, this is a decrease of $198.9 million, or 2 percent, below the level enacted for 2008. The 2009 request for the Bureau of Reclamation and the Central Utah Project Completion Act, funded in the Energy and Water Development Appropriations Act, is $961.3 million, $189.6 million below the level enacted for 2008.

THE CHALLENGES AHEAD

Interior's responsibilities are expanding as the Nation looks to its public lands for energy, water, wildlife protection, and recreation. Since 2001, the Nation has created 13 new parks and 15 wildlife refuges. Population has grown dramatically near once-rural or remote public lands, increasing access to public lands and complicating land management. In the last 10 years, 60 percent of the new houses built in America were located in the wildland-urban interface. Changing land conditions, including the effects of a changing climate, have heightened threats from fire and other natural hazards, complicating land management.

The Department is improving program efficiency, setting priorities, and leveraging Federal funds through partnerships and cooperative conservation to meet these challenges. Interior's accomplishments have been many and varied, with noteworthy advances in management excellence.

Interior has made progress on all dimensions of the President's management agenda—a result achieved despite decades-long challenges in Indian trust management, a highly decentralized organization structure, and a highly dispersed workforce. In 2001, Interior had 17 material weaknesses reported in the annual financial and performance audit. With the annual audit just completed for 2007, we have eliminated all material weaknesses. Despite these successes, as public lands become increasingly important to the economy, national security, and the public, continued success will require a strategic focus of resources to address emerging challenges, achieve key priorities, and maintain current levels of success.

INTERIOR'S ACCOMPLISHMENTS

The Department's accomplishments exemplify Interior's core values: Stewardship for America with Integrity and Excellence. Our achievements, in combination with an outstanding workforce, create a strong foundation for continued stewardship of the Nation's resources. Since 2001, the Department has:

—Restored or enhanced more than 5 million acres and 5,000 stream and shoreline miles through cooperative conservation.

—Restored, improved, and protected wetlands to help achieve the President's goal to protect, enhance, and restore 3 million acres by 2009.

—Improved park facilities for visitors by undertaking over 6,600 projects at national parks and earning a 96 percent satisfaction rate from park visitors.

—Reduced risks to communities from the threat of catastrophic fire, conducting over 8 million acres of fuels treatments on Interior lands through the Healthy Forests Initiative.

—Enhanced energy security by more than doubling the processing of applications for permits to drill and increased the production of renewable energy with new wind, solar, and geothermal projects.

—Awarded $9.8 million to 140 Preserve America projects involving public-private partnerships that serve as nationwide models for heritage tourism, historic preservation, education, and other Federal programs.

—Leveraged a four-to-one investment through a water conservation challenge grant program, generating more than $96 million for 122 water delivery system improvements and conserving over 400,000 acre-feet of water to help meet the water needs of people across the West.

—Completed planned lease sales and generated a new 5-year plan for 2007–2012 that opens up an additional 48 million acres to leasing and has the potential to produce 10 billion barrels of oil and 45 trillion cubic feet of natural gas over the next 40 years, enough to heat 47 million homes for 40 years. The October 2007 Central Gulf of Mexico OCS lease sale generated $2.9 billion, $1.6 billion more than originally estimated.

—Removed the American bald eagle from the endangered species list and put in place a set of management guidelines to secure the future of our Nation's symbol.

—Advanced protection of the Papahänaumokuäkea Marine National Monument in Hawaii, the largest marine protected area in the world, with the publication of regulations codifying management measures.

—Hosted over 464 million visitors to parks, refuges, public lands, and Bureau of Reclamation sites and increased the number of fishing programs on refuges by 24 and the number of hunting programs on refuges by 34.

—Established a new Recreation Reservation Service, a unified pass to public lands, and clarified entrance and recreation fees, in coordination with other agencies.

—Distributed over $79 million to individual Indian money account holders whose whereabouts were previously unknown and archived 400 million pages of trust documents in a state-of-the-art facility.

Our 2009 budget continues investments the Congress provided in 2008 for our top priorities. We continue our Centennial Initiative with record funding levels for park operations. We propose to augment funding for our landscape-scale Healthy Lands Initiative to protect wildlife and assure access to energy resources on public lands. We propose to sustain funding increases in 2008 to combat the methamphetamine scourge in Indian country and improve education programs for students in Indian schools.

Fulfilling the President's commitment to cooperative conservation, since 2001, the Department has provided $2.5 billion in conservation grants to achieve on-the-ground protection, restoration, and enhancement of lands and waters with partners. This commitment continues with $321.7 million requested in 2009 for challenge cost share and partnership programs that leverage Federal funding, typically more than doubling the Federal investments with matching funds.

We also propose four new initiatives. We will advance efforts to improve the status of birds, including migratory birds, and avert further declines in bird populations with an increase of $9.0 million for a Birds Forever initiative. The budget continues the $35.9 million refuge funding increase provided by the Congress in 2008, which will restore 200,000 acres of bird habitat. The 2009 budget seeks an increase of $7.9 million to collect data that is needed to define U.S. jurisdiction of the extended continental shelf under the Law of the Sea, protect wildlife and habitat in ocean environments from marine debris, and conduct high priority research to support coastal restoration. The 2009 budget includes $8.2 million to increase the protection of employees, visitors, lands and resources that are increasingly at risk from illegal activities at parks, refuges, public lands, and Indian lands along the border with Mexico. Of particular interest to this subcommittee, we request an increase of $21.3 million for the Water for America initiative that will enhance knowledge of water resources and improve the capacity of water managers to avert crises caused by water supply issues and better manage water resources to assist in endangered species recovery.

WATER FOR AMERICA

In 2007, the National Science and Technology Council reported that "abundant supplies of clean, fresh water can no longer be taken for granted." The Council of State Governments echoed this concern, concluding that "water, which used to be considered a ubiquitous resource, is now scarce in some parts of the country and not just in the West . . . The water wars have spread to the Midwest, East, and South, as well."

Competition for water is increasing because of rapid population growth and growing environmental and energy needs. These water needs are escalating at a time of chronic drought and changes in water availability resulting from a changing climate.

In 2009, our budget includes an increase of $21.3 million for a Water for America initiative to help communities secure reliable water supplies through information, technologies, and partnerships. This collaborative effort, which involves the Bureau of Reclamation and the U.S. Geological Survey, will help address the water needs of the Nation.

Knowing how much water is available—and how much we consume—lies at the foundation of good water management. Yet this Nation has not completed a water census in over 3 decades. Our Water for America initiative will fill this void. The U.S. Geological Survey request includes an additional $8.2 million to begin funding the first water census in 30 years. USGS will begin a nationwide assessment of water availability, water quality, and human and environmental water use. The census, planned for completion by 2019, will generate information to assist others in managing water in a context of competing demands. The census will provide a national groundwater information system, new technology that integrates surface and groundwater information, and better measurements that result in better management of water resources.

For more than 100 years, USGS has collected, managed and disseminated data on stream behavior. The USGS operates its streamgaging network of 7,000 gages in cooperation with State, local, municipal, and tribal partners. The 2009 budget will modernize 350 gages and re-establish 50 gages discontinued in the past 2 decades to improve capability to ensure a consistent, historical record of streamflow.

The Bureau of Reclamation will recast its water conservation programs and will merge Water 2025 and the Water Conservation Field Services program to stimulate

water conservation and improved water management through an integrated approach that addresses urban, rural, and agricultural uses of water throughout the West. Through the use of West-wide criteria to competitively award grants, this new water conservation challenge grant program will stretch water supplies through water conservation, technology, reuse and recycling, and new or improved infrastructure development. This program will leverage $15.0 million in Federal dollars with State and local funds. We will also protect endangered species and their habitats while protecting water for traditional purposes with an increase of $8.9 million. Funding will be used to acquire water to increase flows in the Platte River; improve tributary habitats for spawning on the Columbia and Snake Rivers; restore habitats on the Yakima River basin, the Middle Rio Grande River, and the Klamath basin, and improve endangered species conditions in the California Bay-Delta.

The Bureau of Reclamation's 2009 budget request of $919.3 million is offset by $48.3 million in funds from the Central Valley Project Restoration Fund Offset. This request supports Reclamation's mission of managing, developing, and protecting water and related resources in an environmentally and economically sound manner in the interest of the American people. The budget emphasizes reliable water delivery and power generation by requesting more than $396 million to fund operation, maintenance, and rehabilitation activities at Reclamation facilities.

To address important infrastructure funding needs, the budget includes an increase of $15.5 million for the Bureau of Reclamation's Safety of Dams program. This will allow the Bureau to address correction actions at Folsom Dam and other high priority projects.

Reclamation is currently developing programmatic criteria for a Rural Water Program as required under the Reclamation Rural Water Supply Act of 2006. Reclamation expects to begin appraisal level studies in 2009. The 2009 budget includes $39.0 million for two ongoing authorized rural water projects: $24 million supports the administration's commitment to complete construction of ongoing rural water projects including ongoing municipal, rural and industrial systems for the Pick Sloan-Missouri Basin Program—Garrison Diversion Unit in North Dakota and the Mni Wiconi Project in South Dakota. The first priority for funding rural water projects is the required operations and maintenance component, which is $15.0 million for 2009. For the construction component, Reclamation allocated funding based on objective criteria that gave priority to projects nearest to completion and projects that serve tribal needs.

The $50.0 million budget for Animas-La Plata funds the completion of major project components including the Ridges Basin Dam, Durango Pumping Plant, and Ridges Basin Inlet Conduit; enables the Bureau to begin filling Lake Nighthorse; and begins construction of the Navajo Nation Municipal Pipeline.

The Bureau will complete removal of the Savage Rapids Dam in 2009. The budget includes $22.7 million for the Middle Rio Grande project to continue to focus on the protection and recovery of the silvery minnow and southwestern willow flycatcher.

The budget request for CALFED is $32.0 million, continuing implementation of priority activities that will resolve water conflicts in the Bay-Delta of California. Funds will be used for the environmental water account, storage feasibility studies, conveyance feasibility studies, science, implementation of projects to improve water quality, and overall program administration.

SUPPORTING THE DEPARTMENT'S MISSION

The 2009 budget aligns resources to achieve these and other high-priority goals guided by the Department's integrated strategic plan. The Department's strategic plan links the Department's diverse activities into four common mission areas: Resource Protection, Resource Use, Recreation, and Serving Communities. A fifth area, Management Excellence, provides the framework for improved business practices, processes, and tools and a highly skilled and trained workforce.

Interior continues to utilize the services of over 200,000 volunteers and extensive seasonal employees. However, the workforce capacity of the Department's programs is an essential ingredient for the uninterrupted delivery of programs and services to the American public.

OTHER BUDGET PRIORITIES

Financial and Business Management System.—The Financial and Business Management System, an enterprise-level, integrated, administrative management system, is replacing the Interior Department's existing legacy systems. When fully implemented, the project will support the business requirements of all Interior bureaus and offices including core accounting, acquisition, personal property and fleet, trav-

el, real property, financial assistance, budget formulation, and enterprise management information.

LEGISLATIVE PROPOSALS

The 2009 budget is accompanied by legislative proposals that will affect receipt or spending levels in 2009 or in future years. These proposals will be transmitted to the Congress for consideration by this committee and other authorizing committees of jurisdiction.

Many of these legislative changes were presented in the 2008 President's budget, including proposals for reallocation of the repayment of capital costs for the Pick-Sloan Missouri Basin Program, and authorization for the San Joaquin River Restoration settlement.

CONCLUSION

Our 2009 budget will—in its entirety—make a dramatic difference for the American people. We will continue efforts to improve our national parks, protect our wildlife and its habitat, and make investments in Indian Country for safe communities and Indian education. In addition, we will help communities address water supply needs, conserve wild birds and ocean resources, improve the safety of public lands along the border for employees and visitors, and continue to address other ongoing mission priorities. This concludes my overview of the 2009 budget proposal for the Department of the Interior and my written statement. I will be happy to answer any questions that you may have.

Senator DORGAN. Secretary Onley, thank you very much.

Commissioner Johnson, you may proceed.

STATEMENT OF ROBERT W. JOHNSON

Mr. JOHNSON. Thank you, Mr. Chairman, it's a pleasure for me to be here, also, and it's an honor to be in front of the members of the committee here, as well.

I have Mr. Robert Wolf with me today, he is the head of our Program and Budget Group with the Bureau of Reclamation, and he'll be assisting me with details if I need some help.

I would like to truncate my oral remarks, and very quickly hit on three broad categories of the Reclamation budget, and then just spend a minute talking about our Water for America initiative that's included in the 2009 request.

Reclamation's budget breaks down into three really broad categories. Our first priority is the operation and maintenance of our facilities. We deliver water to 10 million acres of irrigated farmland, we deliver water to 31 million people, and we produce 44 billion kilowatt hours of energy annually.

We have 58 power plants, 350 high dams—450 dams, if you count the lower dams—and maintaining that infrastructure, which largely is 50 years old, or older, is the first priority of the Bureau of Reclamation. And when we look at our budget, we have about $400 million associated with insuring that we're able to maintain that infrastructure and continue to deliver those water and power supplies like we have in the past.

The second component of our program that I like to generalize about is what I would call River Restoration Programs. The Endangered Species Act, the National Environmental Policy Act, and the Clean Water Act have really established a new set of public values that Reclamation has to deal with, and the Corps, as well. And we found ourselves—in complying with those acts—being heavily involved in restoring river basins—river basins where we've had heavy involvement in developing water supply systems. We found

that in order to be able to deliver, or continue to deliver, the benefits of our projects—that we have to be very active in managing those river basins to maintain the ecosystems and protect the species that live there.

We have about $150 million in our budget for those kinds of activities—the Rio Grande, the Colorado, the Snake, the Columbia, the Platte, the Sacramento and San Joaquin, the Trinity River—all have major river basin restoration programs, the Klamath, I don't want to leave out the Klamath—certainly an important river basin—and we are putting a lot of our resources into meeting those requirements on those river basins.

The third is, Reclamation continues to be involved in the development of new water supplies. We're still constructing water projects, we're heavily into the Animas La Plata Project in Colorado and New Mexico, we have an active Rural Water Program, that I know you all have a great interest in. We have a Water Reuse Program, funding additional water reuse. We have Indian programs to develop facilities to deliver water to Indian tribes. And that component of our program is also approximately $150 million.

So, that in a very broad framework is the crux of the Reclamation program, and what our 2009 budget represents.

Quickly, I would like to touch on Water for America, a new initiative. An initiative that I am very excited about, I think it's going to help Reclamation continue to be a key player in dealing with some of the critical water supply issues that we're facing in the Western United States. Chronic drought, changing climate, rapid population growth, and increased environmental and energy needs has created water conflicts leading to growing interstate and intrastate competition for water resources.

In fiscal year 2009 Reclamation will partner with the U.S. Geological Survey to implement a Water for America initiative aimed at addressing 21st century water challenges. The 2009 budget request for Water for America is $31.9 million. Of this, $19 million appears as the Water for America line item in our budget. The remaining $12.9 million is included in specific projects for enhanced endangered species recovery activities, which is about $8.9 million, and investigation programs, which is about $4 million.

The goal of the Water for America initiative is to address the impending confluence of three factors, threatening to overwhelm our current ability to provide water to the arid West—increased water demands, aging infrastructure and decreased, or altered, availability of water supplies.

Reclamation's part in Water for America will focus on two strategies. First, Reclamation will conduct several comprehensive basin-wide water supply and demand studies, in conjunction with willing partners in areas where high levels of anticipated water and supply/demand imbalances exist.

Each study will include three main elements, state of the art projections of future water supply and demand for the river basin, analysis of the basin's existing water and power infrastructure performance in face of changing water realities, and finally, recommendations for adaptation and optimizing current operations and activities; or by changing or supplementing existing infrastructure and operations and adopting new technologies. These activities

will be carried out in concert with Reclamation's existing planning programs.

PREPARED STATEMENT

Second, we will look at expanding, protecting and conserving our Nation's water resources through a broad-based Challenge Grant Program, building on the existing Water 2025 Challenge Grant Program that we've had over the last 4 or 5 years. Our intent is to broaden that program to include Challenge Grants that would advance water technology, water treatment technology, and support proactive efforts to address endangered species problems, as well as the traditional grants to encourage water conservation in areas where there is potential conflict in water resource use.

Thank you, Mr. Chairman, that concludes my oral remarks.

[The statement follows:]

PREPARED STATEMENT OF ROBERT W. JOHNSON

Thank you, Mr. Chairman, Senator Domenici and members of the subcommittee, for the opportunity to appear before you in support of the President's fiscal year 2009 budget request for the Bureau of Reclamation. With me today is Robert W. Wolf, Director of Program and Budget. Additionally, we have Reed Murray, Program Manager for the Central Utah Project Completion Act should you have any questions on that program.

I appreciate the time and consideration this subcommittee gives to reviewing and understanding Reclamation's budget and its support for the program. Reclamation works hard to prioritize and define our program in a manner that serves the best interest of the public and those who rely on Reclamation for their water and power.

Our fiscal year 2009 request has been designed to support Reclamation's core activities to deliver water and generate hydropower, consistent with applicable State and Federal law, in an environmentally responsible and cost-efficient manner while meeting the President's goal of balancing the budget by 2012.

The proposed funding will allocate funds to projects and programs based on objective and performance-based criteria to most effectively implement Reclamation's programs and its management responsibilities for the water and power infrastructure in the West. The President's budget request emphasizes the following principle: enhancing management of our water infrastructure and programs in the West by eliminating program redundancies, leveraging partnerships with our western stakeholders and maximizing opportunities for competitive processes.

The fiscal year 2009 request for Reclamation totals $919.3 million in gross budget authority. This takes into consideration the effects of the proposed legislation for fiscal year 2009 that will redirect $7.5 million for Friant surcharges from the Central Valley Project Restoration Fund to the San Joaquin River Restoration Fund. The request also is partially offset by discretionary receipts in the Central Valley Project Restoration Fund of $48.3 million.

WATER AND RELATED RESOURCES

The fiscal year 2009 request for Water and Related Resources is $779.3 million. The request for Water and Related Resources includes a total of $383.0 million for water and energy, land, and fish and wildlife resource management activities (which provides for construction and management of Reclamation lands, and actions to address the impacts of Reclamation projects on fish and wildlife). The request also includes $396.3 million for facility operations, maintenance, and rehabilitation activities which is used to ensure sound and safe ongoing operations.

Adequate funding for facility operations, maintenance, and rehabilitation continues to be one of Reclamation's highest priorities. Reclamation continues to work closely with water users and other stakeholders to ensure that available funds are used effectively. These funds are used to allow the timely and effective delivery of project benefits; ensure the reliability and operational readiness of Reclamation's dams, reservoirs, power plants, and distribution systems; and identify, plan, and implement dam safety corrective actions and site security improvements.

Highlights of the Fiscal Year 2009 Request for Water and Related Resources

I would like to share with the committee several highlights of the Reclamation budget, including one of the most significant and exciting elements of our 2009 request, the Water for America Initiative. In fiscal year 2009, Reclamation will partner with the U.S. Geological Survey to implement the Water for America initiative aimed at addressing 21st century water challenges and ensuring secure water supplies for future generations.

Water for America ($31.9 million).—Of this amount, $19.0 million appears as the Water for America Initiative line item. While the remaining $12.9 million is funded in specific projects for enhanced endangered species recovery activities ($8.9 million) and displayed as individual investigation programs ($4.0 million) in the budget request, collectively the $31.9 million supports the cohesive Water for America initiative. Reclamation's efforts focus on two of the Initiative's three strategies: Plan for Our Nation's Water Future; and Expand, Protect, and Conserve Our Nation's Water Resources. The third component, Enhance our Nation's Water Knowledge is funded with the USGS.

As part of the Plan for Our Nation's Water Future component of the Initiative, Reclamation will incorporate the existing investigations programs with a new basinwide studies program, thus initiating comprehensive water supply and demand studies to assess the impact of increased water demands on finite water sources. The Expand, Protect, and Conserve Our Nation's Water Resources component merges the most successful elements of two existing water conservation programs, Water 2025 and the Water Conservation Field Services Program. Competitive grants will be awarded based upon West-wide criteria to address emerging challenges and prevent future conflicts.

—*Plan for Our Nation's Water Future ($8.0 million).*—In planning for our Nation's water future, Reclamation will conduct comprehensive water supply and demand studies. The studies, to be done in conjunction with willing partners, will occur in areas where high levels of anticipated water supply/demand imbalances exist. Each study will include three main elements: state-of-the-art projections of future supply and demand by river basin; analyses of how the basin's existing water and power infrastructure will perform in the face of changing water realities; and recommendations for satisfying future water needs through adapting and optimizing current operations and activities, or by changing or supplementing existing infrastructure and operations and adopting new technologies. Additionally, Reclamation's investigation programs will complement the comprehensive basin studies and will place an additional emphasis on resolving 21st century challenges.

—*Expand, Protect, and Conserve Our Nation's Water Resources ($23.9 million).*—The Expand, Protect, and Conserve Our Nation's Water Resources effort will use a broad-based challenge grant program (building upon and recasting the existing Water 2025 Challenge Grant program and the Water Conservation Field Services Program) to accelerate the implementation of cost-effective actions that will conserve water by improving efficiency; recycle and desalt water to create new supplies; and support proactive efforts to avoid the decline of sensitive species.

Another component of this strategy is accelerating endangered species activities in order to maintain and improve existing resident populations and/or localized critical habitat for various species impacted by Reclamation projects, thereby safeguarding the water supplies associated with these projects. Activities will include acquiring land for habitat development and improvement projects, recovery activities for listed species, improvements to stream flow, removal of barriers to spawning grounds, restoration of critical habitat and other related actions.

Other significant programs and highlights include:

Klamath Project in Oregon and California ($25.0 million).—The fiscal year 2009 President's budget request will continue funding for Reclamation to collaborate with other Federal and State agencies, tribes and the public to develop a basin-wide recovery plan that addresses water supply, water quality, fish habitat, and fish populations.

Lower Colorado River Operations Program in California, Arizona and Nevada ($16.4 million).—The fiscal year 2009 President's budget request will provide funds for the work necessary to carry out the Secretary's responsibilities as water master of the lower Colorado River. The fiscal year 2009 request funds measures under the multi-species conservation program to provide long-term Endangered Species Act compliance for lower Colorado River operations for both Federal and non-Federal purposes.

Middle Rio Grande in New Mexico ($22.7 million).—The fiscal year 2009 President's budget request will continue funding for endangered species activities and

Reclamation's participation in the Middle Rio Grande Endangered Species Act Collaborative Program as well as repair of priority river maintenance sites.

Animas-La Plata in Colorado and New Mexico ($50.0 million).—The fiscal year 2009 President's budget request will continue construction of the project's major features, Ridges Basin Dam and Durango Pumping Plant and the Ridges Basin Inlet Conduit. It will allow for initiation of testing on the Durango Pumping Plant and Ridges Basin Inlet Conduit, thereby enabling the initial filling of Lake Nighthorse. With this level of funding Reclamation will start constructing components of the Navajo Nation Municipal Pipeline. In addition to construction funding, this request includes funding for continued operation and maintenance of improvements for wetland and wildlife mitigation lands associated with the project.

Savage Rapids in Oregon ($3.0 million).—The fiscal year 2009 President's budget request will provide funds for continuing construction of the pumping facilities. Removal of this irrigation diversion dam and the installation of pumping facilities will allow the local farming community to continue irrigated agriculture and remove a migration barrier for the threatened Southern Oregon and Northern California coho salmon.

Columbia/Snake River Salmon Recovery in Idaho, Oregon, Montana, and Washington ($18.0 million).—The fiscal year 2009 President's budget request will address the requirements in the biological opinions issues in December 2000 by the U.S. Fish and Wildlife Service and in November 2004 by the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries). The 2004 biological opinion has been remanded to NOAA Fisheries and a new biological opinion is due in May 2008. During the remand, the 2004 biological opinion remains in place as Reclamation continues to implement actions identified in the 2004 updated proposed action.

Platte River Endangered Species Recovery Program ($11.5 million).—The President's fiscal year 2009 budget request for the Platte River Recovery Implementation Program is $11.5 million. The agreement for the program was signed by Secretary Kempthorne and the Governors of Nebraska, Colorado and Wyoming in late 2006. Platte River habitat is essential to the recovery of the whooping crane, interior least tern, piping plover, and pallid sturgeon (all threatened or endangered species). Legislation was introduced in the 110th Congress to authorize the Secretary of the Interior, through the Bureau of Reclamation, and in partnership with the States of Wyoming, Nebraska, and Colorado, other Federal agencies, and other non-Federal entities to participate in the implementation the Platte River Recovery Implementation Program for Endangered Species in the central and lower Platte River Basin and to modify the Pathfinder Dam and Reservoir.

Site Security ($29.0 million).—The President's 2009 budget request for site security helps to ensure the safety and security of the public, Reclamation's employees and key facilities. The funds will support ongoing security activities, including physical security, personnel security, information security, law enforcement and research activities to maintain an effective and reliable security program and allow Reclamation to conduct security-related studies and reviews. The request also includes appropriated funds for guards, patrols, and law enforcement, including coordination, execution, and maintenance of law enforcement agreements with agencies outside Reclamation. In fiscal year 2008, 2009, and in future years, Reclamation plans to collect all reimbursable costs, including guards and patrols, as well as operation and maintenance of facility fortifications. Reclamation will continue to treat facility fortification, studies, and anti-terrorism management-related expenditures as non-reimbursable.

Safety of Dams ($91.3 million).—The President's budget allows Reclamation to ensure that safety and reliability of Reclamation dams is one of the Bureau's highest priorities. The Dam Safety Program is critical to effectively manage risks to the downstream public, property, project, and natural resources. Of the budget request of $91.3 million, $71.5 million is for modifications at several facilities including Folsom Dam.

Rural Water Program Development ($1.0 million).—The fiscal year 2009 President's budget request of $1.0 million will allow Reclamation to begin implementation of the program on a pilot basis. Reclamation is currently working on meeting the requirements of title I of the Rural Water Act in order to implement the program. First, Reclamation is undertaking a rulemaking process, to develop programmatic criteria. Second, as required by the Act, Reclamation will complete an assessment of the status of authorized rural water supply projects and of other Federal programs that address rural water supply issues. This study will enable Federal agencies to maximize coordination in order to promote efficiency in those Federal activities targeting rural water supply needs in the West.

Science and Technology (S&T) ($9.0 million).—The fiscal year 2009 President's budget request includes funding for the development of new solutions and tech-

nologies which respond to Reclamation's mission-related needs. Reclamation's S&T work will contribute to the innovative management, development, and protection of water and related resources. This does not include the $2.0 million for the Desalination and Water Purification Research program.

ONGOING RURAL WATER PROJECTS

This request includes $39.0 million for two ongoing authorized rural water projects: The first priority for funding rural water projects is the required operations and maintenance component, which is $15.0 million for 2009. The budget includes $24 million to support the administration's commitment to complete construction of ongoing rural water projects including ongoing municipal, rural and industrial systems for the Pick Sloan-Missouri Basin Program—Garrison Diversion Unit in North Dakota and the Mni Wiconi Project in South Dakota. For the construction component, Reclamation allocated funding based on objective criteria that gave priority to projects nearest to completion and projects that serve tribal needs.

TITLE XVI

The request includes $7.0 million to support ongoing title XVI construction projects, title XVI research activities, and the title XVI feasibility study review process developed in 2007. The title XVI projects develop and supplement urban and irrigation water supplies. Reclamation will continue to place priority on funding projects that: (1) are economically justified and environmentally acceptable in a watershed context; (2) are not eligible for funding under another Federal program; and (3) directly address administration priorities for the Reclamation program such as providing instream flows for Federally endangered or threatened species, meeting the needs of Native American communities, and meeting international commitments.

POLICY AND ADMINISTRATION

The $59.4 million request in fiscal year 2009 funds the development, evaluation, and implementation of Reclamation-wide policy, rules, and regulations, including actions under the Government Performance and Results Act, and implement the President's Management Agenda. These funds are also used for management and performance functions that are not chargeable to specific projects and required for ongoing Commissioner's activities.

CENTRAL VALLEY PROJECT RESTORATION FUND

This fund was established by the Central Valley Project Improvement Act, title XXXIV of Public Law 102–575, October 30, 1992. The request of $48.6 million is expected to be offset by discretionary receipts totaling $48.3 million, which is the maximum amount that can be collected from project beneficiaries under provisions of section 3407(d) of the act. The discretionary receipts are adjusted on an annual basis to maintain payments totaling $30.0 million (October 1992 price levels) on a 3 year rolling average basis.

The CVPRF request is a net of $48.6 million. This includes a redirection of $7.5 million collected from the Central Valley Project Friant Division water users to the new San Joaquin River Restoration Fund for fiscal year 2009. Previously, these funds went into the CVPRF as outlined in the Reclamation Projects Authorization and Adjustments Act of 1992, title XXXIV of Public Law 102–575, section 3406(c)(1). Under the Settlement, the legislation proposes to redirect approximately $17.3 million per year of payments from the Central Valley Project, Friant Division water users into the Fund which would be available without further appropriations to implement the provisions of the settlement. These funds will be used for habitat restoration, improvement and acquisition, and other fish and wildlife restoration activities in the Central Valley Project area of California.

SAN JOAQUIN RIVER RESTORATION FUND PROPOSED LEGISLATION

Funding in fiscal year 2009 will be used to continue planning, engineering, environmental compliance, fisheries management, water operations, and public involvement activities related to the Restoration and Water Management goals in the settlement. The administration will again support passage of authorizing legislation, the San Joaquin River Restoration Settlement Act, which includes a provision to establish the San Joaquin River Restoration Fund.

CALIFORNIA BAY-DELTA RESTORATION FUND (CALFED)

Title I of Public Law 108–361, titled the Calfed Bay-Delta Authorization Act, was signed by the President on October 25, 2004. The act authorized $389 million in Federal appropriations over the period of fiscal year 2005 through fiscal year 2010. For fiscal year 2009, $32.0 million is requested to enable Reclamation to continue to advance its commitments under the CALFED Record of Decision and with a focus toward implementation of priority activities included in the Calfed Bay-Delta Authorization Act that will contribute to resolving water resource conflicts in the CALFED solution area. Funds will specifically be used for the environmental water account, feasibility studies of projects to increase surface storage and improve water conveyance in the Delta, conduct critical science activities, implementation of projects to improve Delta water quality, ecosystem enhancements, and program planning and management activities.

FISCAL YEAR 2009 PLANNED ACTIVITIES

Reclamation's fiscal year 2009 priority goals are directly related to fulfilling contractual requests to deliver water and power, while balancing a range of competing water demands. Reclamation will continue to deliver water consistent with applicable State and Federal law, in an environmentally responsible and cost-efficient manner. Reclamation will deliver 28 million acre-feet of water to meet contractual obligations while addressing other resource needs (for example, fish and wildlife habitat, environmental enhancement, recreation, and Native American trust responsibilities).

Reclamation will maintain dams and associated facilities in good condition to ensure the reliable delivery of water. Reclamation will continue to meet or beat the industry forced outage average to ensure reliable delivery of power. Reclamation will reduce salinity by preventing an additional 13,500 tons of salt from entering the water ways.

Moreover, the fiscal year 2009 budget request demonstrates Reclamation's commitment in meeting the water and power needs of the West in a fiscally responsible manner. This budget continues Reclamation's emphasis on managing those valuable public resources. Reclamation is committed to working with its customers, States, tribes, and other stakeholders to find ways to balance and provide for the mix of water resource needs in 2009 and beyond.

MANAGING FOR EXCELLENCE

Reclamation continues to make significant advancements in its quest for management excellence. Reclamation's Managing for Excellence Action Plan reflects specific actions to realize the underlying principles of the President's Management Agenda. The National Academy of Sciences, at Reclamation's request, completed and published its study in 2006 to assist Reclamation in determining the appropriate organizational, management, and resource configurations to meet its construction and related infrastructure management responsibilities associated with fulfilling its core mission of delivering water and power for the 21st century.

The Managing for Excellence action plan, developed in response to the Academy's report, outlines a process and timeframe for identifying and addressing the specific actions that can be taken to increase transparency, efficiency, and accountability within Reclamation. To date, Reclamation has completed 38 out of 41 activities. The balance will be completed by the end of February 2008.

CONCLUSION

Mr. Chairman, please allow me to express my sincere appreciation for the continued support that this subcommittee has provided Reclamation. This completes my statement. I would be happy to answer any questions that you may have at this time.

Senator DORGAN. Commissioner Johnson, thank you very much.

I have a number of questions, but I want to start. I mentioned in the statement as I introduced you all that I was looking at the Special Inspector General for Iraq Reconstruction report and he was reporting on the number of water projects that we're doing in Iraq. He noted that we're paying for 967 water projects we're finding in Iraq including a water treatment plant in Sadr City, water treatment plant al-Wathba, water treatment plant Shark Dijla,

water treatment plant al-Wahda, design/construct Euphrates Main Water Supply Project, Baldaruse Water Supply Project, Phase II Water Supply Project, Meshkab, and I could go on and on. And then you come before our committee on behalf of a budget that says, "By the way, let's cut funding for water projects in the United States by $1 billion."

And I know you prepared a budget. And you probably won't tell us what you prepared, because the way our game is played, you have to send it up and it goes through the Office of Management and Budget strainer, then over to the White House. If you would come here and tell us that you didn't get as much as you think you need, you'll lose your job. So, that's the way this dance occurs yearly.

We don't blame you for it, but I think it's very hard for you to come and support a proposition that we should spend $1 billion less on water investment projects in this country in the coming year than we did last year.

And frankly, I think it's very hard to make the case that we can do hundreds and hundreds of water projects funded by the United States in Iraq, but we can't afford water projects that are needed here. And so, we do. We paid for those. That's a Special Inspector General report of all of the funding that we're doing in Iraq.

Let me ask the Bureau of Reclamation, since we're in the ninth year of a drought in western and central North Dakota, do you have predictions for what might happen in the future in our area?

Mr. JOHNSON. That's part of our Water for America initiative. We are going to be looking at a number of basins West-wide, and we haven't specifically identified those basins yet. We're going to be going through a public process to identify them.

Certainly we're aware of what's going on in the Great Plains Region, and there certainly has been—over the last 8 or 9 years—significant drought that's occurred up there. We're aware of the reservoirs decline. In fact, I'm sure the Corps is probably more aware of it than us, since it's their reservoirs that have declined the most, but yes, we're very aware of that, Senator.

Senator DORGAN. Let me ask a question about the Law of Armed Conflict Rural Water Project. That's been funded for the previous 4 years, even in 2007 when the administration prepared a spending plan under the continuing resolution, and yet you send us a request that says we shouldn't fund that project this year. Tell me how you came to that conclusion?

Mr. JOHNSON. I think what it comes down to is the balancing of the priorities within the President's budget and also meeting the goal of achieving a balanced budget by 2012.

Senator DORGAN. But that's not responsive. My question is about this project. We've funded it 4 years, and so has the President's budget, and all of a sudden you say, "Don't continue."?

Mr. JOHNSON. Within the Rural Water Program, for the funds that we had, we used two primary criteria to fund the projects that we did. One, we tried to focus on projects that served Indian tribes, and two, we tried to focus on those projects that were farthest along, where we could put money and make the most progress. And that was the primary criteria that we used to come up with the funding that we've presented in our budget.

Senator DORGAN. Okay. Again, you've got a tough job, and that's an artful answer, but you have a tough job.

General, the President's proposed a $5.7, $5.8 billion in emergency Federal funding to be matched by $1.5 billion in local funding to complete the Hurricane Protection System. The President said that he committed that he was going to finish that in time for the 2011 hurricane season.

Now, the funding was proposed as a part of the regular 2009 Appropriations bill, rather than the supplemental, which means this will be done later than the supplemental. My understanding is these funds are needed by October 1, or the construction schedule can't be maintained, number one. And number two, my understanding is that it may well be the case that there's not $1.5 billion locally to meet the local share on this. Tell me about that?

General VAN ANTWERP. First, a good portion of that money needs to be available on October 1, to award some of the contracts. So, that is an emergency, but not under a supplemental. So, we have to deal with that. And a day slipped will be a day slipped in the project, and the 2011 date will be in jeopardy if that funding isn't available on October 1.

Senator DORGAN. But why would it not have been requested in a supplemental? Last year, we had veto threats against, I think, 10 appropriations bills, and so the result was what they wanted. The appropriations bills weren't done in October, but rather much later. And that may be the case this year. If that's the case, what happens, these—you can't meet these construction schedules? Is that what's going to happen?

General VAN ANTWERP. Ultimately, if the funding isn't there, there will be slippage in the construction schedules, that's true.

I think the second part of your question, very quickly, is in the cost-sharing—is that there is a provision where we can allow the sponsor to have additional time, up to a year, but we are counting on the sponsor coming up with their portion of this, and that's being worked very hard right now.

Senator DORGAN. But WRDA 86 allows the non-Federal share to be repaid over 30 years, which would probably have been a less risky proposition for you to recommend.

I have a good number of questions about the Missouri River, and also Devil's Lake, and I want to defer those to allow my colleagues to ask questions.

Senator Domenici.

Senator DOMENICI. Is it still a lake?

Senator DORGAN. It's still flooding.

Well, the fact is, it's overflowed, and it's now filled a second lake next to it, so there's no additional capacity left, I mean we've got real problems.

Senator DOMENICI. Well, I've worked on it a couple of times, maybe this will be—do something this year might be my last time.

In any event, let me say I'm willing to help.

Let me put—Corps of Engineers Secretary Woodley, and your testimony before the subcommittee told us that there's a looming problem on the Inland Waterway Trust Fund, that needed to be addressed. However, we never received a proposal to mitigate the pending disaster.

The President in 2009 budget proposal announced that legislation would be forthcoming. Finally, last week, the administration proposal was submitted to Congress, is that correct?

Mr. WOODLEY. That is correct.

Senator DOMENICI. And why did it take a year to prepare the legislation, and preparing it—this brand-new policy, which is indeed that, brand-new, and going to be very difficult to get through here—did you consult with relevant authorizing and appropriations committees? Or was that not you job?

Mr. WOODLEY. Yes, sir, we consulted very heavily with a very wide variety of people in the community, throughout the administration and received views from a very large cross-section of the people that were affected by it. I don't know that we would be entitled to receive formal views from the committee, but——

Senator DOMENICI. I don't think you submitted it to us, but that's—that's all right.

This legislation, from what I can tell, will be tough to get enacted in any year, much less this year. It took me several years before I was able to finally get the legislation establishing the Inland Water Trust Fund, I don't think you were here then, when that happened.

Mr. WOODLEY. Very likely not, Senator.

Senator DOMENICI. You probably still had hair on your head when that occurred.

Mr. WOODLEY. Very likely so, Senator.

Senator DOMENICI. A long time ago. And now you want us to complete this change—fundamental mechanism change in the next 6 months, I really don't think that's going to happen, and nonetheless I look with interest on your proposal and look to learn about it, as much as I can, Senator.

Secretary Woodley, in your press release, you state that the budget represents the prudent use of available funding to advance important mission objectives. Unfortunately, this budget is implemented—if it is—the Corps will be forced to stop construction on 75 percent construction projects. Is it prudent to provide no funding for projects that have been under construction for a year, 2 years, or, in fact, years? What are we supposed to tell the project's sponsors that are sharing the costs of these projects? How much do you estimate the Corps will pay in termination fees, if any? Could you just talk to me about this problem that we're going to have?

Mr. WOODLEY. Yes sir, our effort has been to concentrate the very limited funding that we have on the projects that have the greatest potential for return. And as I say, there is no question that this budget does not provide all of the resources for all of the good things that the Corps of Engineers could accomplish in fiscal year 2009. I do not represent that it does, and I will not represent that it does. We leave a lot of good work on the table.

Senator DOMENICI. Secretary Woodley, could you, Secretary, only explain the President's Executive order on earmarks, and based on what you know, how do you believe it will be implemented?

Either of you?

Mr. WOODLEY. Secretary, our view that we have taken is that it is something that leaves a lot of questions unanswered, and that will have to be answered in the course of implementation. And I

certainly hope that we're able to work with the Office of Management and Budget and the Appropriations Committees to come to a clear understanding of exactly how it's to be implemented.

Senator DOMENICI. Okay, well, I don't need anything further. What you're really saying is that it leaves much to be desired, and a lot of—there are a lot of questions about the earmark policy, how it would be done. And there's some holes in it that have to be filled, and the like, is that right?

Mr. WOODLEY. Well, certainly as an Executive order, it is a expression of the policy of the executive branch and we will be implementing it as we understand it, fully and rightly. And we support it in every way.

Shall I say that again?

Senator DOMENICI. No, that's fine.

Mr. WOODLEY. Thank you.

Senator DOMENICI. Let me talk to the Commissioner a minute?

In your quest for more water projects, and water activities, water action—I didn't hear you mention de-sal, or water purification. Are those included in your process as you think of getting involved more, and more effectively in water needs?

Mr. JOHNSON. Yes, they are. We have—as part of our research program—have included research activities for water desalinization, and water technology development. In fact, we have O&M dollars for the Tularosa Plant that you referenced earlier. Our research facility there. And we do have some research dollars, as well, to help fund initial research activities at that facility.

Senator DOMENICI. Well, I just want to say, you know, desalinization and water clean up technology is just on the cutting edge, I mean, we're just close to making some giant breakthroughs. And in States like mine which are very dry, we have huge amounts of inland water, and then water that's salty, that we could use, and which has changed the future of our State.

And I hope you will continue to emphasize it, and not be concerned to make it something that you will be out front in, because you can do that.

My last comments and observations go to you, General.

The Corps has been doing an outstanding job for the last 10 years on the Rio Grande River basin, with reference to the huge greenbelt that exists because of cottonwood trees. We have just about changed that area to something absolutely beautiful from an area that was fragile, frail, burned down anytime—two or three times a year, the big, big fires. It's going to be used by the people, and there are marshes in it for ducks and geese and other kinds of activities, and now a park is going to be constructed right in the middle of that basin, centering in Albuquerque. That's been authorized by Congress, and I understand the Corps intends to show that you know how to do a real water-land park with green trees in it, in an arid State. And I hope you will be there when we dedicate the project, because I think it's going to be a real credit to the Corps, what is going to be there, in this park, in Albuquerque, New Mexico.

Senator DOMENICI. Thank you, Mr. Chairman.

Senator DORGAN. Senator Johnson.

Senator JOHNSON. Commissioner Johnson, it occurs to me that we Johnsons ought to stick together. In your testimony, we're getting the budget for BOR water projects, you indicate that the Bureau prioritized funding for operation and maintenance costs, and then construction funding for ongoing rural water systems nearest to completion, to serve populations.

Using those criteria, the Bureau provided no funding for several other ongoing regional water system projects. In making this decision, did the Bureau examine the fact on how delaying funding for these projects will add to the total cost to complete? Do you agree that deferring construction on ongoing drinking water projects will contribute to an even greater future funding crisis at the Bureau?

Mr. JOHNSON. Senator, certainly to the extent that we're not funding projects, they do continue to have cost increases, there's just no denying that. That's a very correct observation.

Senator JOHNSON. My second question is about the effect on the specific projects and the view of some in the Congress that the Senators and House Members should have no ability to direct funds to specific initiatives.

Commissioner Johnson, is there any other Federal agency that is funding the Lewis and Clark Regional Water System?

Mr. JOHNSON. Not that I'm aware of, sir.

Senator JOHNSON. Since the Bureau is proposing no Federal funding for the Lewis and Clark Regional Water System in fiscal year 2009, the only way for this project to receive Federal funding next fiscal year, is for the Congress to appropriate funding, is that correct?

Mr. JOHNSON. The—you're getting back to the question on earmarks, I suppose.

Senator JOHNSON. Yes.

Mr. JOHNSON. And, you know, I think that that's—there's a lot of detail in that that has to be worked out, certainly Reclamation will follow the Executive order, as I'm sure the Corps will, but there's a lot of details there that are yet to be defined. And we'll certainly be working to—with the Department and with OMB, you know, on the Reclamation program and where that has an effect, and where it doesn't.

Senator JOHNSON. Mr. Chairman, I will submit my additional questions to the Corps of Engineers and the BOR for a written response.

Thank you.

Senator DORGAN. Senator Johnson, thank you very much.

Senator Craig.

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

I guess there's another way of—another perspective of looking at earmarks. Now that we have heard your earmarks, isn't that a reality? Have we not heard the priorities of the agencies of the executive, and therefore heard the President's earmarks? But, how dare we even consider those, or think of them in that context?

I'm just—I guess I get a little constitutional when I think of who has the priorities and the responsibilities of budgeting under the Constitution, and not under the statute. And if that were the case, then I think what I just said, Mr. Chairman, would be constitutionally accurate—we have now heard the President's earmarks.

Having said that, though, let me turn to you, Secretary Woodley, and thank you for at least a few earmarks that you have established, and one of those that I think is something, Mr. Chairman, we've got to take a very close look at. This happens to be specific to the Pacific Northwest, and to the Columbia Snake River Transportation System, and I'm speaking now to, of course, the dredging of the Lower Columbia River, and the budget you've put there, That certainly helps us get to the near completion of that project, which is critical to all locks and barge systems up river. Why does the Senator from Idaho focus on that? Because the last sea port in that system is in the State of Idaho.

And, Mr. Chairman, something that I think we will increasingly focus on as it relates to the responsibility of the Army Corps of Engineers and Secretary Woodley in days to come will be the value of water transportation as surface road transportation goes up dramatically and costs of fuel, and the ability to move large, heavy loads through the system.

Now, our canal and water systems in the United States are becoming increasingly important by the day, as we see fuel costs go up to $4 plus for diesel, $1,100 to fuel a big 18-wheeler truck, versus the ability of our barge and waterway systems to move a large freight.

So, therefore, completing the dredging below Portland and the Lower Columbia is critical to the whole of the system.

Let me also commend you for your response to the incident at the John Day navigation locks. That was very important, too, General, as we—and you moved promptly and timely in doing that.

Now, interestingly enough, I was there when Animas La Plata was simply an idea in the eye of a Congressman from that district, and few interested groups. Ray Kagosic was the Congressman at that time, and I was a freshman on the Interior Committee in the House—28 years ago, Commissioner. Does it take a long time to do anything around here? It sure does. But I understand we're about ready to cut the ribbon on Animas La Plata.

So, I guess my advice to you, Mr. Chairman, is with Devil's Lake—just simply hang in there. It takes a long time to get these things done, even if we define them as an emergency.

But, let me also say—and this is simply not a request for resource, because I think while I don't agree with all of your earmarks this year, I think they are priorities that represent a lot of our needs.

In the northern tier, especially north Idaho, in a time of global warming, has received an unprecedented amount of snowfall this year. In fact, we now have historic record levels of snow on the ground, in the panhandle and the areas of north Idaho, and parts of Montana, eastern Washington and others. And we're hoping above hope that it leaves us slowly, and gradually, this spring.

But if it doesn't, I'm quite confident the Army Corps of Engineers will be there. This is simply a head's up—watch closely as our record snow falls melt into the system. I believe the Snake Columbia system is at a near 30 year high in potential runoff, so—it is difficult to talk drought or to talk climate change in this particular environment. All I am saying to you, General, and certainly to you,

Secretary, is—stay ready. Depending on how this valuable moisture leaves us.

Thank you, Mr. Chairman.

Senator DORGAN. Senator Reed.

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

And again, gentlemen, thank you for joining us.

Secretary Woodley, the Fox Point Hurricane Barrier became the responsibility of the Corps of Engineers in October 2008, and the Woonsocket Levy project will become the Corps responsibility in January 2009. How do you propose to meet those obligations under the law?

Mr. WOODLEY. Authorization has been provided, Senator, so far we have not been able to identify the funding within our system to undertake that, but I can assure you, we are very much aware of the obligation, and intend to do everything we can to discharge it.

Senator REED. Do you have a timeline where you're going to identify the funds? And do you have a work plan at least, even though the funds might not be evident or tangible at the moment?

Mr. WOODLEY. Yes, sir. We have estimates as to how much would be called for, and we are actively seeking the ability to do that.

But, you know, it's certainly—when you, when an obligation is established or authorization is established, it is something that we would like to have the opportunity to budget for or program for, anyway, before it takes place. But in this case, we're just going to have to manage it as best we can.

Senator REED. Well, I appreciate that, Mr. Secretary, and I just want to make it clear, again, I think you understand this, that this is something I feel is very, very important, that it has to be done, and I obviously will work with you and General Van Antwerp and your colleagues, but I will return again, and again, to make sure that this is successfully completed. And I—anything you think we could do, let us know. But I expect it to get done.

Mr. WOODLEY. Yes, sir. We understand very well your views on the matter.

Senator REED. Thank you.

Thank you, Mr. Chairman.

Senator DORGAN. General and Mr. Secretary, coming back to Devil's Lake, it's easy for us to wait, but it's not easy for the lake to wait. This is one of, I think, only a couple of examples in America where there is lake flooding, which is different than river flooding.

River flooding comes and goes, it courses down, takes cars and homes with it, and then all of a sudden a couple of days later, everything looks calm.

This lake flooding is in a closed basin, like the Great Salt Lake, the Devil's Lake basin has an upper area that's close to the size of the State of Massachusetts, and it all funnels down into this area at the bottom called Devil's Lake. And it's up 25 feet and stays up, and it's now been running off into Stump Lake. Stump Lake is up 15 feet in the last 2 years, because there's no place else for it to run, and it appears to me that the USGS says there's a 70 percent chance that the wet cycle will continue for at least an-

other decade, and a 40 percent chance the wet cycle there will continue for another three decades.

So, in terms of protect not only the community of Devil's Lake, but the roads and the infrastructure in that region, the Corps has to be involved now in planning an increase in the levees and dikes and a range of other things. Can you tell me, is the Corps actively involved in this area, General?

General VAN ANTWERP. Yes, sir, we definitely are. By the way, the lake elevation is 1,447 feet this morning. In these two lakes, as you're well aware, they do operate together, and we're considering in the reevaluation, how do they work together and what do we have to do for the levees that are supporting this?

So, we are very much on top of this, we are very much interested in getting this fixed now, with the predictions for the next decade.

Senator DORGAN. The reason I'm sensitive to the fact that you may not find the local sheriff $1.5 billion down in the gulf, is the local share that will be required for Devil's Lake for a levee increase. Those folks don't have the money, and they've been fighting a lake flood that came and stayed now for many, many years. So, we—let me say this about the Corps.

I admire the Corps in the way it fights floods. I mean, I've watched the Corps stand on the dikes of the Red River, and saw the dikes breach, and saw an entire town of 50,000 people evacuated—I admire what the Corps does to fight floods, you do a good job.

I really have great problems with what the Corps does to manage the Missouri River, so that's a different subject. In Devil's Lake and our region, we really need your help, we need you to be way out in front of what we need done here in terms of policy choices, and we need to protect people and property and try to manage a very difficult flood. Lake flooding is not something you're accustomed to, and our laws don't even comport to lake flooding. Most of the way we write laws have to do with river flooding.

But with respect to the river, I might say, the management of the Missouri River is a continuing serious problem. You're continuing to remove water from the upper main stem dams in the Missouri River, North Dakota, South Dakota, Montana, and so on, in order to support a barge industry which apparently was intended to be a whale, but has now become a minnow.

There are times when there's one barge, one barge on the Lower Missouri River, and for that one barge, you are releasing water, instead of storing it in the upper reservoirs. That's not in anybody's interest. That's not in Senator Bond's interest, because he should want that water stored so that, at some point whether it's the lower Missouri, or especially the substantial amount of barging on the Mississippi, that we would save that water to be using it when they need it.

You know, it's of interest to me that when there's too much water down south, then they want some help with those of us up north, but otherwise, they want to manage the river for their one barge.

Does it seem strange to you that you're releasing water, a pretty substantial amount of water to float one barge? And the reason I mention one barge, I can show you the reports, the weekly reports, in which there's one barge floating in the lower Missouri, and we

have scarce water in the upper reservoirs and you're releasing water to float this little cork down there someplace, I mean, does that bother you? Tell me yes.

Mr. WOODLEY. Yes, Senator, that is very troubling. The original project, of course, was authorized many years ago, with navigation as an authorized project purpose. I believe that the people that are served by the navigation channel see a value in continuing that navigation support, and I think that we have made some substantial improvements in the management scheme when we implemented the new Master Manual in 2004, but certainly at times of—particularly in times of drought—that is a very difficult balancing that has to take place.

Senator DORGAN. My point is that now that river system would now have about 54 million acre feet in it, instead of that, it's roughly a 34 million, 35 million acre feet. And yet it still doesn't trigger drought emergency measures. And so, we're moving water out of these upstream reservoirs in which we should store it, to float one barge.

And so, if the market system were such that the barges were determined to be very valuable, you'd think you'd have barge traffic down there. But that's not the case, there's not any significant barge traffic. A fair amount of what's going on down there, to the extent that there's any barging at all, is sand and gravel, and I intend to hold a hearing of this subcommittee, just on this issue, and it will be held a little later this year, as soon as we're through the appropriations process.

But we're going to explore this in great, great depth. That's why, General Antwerp, I'm so pleased that you've joined us, and you and Secretary Woodley are going to be witnesses at that hearing, because we need to talk through this and fix it. The upstream industry that has developed is 10 times the barge industry—10 times. And yet, we are managing the river for the minnow, and ignoring the whale. It makes no sense to me at all, I've been at this for about 10 years, and I haven't been able to really get any satisfaction—well, once in a great while somebody throws us a small bone, but the management of that river is, in my judgment, not competent, and not at all with any kind of reservoir of common sense.

So, we're going to have a hearing, I will ask you back for that hearing, but I did want to raise it today, because it really bothers those of us—Senator Johnson, myself, and others—who live upstream and know that there's a much different way to manage that for the benefit of all States—the States in the up-river and downriver areas.

I have a large number of questions that—with your indulgence, I'm going to submit to—because we won't have a chance to ask all of them today, but I do want to ask a series of questions and as I call on my colleagues for additional questions—the hearing has just been changed to 11 o'clock—or, excuse me, the votes have just been changed to start at 11 o'clock, so we have a few more minutes.

I want to mention what my colleagues, Senator Domenici and Senator Craig had mentioned on this issue of earmarks. I don't understand and I think it's perhaps unworkable, these suggestions the President has made. I think what he has made, and Senator Craig was suggesting it—what he is saying is, "I'm going to send

my earmarks to Congress, it's what I think we should invest in, in this country, and then if you add anything to it, we're going to consider those special interest, congressional pork, earmarks," or whatever lexicon you might want to use. That is a—that's a curious way to engage with the legislature.

The Congress—certainly the President has priorities, has every right, and we would expect that he would pursue those priorities. He should, as a matter of respect, understand there are priorities in the Congress, as well. And perhaps a merging of the best of which both have to offer, rather than the worst of each, would be in the best public interest of this country.

So, I raise that only because my colleagues did. I think the President's suggestion—especially in this subcommittee, more than perhaps any other, is completely unworkable. Most of what we do represents earmarks by the President, and in many cases by us, and approved by us, and that's the way this committee almost has to work, in terms of choosing what kind of investments in water policy we want to engage in around the country.

Senator Craig.

Senator CRAIG. I do have one additional question and I think Senator Domenici engaged you, Secretary Woodley, briefly as it relates to the proposals for the Inland Water Trust Fund, and what that will mean.

And we might, for just a moment, get some of your insight as to what we could expect. So, I want to set this scenario up. Keeping in mind that a commercial vessel must pass through eight navigation locks from Portland to the Port of Lewiston, it's my understanding that this fee would be imposed on commercial barges using locks operated by the U.S. Army Corps of Engineers, the fee would be phased in, beginning October 1, 2008, with increases each year through 2012, adjusted thereafter based on the total net assets of the Inland Waterway Trust Fund.

It's also my understanding that this Trust Fund is used to pay half of the cost of new capital construction projects and major rehabilitation. None of us dispute the need, certainly, for rehabilitation.

What would this cost? In that scenario of eight locks—how much will it cost, per lock? What would be the net gain in fees collected, using a lock versus a gas tax that is currently used? And how will this affect the Columbia River Navigation System? Can you give us some insight into that proposal?

Mr. WOODLEY. Yes, sir. The net cost would have to be calculated by netting out the elimination or phasing out, over time, of the 20 cent per gallon fuel tax that exists——

Senator CRAIG. Right.

Mr. WOODLEY. That is to be eliminated.

The amount will go, per barge, per lockage, from a $50 charge, to an $80 charge by 2012, and then will, because if I'm not mistaken, all of the locks on their system are 600 feet or larger.

And so——

Senator CRAIG. I think that's right.

Mr. WOODLEY. So, we are making a special provision for the smaller locks so that they would pay at a lower rate.

Senator CRAIG. You say smaller locks, you mean smaller vessels?

Mr. WOODLEY. No, sir, I mean smaller locks in the upper reaches of the system, the less than 600 foot long lock.

Senator CRAIG. Oh, yes.

Mr. WOODLEY. We would charge a smaller fee in order to provide for a more equitable distribution between the large locks and the smaller locks.

The—I would expect that it would—so there's a net I can't figure out, the rest is a pretty straightforward calculation, but essentially we are projecting a need in the Fund of an additional $100 million a year in revenue, from whatever source, that it can come from indefinitely into the future as we continue to make the important improvements that we've made.

We are, to some degree, a victim of our own success here, Senator, we have been able to budget—and the committee has supported—a very strong level of investment in the Inland Waterway System, in both new construction and in rehabilitation efforts. And that has—there was a time some years ago before I took office that the balances in the Inland Waterway Trust Fund had actually been allowed to accumulate, and increase. And we have invested those balances, but the needs for investment have outstripped the revenue that we're receiving from the tax.

So, one thing that was surprising to me, in recent years, in spite of increases in traffic, the tax amounts, of collections, have actually in some—in one fiscal year—declined. And that was a good thing, I guess, because——

Senator DOMENICI. Why is that?

Mr. WOODLEY. I believe that the reason is that the increases in fuel—in the cost of fuel—had encouraged the barge tow boat operators to repower their boats with more efficient diesel engines. Which is, of course, a good thing, unless you're counting on revenue from——

Senator CRAIG. Sure.

Mr. WOODLEY [continuing]. Them buying gallons of diesel fuel.

So, this is certainly not something on which reasonable minds could not differ.

Senator CRAIG. As this develops, we'll take a look at it.

Last question, tied to that—non-commercial traffic, recreational traffic using the locks—?

Mr. WOODLEY. Would not be charged any fee whatsoever, as is the case today.

Senator CRAIG. As the current case.

Senator DOMENICI. They don't pay now.

Senator CRAIG. They don't pay now, no, and that's why I was saying——

Mr. WOODLEY. On the other hand, the general revenue, the general fund pays 50 percent of the cost of rehabilitation, and all of the recreational people are, at least, we expect them to be taxpayers in some form or another.

Senator CRAIG. Uniquely enough, but in the Snake Columbia System, a sizable amount and a growing traffic is in cruise boats, that literally make it all the way up to Lewiston, Idaho, Clarkston, Washington—sizable cruise boats. Are they considered commercial traffic in this sense, that they would pay a fee?

Mr. WOODLEY. No, sir, I believe not. I believe that this is specifically for cargo-carrying barges.

Senator CRAIG. Thank you, Mr. Chairman.

Thank you, Mr. Secretary, General, Secretary.

Senator DORGAN. The Senator from Louisiana?

Senator Domenici, do you have an additional question?

Senator DOMENICI. Yes, Mr. Chairman.

I just wanted to close this up and talk to Secretary Woodley about this inland fee, waterway fee.

You know, that was a—believe it or not, I was a freshman Senator when somehow or another I was challenged to do something about this, and passed a bill to tax the commercial barges. It was totally unexpected that it could be done, but we were aided and abetted by the Washington Post which took on the task of helping to pass this, by choosing the bill that would impose this tax to be their choice of a bill to educate their readers on how a bill is passed, how a law is made. And they logo-ized the bill, S. 789, and anytime anything was done, they put it on the front page, and editorially commented what phase this was of moving a bill.

And of course, they played the Domenici—David against Goliath—and one afternoon we had a vote and we won by 12 votes in the United States Senate against Russell Long, my good friend from Louisiana. That's right.

But let me tell you to close the record, because things are different now. But I won that hearing here and in the House, and then I was home campaigning for reelection, and I was told that somebody was going to open the issue while I was gone campaigning, and kill the tax. And my staff said, "Abandon your campaign and come back," and I said, "No, I can't do that. Can't you talk to somebody around there?"

Well, the word got to Russell Long who had lost, I had beat him, that somebody threatened to do this. And he put in a phone call to me, and said, "Don't you come back,"—he was a Democrat, I was a Republican—"You do your campaigning. I was beaten by you, fair game, and I'll see to it that nobody does that to your bill," himself. And, of course, I felt totally confident that he could do better than I, why should I return?

And sure enough, the person—I know who it was, it was the Senator from the State with the lock that we were then building—and he saw better than to take on Russell Long, and the tax remained. It's been a long time, and I wish you well, in trying to pass a better one. And a better one would be what you're talking about. But don't think it will be easy, because people have to understand what's happening to them, and all kind of stories get told about what's happening to them, you know, until it gets down the facts. It takes a long time.

Thank you, Mr. Chairman.

Senator DORGAN. Thank you.

Senator Landrieu.

Senator LANDRIEU. Thank you, Mr. Chairman.

And let me begin, I'm sorry that I was delayed in getting here, I had another markup in the Homeland Security Committee and had several bills pending, and so I apologize to the panelists for

being late because this is a very, very important subject, as you know, for our State.

But I'd like to begin, I'm going to submit my opening statement, Mr. Chairman, for the record. But, I'd like to begin by showing the expenditure chart, that is very concerning, and I don't think I have to explain this to the members of the committee who have been working on this issue long before I took a seat here.

But, this is the civil works and capital investment, as a percentage of GDP, Mr. Chairman, and if I could just have you look up for just a second, at this chart, up here, it's really rather frightening to me.

This is since 19—Alan, is it 1940? Since 1929. The civil works and capital investment is a percentage of the Gross Domestic Product, of which this budget sits within. I think this is frightening to our country. I don't think our country sustains its economic strength on a budget like this. We're going to have this chart updated, General, we're working on that now, it goes through 2001, but we're going to extend it out to the present.

But, this brings me to my first question—that is, how are we justifying a Presidential budget of $800 million less than you used last year, when the needs are substantially greater, and the trend lines are extremely troubling. And I would like to hear from you, General, about what your comments have been about this, what speeches do you give about your ability to do your job that you have to do to protect people and to promote commerce with trend lines like this, and a budget that's $800 million less than we had last year?

General VAN ANTWERP. Well, ma'am, I think one thing that we looked at was the American Society of Civil Engineers scorecard that said the backlog in this particular area is about $1.6 trillion. So, there's no question there is a huge need in the country to do this. What we did was, as best we were able, to put together a performance-based budget, based on the dollars that we have, to do the right things, and first things first. And so it was based on, there are health and safety, there are 11 dam safety projects in there that we have to get at.

There are a number of other projects we wanted to complete—we looked at cost/benefit ratios. So, basically we're taking a limited amount of money, and with some performance criteria that we could lay out for you, we racked and stacked those projects.

But there is no question there is a huge backlog of infrastructure needs in the country.

Senator LANDRIEU. Well, are you prepared to testify this morning, and if you would, suggest what percentage of those trillion dollar projects does not have a significant consequence for not completing them? Would you say that 10 percent of them, or 20 percent of them, or 30 percent of them are actually completely without any merit? Or with such limited merit that we shouldn't, you know, shouldn't try to address them? Do you have any sort of handle on those projects?

I understand that you've listed the trillion plus that you don't have money for, in some sort of rank order. I think that would be, actually, very easily said but very difficult to do.

So, my question is, what percentage of that do you think we could potentially eliminate, and not suffer, really, a grave consequence? Whether it's flooding, or commerce, or et cetera?

General VAN ANTWERP. Well, I guess I would approach it that the $1.6 trillion needs to be done over time, but some things are more urgent and compelling. For instance, when we look at the dams of the country—and there are over 3,500 significant ones—and then there are a lot of smaller agriculture and privately owned dams in this country, even.

But, we look at those in categories one to six. And the most—the number 1, of which we are doing 11 of those right now, they are what we call "urgent and compelling," we know that there is either seepage or piping, which is the material actually flowing with the water through the dam. Those need to be fixed now. Those are in the budget.

We are studying Tier 2 but we're not getting at a lot of Tier 2. So, it goes like that. And Tier 6—that would be a dream for many, many years down.

So, we're trying to really look at the life and health safety——

Senator LANDRIEU. Where are the levees in that—levees not just for the Mississippi, but for the other major rivers?

And, if Alan, you'd put up the next chart?

General VAN ANTWERP. Well, we have 12,000 miles of levees in this country, one-third of the levees that are in harm's way are really in the Sacramento area, and then, of course, the levees in New Orleans and a lot of crucial levees across the country, we do have an inventory of them, we did a very extensive levee inventory, we know the risks and we're trying to get at those sections of levees first, that need to be done first.

Senator LANDRIEU. Mr. Chairman, I think this chart is instructive. I asked my staff to basically show a chart of the major waterways, navigation waterways in the country.

And as you can see, it's heavily weighted to the east coast, because the great river systems are in the east coast, and the channels along the southern part—which you can see from Texas all the way to Florida—is the intercoastal canal. There's also an intercoastal canal going up the eastern seaboard, which bears basically the predominant burden, if you will, and responsibility for the commerce of the Nation.

And so, when people continue to say to me, well, "Senator, Louisiana gets a very high portion of the Water bill," my simple response is, "We have an inordinate proportion of the water." And the Water bill isn't a Desert Resources bill; it's a Water Resources bill. And basically, wherever the water is, that's where the resources need to go.

So, I make no apologies for the 17 percent of the authorizations in that Water bill, and intend to see all of them built and—planned and built over time. But you can see why Louisiana, and to some degree Mississippi—because we share the mouth of the river, Mr. Chairman. But this drainage system impacts our Corps of Engineer district, I would suggest, unlike any in the country.

Now, it is really telling to me, to understand the water battles in the West. I now understand them after looking at this chart, because they simply don't have enough. And what they do have,

they're trying to use some for power and some for irrigation, I'm not certain they have, really, for either one.

And at great expense to the Nation, to try to help them figure out their situation which I'm very sympathetic for. But our situation is the opposite. Today, I understand—did the spillway open today? Did you order the spillway opened, or did your Director?

General VAN ANTWERP. Ma'am, I did, at 10 o'clock this morning, so——

Senator LANDRIEU. The spillway was open. Today, because the river is so high, at 10 o'clock this morning, which is——

General VAN ANTWERP. I think if I could correct myself, I think the announcement was going to be made, but I don't believe it's going to be open until probably tomorrow.

Senator LANDRIEU. Okay, but today at 10 o'clock, Mr. Chairman——

General VAN ANTWERP. The announcement.

Senator LANDRIEU. The spillway, which is a great, sort of, flood prevention mechanism, if you will, is being opened for the first time since 1997. Because the river, the Mississippi River is so high, as we've all been following now for, actually, weeks, and the Corps has made a decision. The good thing about that decision, it will prevent flooding. The bad news about that decision, is moving water from the river into a fresh-water lake system has other consequences that we have to deal with.

But, this is a constant battle where—in the State that I represent—trying to manage this water. And let me just say, Mr. Chairman, we can not manage it on the budget we have.

We will have another major floods—this last one cost upwards of $200 billion to the Federal Government, that's going to be the cost of Katrina/Rita when all is said and done. And the primary—the primary reason of that number is not the hurricanes that could not be avoided, it's the collapse of the infrastructure system that should have held, and didn't.

So, I know that I'm going on past my time, and I do have a few questions if the chairman would give me just a few more minutes.

Senator DORGAN. Let me observe, the vote has just started, I believe, in the Senate.

Senator LANDRIEU. Okay.

Senator DORGAN. So, we'll have a very brief period, and then we're going to have to go back to the Senate to vote.

Senator LANDRIEU. Does Senator Murray have a question? Okay, let me then just ask one question, but I'll wrap this up by saying, we cannot sustain this budget either in the State of Louisiana or in the country.

Just real quickly—are you considering the drainage to the river proposal to the metropolitan area of New Orleans? In other words, the pump to the river, as opposed to the pump to the lake proposal? And just a very brief answer, is it even on your radar screen? Because it's a very important project for us to consider, as a better way to fix our system so it doesn't break again?

General VAN ANTWERP. Yes, ma'am, we are. We're considering that as an alternative.

Senator LANDRIEU. Okay, and second the Morganza to the gulf project, which you all have temporarily put on hold, when was the

last time you used section 902, if you know, to prohibit the advancement of a project that's been authorized by this Congress? Do you know?

Mr. WOODLEY. Senator, our practice is when we believe that a project is going to exceed the amount authorized by Congress, our practice is to return to Congress and to achieve—to make that known—and to seek additional authorization, and I believe that that is a longstanding practice, and that that is indeed by far the most appropriate thing for the agency to do under the circumstances.

Senator LANDRIEU. Well, I'd like to know the last time, and my final word on this, it took us 25 years, Mr. Chairman, to get this project authorized. The Corps is the one that gives us the estimates. So this game—which I call it a game—they give you a low estimate, you can't get a higher estimate in the bill if their estimate is low—so they give you a low estimate, you finally get it authorized after you get it authorized, they tell you, then, it's too little and we can't—you know, we can't go forward.

So, we're going to be visiting this again, this issue of Morganza to the gulf.

Senator DORGAN. Senator Landrieu, Thank you very much, Senator Murray?

Senator MURRAY. Thank you, Mr. Chairman, I know a vote's been called, but I want to ask just two critical questions and one is on the Centralia Flood Project. This is the first budget request since the passage of WRDA, and the Centralia Flood Control Project was included in that bill, it's a much needed project to prevent further damage from the Chehalis River rising over its banks.

Now, I understand there are many projects that need funds, but it is really shortsighted to pass up an opportunity to get moving on this levy project. Can you share with me why this was not included in the President's proposed budget?

Mr. WOODLEY. Yes, Senator. The authorization came, I believe, in November. By that time, our budget is very much in place, and very few changes are made—I was only able to make a very few changes to respond to matters that were included in the authorization. We will be working on that project for future fiscal years——

Senator MURRAY. So, you do expect it to be in the next request?

Mr. WOODLEY. I will say that unless—I have not seen how it competes in that process, it will be in a position to compete, I believe, in that process——

Senator MURRAY. To compete in that process—that doesn't sound very promising.

Mr. WOODLEY. No, it doesn't sound very promising, Senator, I will say that we have not——

Senator MURRAY. Well, I mean this is my frustration in my—go ahead.

Mr. WOODLEY. We have not funded new starts in our budget, generally speaking, for some time.

Senator MURRAY. Well, my understanding is——

Mr. WOODLEY. That is a new start.

Senator MURRAY. Yes, the capacity of this is $1.2 million.

Mr. Chairman, these are what we have to do because the administration doesn't send us the adequate requests that we have

passed in our authorization bills. We end up having to—and this project, I think, is about $1.2 million that is needed this year—have to do it as an earmark, and then we hear, "Well, all the bills are going to be vetoed that have earmarks," well, that's irresponsible. We have to start figuring out the honesty of this budget process, and realize that the reason that we have to go back and do these earmarks is because we have an administration that is not following through and giving us what we need in authorized projects.

And quickly, on the Chehalis River Basin Study, same idea. This is a project that is sitting out there, can you tell me why that was left off the table?

Mr. WOODLEY. Pardon?

We don't have the details on the Chehalis, so if you pardon me one second, I may be able to get you——

Senator I apologize, I will have to answer that for the record.

Senator MURRAY. I would appreciate that, and appreciate the opportunity, Mr. Chairman, to come back and ask those questions. I think my State is seeing what a lot of States are, we're losing homes, and it's costing us millions of dollars in damage, because we're not doing an adequate job of fulfilling our responsibilities as a country.

Thank you, Mr. Chairman.

Senator DORGAN. There's about 6 or 7 minutes left on this vote. Senator Landrieu, I should mention to you that I asked questions about the request that has been made with respect to the gulf, and especially the $1.5 billion anticipated local share which should be paid in a short period of time. I asked questions about how they expected that region to pay a local share, when WRDA would have anticipated that to the extent that local share existed, they might have up to 30 years. So, I asked that series of questions on the record, I wanted you to know.

Senator MURRAY. Thank you.

Senator LANDRIEU. And may I just say, for the record, I thank the Chair, because that is something I'd like to work out a longer time to pay, but Washington power permits, Port of Iberia, category five report and the ongoing cooperative arrangements with the Dutch were other things I wanted to ask. I'll submit those questions to the record, and I really thank the chairman for asking some of the questions about the cost share that's very important for us to tackle, thank you.

ADDITIONAL COMMITTEE QUESTIONS

Senator DORGAN. Let me thank all of the witnesses who've appeared today, I apologize that we've had a vote intervene, but I think we have at least exhausted many of the inquiries that we wanted to make, and there—we will submit a list of written questions, and we appreciate your being at this hearing.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO HON. JOHN PAUL WOODLEY, JR.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

INLAND WATERWAY TRUST FUND

Question. Secretary Woodley, In your testimony before this subcommittee last year you told us that there was a looming problem with the Inland Waterways Trust Fund that needed to be addressed. However, we never received a proposal. The President's fiscal year 2009 budget proposal announced that legislation would be forthcoming to address the shortfall in the Inland Waterway Trust Fund. Finally, last week the administration proposal was submitted to Congress. What took so long to get us this legislation?

Answer. Coordination within the administration took longer than we originally anticipated.

Question. The fiscal year 2009 budget submittal states that the President's request utilizes all balances in the Trust Fund as well as all receipts expected to be generated in 2009. This is about $167 million. How much have we been funding on average for Inland Waterways over the last several years?

Answer. Annual funding from the Inland Waterways Trust Fund increased from $102 million in fiscal year 2003, to $203 million in fiscal year 2007 for an average of $149 million for the period fiscal year 2003–2007.

Question. How much does the current Inland Waterways Trust Fund generate in annual receipts?

Answer. The existing $0.20 per gallon diesel fuel tax generates about $90 million per year.

Question. Then you have known for a number of years that this day of reckoning was coming and you waited until now, halfway through the fiscal year, to make this type of proposal?

Answer. The balance in the Trust Fund has been adequate until the last 2 years when it became clear that project costs were increasing dramatically and the number of construction and major rehabilitation projects were increasing, while revenues were generally declining.

Question. This will be tough legislation to get enacted in any year, much less this year. It took me several years before I was able to finally get the initial legislation establishing the Inland Waterway Trust Fund enacted in 1978. And now, you want us to completely change the funding mechanism in the next 6 months?

Answer. Due to the continuing decline in the Trust Fund balance we urge Congress to take action at its earliest convenience.

Question. What has been the navigation industry's reaction to your proposal to phase out the fuel tax and replace it with a lock user fee?

Answer. The navigation industry in general does not support the imposition of any additional costs on the industry to increase revenues to the Trust Fund, through either lock user fees or increased taxes. The industry supports increased Federal expenditures and reduced Inland Waterways Trust Fund contributions by changing the cost-sharing percentages from 50 percent Federal and 50 percent Trust Fund to 75 percent Federal and 25 percent Trust Fund.

Question. The fuel tax has been 20 cents per gallon for more than 10 years. Was any thought given to a proposal to raise the fuel tax? Why was that idea rejected?

Answer. Yes, consideration was given to raising the fuel tax. However, the user fee more appropriately aligns the costs and revenues by financing the Trust Fund's 50 percent share of the capital costs from revenues paid by the users who most directly benefit from reduced lock outages, improved safety, reductions in the time per lockage, and other benefits associated with the expenditures for new locks, lock replacements and expansions, and rehabilitations. The existing fuel tax is paid by towboat operators purchasing fuel on the 27 inland and intracoastal waterways listed in 33 U.S.C. 1804. Operators do not pay a fuel tax on the 40 waterways segments that are not listed, even when they use a lock, while operators on the extensive open water reaches of the system (such as on the Lower Mississippi River) are paying a substantial portion of the overall fuel tax where there are no locks and dams. Therefore, many system users receive little direct benefit from the investments that are being funded with the fuel tax, while others are receiving these benefits but not paying for them.

Question. It appears that the proposed lock user fee will fluctuate depending on the balances in the Trust Fund? Do you believe the industry will support a user fee that could change up or down annually?

Answer. We believe that a fee schedule that provides sufficient funding to construct, replace, or rehabilitate the infrastructure desired by the industry, while not

creating a large surplus or depleting the balance in the Trust Fund, could be supported since it is in the overall interest of the industry.

BUDGET REQUEST

Question. Secretary Woodley, in your press release on the fiscal year 2009 budget you state that "The budget represents the prudent use of available funding to advance important, mission-based objectives. I am proud to present it."

What exactly are you proud of? Is it the decrease of $79 million over what you proposed in fiscal year 2008, or is it the $851 million decrease from what we provided in the fiscal year 2008 Omnibus?

Answer. We are keenly aware that the nation has many competing needs, and this budget reflects the President's priorities for the Civil Works program. The Army Corps of Engineers must execute the budgetary resources it is provided as efficiently and effectively as possible. The budget provides a continued high level of funding for operation and maintenance of key infrastructure, with a $16 million increase over last year's budget. The budget also focuses resources on completing the highest-return construction projects, in order to realize their economic and environmental benefits sooner, giving priority to 79 high performing projects and will result in 12 project completions in fiscal year 2009, bringing significant benefits on line.

Question. Is it prudent to provide no funding for projects that have been under construction for years?

Answer. The fiscal year 2009 budget uses objective performance measures to establish priorities among projects and, through a proposed statutory change in Corps contracting practices, would also increase control over future costs. The performance measures used include the benefit-to-cost ratios for projects with economic outputs; and, for aquatic ecosystem restoration projects, the extent to which the project cost-effectively contributes to the restoration of a nationally or regionally significant aquatic ecosystem that has become degraded as a result of a Civil Works project or to an aquatic ecosystem restoration effort for which the Corps is otherwise uniquely well-suited. The selection process also gives priority to dam safety assurance, seepage control, static instability correction, and to projects that address a significant risk to human safety. Under each of these criteria, resources are allocated based on performance. This approach significantly improves the realization of benefits to the Nation from the Civil Works construction program and will improve overall program performance by allowing the Nation to realize the benefits of the projects with the best net returns (per dollar invested) sooner.

Question. What are we supposed to tell the project sponsors that are sharing in the costs of these projects?

Answer. The President's fiscal year 2009 budget for the Army Civil Works program is based on performance. All funds available for Civil Works are allocated in the budget based on the outputs and outcomes they would produce, and no funds are explicitly requested for paybacks. Likewise, the Corps capabilities to perform additional work are formulated based on the prospective work that could be performed, not based on prior reprogrammings and other transactions.

Question. It will cost them more. It will cost us more. Again, how is this prudent?

Answer. This budget is based on the administration's desire to produce a performance based budget focusing on completing investment opportunities that will yield good returns for the Nation in the future. It also provides the highest level of funding ever requested for the Civil Works program in the President's budget.

EARMARKS

Question. Secretary Woodley, Could you explain the President's Executive order on earmarks?

Answer. Executive Order No. 13457, entitled "Protecting American Taxpayers from Government Spending on Wasteful Earmarks", is intended to ensure that Federal funds are spent in accordance with laws, regulations, and merit-based decisionmaking. The recent performance-based budgets for the Civil Works program are examples of the application of merit-based decisionmaking.

Question. Based on what you know, how do you believe it will be implemented?

Answer. Implementation guidance has not yet been developed. The Executive order is prospective and does not apply to previously enacted appropriations for fiscal year 2008, so as yet we have no experience implementing it. The Executive order supports this administration's strong emphasis on performance-based decisionmaking, as reflected in the President's Management Agenda and recent Civil Works budgets.

Question. Secretary Woodley, do you believe that in a project based budget such as yours, that all of the projects in the statement of managers will be considered as earmarks that are advisory under this Executive order?

Answer. Thoughtful consideration needs to be applied to the question of the designation "earmark" in programs, like the Army Civil Works program, that historically have been line-item funded for individual programs, projects, and activities. I believe the Executive order should be applied in a way that furthers the intent of encouraging performance based decisionmaking.

Question. If I understand you correctly, the Intent of Congress is irrelevant under this Executive order. Is that correct?

Answer. The Comptroller General established years ago that committee reports accompanying Acts of Congress are advisory, but are to be afforded great deference. Moreover, the Comptroller General advised that if the executive branch intends to act contrary to the statement of managers as laid out in such a report, an explanation is owed to the committee or committees that issued the guidance. Also, the statement of managers and other committee reports are part of the legislative history of the respective appropriations acts.

Question. Have you considered how you will manage a program if all of these projects are contained in legislative language? You have always had some flexibility to allow proper management of your respective programs. This Executive order seems to be hurting you, more than it is restraining Congress. Won't your jobs be harder?

Answer. Certainly, having allocations to each program, project and activity laid out in statutory language would change current management practices to some extent and would require greater attention and accuracy in the development of cost estimates. Such legislation also could include provisions authorizing reprogrammings or transfers among the line items within specified limits, which would give the program managers some flexibility.

Question. How will you deal with emergency situations if all funding is earmarked in legislative language?

I can assure you that Congress is not going to provide you a lump sum appropriation and trust that you will do the right thing. That would be irresponsible of us and an abdication of our constitutional duties. Additionally, it would also impede our ability to undertake proper oversight over your execution of these programs.

Answer. If Congress were to itemize funding allocations in statutory language, either directly or by referencing the statement of managers, it would be critically important for Congress to also provide a mechanism to ensure that agencies have sufficient discretion to respond to emergencies. This could be done by statutory establishment of reprogramming or transfer process and conditions and/or by providing a line item allotment of funding to be used for emergency purposes. An example would be the emergency transfer authority provided to the Secretary of the Army in Public Law 84–99. I would note that in fiscal year 2007, while operating under a year-long continuing resolution, my staff worked closely with the Army Corps of Engineers Headquarters to first establish objective, transparent criteria and then to apply those criteria in allocating the fiscal year 2007 appropriations for the Civil Works program. If the executive branch were to be allowed great discretion in allocating Civil Works appropriations, then advance consultation on transparent, merit-based criteria and periodic reporting to Congress on program execution certainly would be appropriate to ensure Congress has sufficient information to carry out its oversight role.

QUESTIONS SUBMITTED TO LIEUTENANT GENERAL ROBERT VAN ANTWERP

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

COLLECTIVE BARGAINING RIGHTS

Question. What impact, if any, will implementation of the HPO have on collective bargaining rights and the way in which Corps employees are represented by Federal employee unions during and after the implementation of the HPO? What impact, if any, will implementation of the HPO have on existing bargaining units within the agency, the rights of employees to collectively bargain within the agency and on the ability of various unions to continue to represent employees in the agency after collective bargaining agreements expire and are renegotiated? Will any positions within existing bargaining units be moved to new bargaining units? Will any positions within existing bargaining units be moved outside bargaining units? Why will this HPO be different from the logistics HPO which cast 400 employees out of collective

bargaining arrangements for no apparent reason, given that their work and their worksites have not changed?

Answer. We do not expect any change in bargaining rights. Unlike the Logistics High Performing Organization (HPO), the NavLocks study is not proposing to create a new organizational entity, therefore, local labor relations agreements will continue as negotiated locally.

NEGOTIATING OVER APPROPRIATE ARRANGEMENTS AND PROCEDURES

Question. Many of the employees affected by the HPO will be represented by unions, both during and after implementation. Does the Corps acknowledge unreservedly that all represented Federal employees would be able to negotiate at the local level appropriate arrangements and procedures of the HPO and if necessary pursue appeals to Federal labor authorities including but not limited to the Federal Labor Relations Authority and Merit Systems Protection Board? What differences if any would there be in terms of negotiating over impact and implementation at the local level under the HPO and if the HPO were instead being separately implemented by several Corps districts simultaneously as several distinct reorganizations?

Answer. There will not be any changes in bargaining rights. The study is not proposing a new organizational entity, therefore, local labor relations agreements will continue as negotiated locally. No Corps district reorganization is recommended in this study.

WORKFORCE

Question. Will there be fewer Federal employee jobs in the locks & dams, district offices, and fleet maintenance crews during implementation and the first 5 years after implementation than there were on the first day of the HPO's development? If so, please provide an explanation that includes estimates for the Federal employee jobs lost for each of the three categories (locks & dams, fleet maintenance, and district offices). If there will be fewer jobs, how will these reductions be achieved in each of the three categories? What role will attrition play in reducing the workforce? If attrition will be used, when and to what extent will it be used in each of the three categories? Corps management has said that no employee would involuntarily lose his job because of the HPO—is this still the case? What, if any, job losses will there be through re-engineering of jobs, i.e., retaining the jobs but changing the types of positions, thus leaving current employees unqualified? In which if any of the three categories [locks & dams, district offices, and fleet maintenance crews] do you anticipate adding Federal employee jobs, and by how many? If so, what efforts will the Corps undertake to ensure that it has the funding necessary to hire the additional employees? If the HPO recommends an increase in the number of Federal employees, will OMB allow for such an increase?

Answer. We cannot predict future funding levels and events that are beyond the control of the Corps and that may impact staffing levels throughout the organization. However, given sufficient funding for operating and maintaining the locks and dams, there would be no net loss of jobs as a result of this study. The study is not going to propose any new organizational entity to operate and maintain the locks and dams in the inland waterway system. The study will be recommending a series of business process improvements that are intended to provide consistency in O&M procedures across the Corps, while working within the long-range strategy of applying resources to the most critical projects based on risk and reliability within a watershed (or division) boundaries.

If the study should recommend increases in staffing, the funds to support those positions would be considered through the normal budget process.

CONTRACTING OUT

Question. Corps employees were told by the agency's management that the HPO would obviate the need for any contracting out. What contracting out of work either performed by Federal employees or last performed by Federal employees (e.g., employees who are lost through attrition) would occur as part of the HPO? If contracting out of work currently performed or last performed by Federal employees is part of the HPO, in which of the three categories of affected work would this contracting out occur, the work of how many Federal employees would be affected for each category, and through what procurement process would this contracting out occur? Would Federal employees, either already on the agency's staff or to be added later, be given opportunities to perform new work and work currently outsourced? If so, in which categories would this insourcing occur, the work of how many Federal

employees would be insourced, and through what process would this insourcing occur?

Answer. No contracting out of work performed by Federal employees will occur as part of or as a result of the study. Additionally, work previously outsourced may be considered for insourcing through an appropriate process allowed under the prevailing legislation. We do not have any estimate of number of positions that may be considered for insourcing, pending additional analysis after the completion of this study and as existing contracts are up for renewal.

TERMS OF EMPLOYMENT

Question. Employees who were involved in the logistics HPO and the information management A–76 were forced to reapply for their jobs. Will any of the employees covered by the HPO be required to reapply for their jobs? If so, which ones? Will any of the employees covered by the HPO be involuntarily required to take downgrades? If so, which ones? Will any of the permanent employees covered by the HPO be involuntarily required to take seasonal employment? If so, which ones? Will the HPO change the pay structure of locks and dams operations and maintenance personnel based on where they live? Will district office personnel be expected to move to another district office? Please provide estimates by district on the numbers of district employees to be shifted to other districts. What adverse impacts will the HPO have for fleet maintenance personnel? Will fleet maintenance personnel be expected to move to other districts? Please provide estimates by district on the numbers of affected fleet maintenance employees to be shifted to new districts. Would fleet maintenance personnel be expected to work more outside of their home districts? If so, for how many more days per year?

Answer. No employee will be required to reapply for his/her job, take a downgrade, or to change status from permanent to seasonal. The study does not recommend changes to the existing Corps chain-of-command, organizational structure, or a decrease in the staffing levels.

The NavLocks study will not require that employees in a district office move to another district office.

The NavLocks study will not recommend that employees in one district's maintenance fleet permanently move to another district's maintenance fleet. However, on a short term basis, as is the current practice, we envision using personnel from several districts' maintenance fleets to assists other districts to more rapidly restore functionality/operating capability to a lock. As we try to manage work and perform the most critical tasks in a river system, on a short term basis, we envision making teams of service personnel from maintenance fleets to increase capability to quickly perform tasks to minimize system downtime. We realize that working away from home is inconvenient to employees and we will try to minimize the adverse impacts to the extent possible.

HPO STRUCTURE

Question. To what extent is the HPO different from reorganizations that Corps districts could accomplish on their own? What additional legislative authority will the Corps be seeking in order to carry out the HPO? Will districts continue to decide, within the parameters set by the Congress, how money is spent on locks and dams projects—or will such decisions be made by another entity, perhaps one created by the implementation of the HPO? Will districts continue to negotiate and administer contracts for locks and dams—or will such arrangements be determined by another entity, perhaps one created by the implementation of the HPO?

Answer. The study is conducted Corps-wide for improving reliability and availability of the entire inland navigation system through better business processes. The study is not being conducted for the purpose of reorganizing districts; therefore, it should not be confused with "reorganizations" that could be done by individual districts, based on their workload and/or mission changes. Regarding how money is spent on locks and dams projects, there will be no new organization as a result of the HPO and districts will continue to carry out their current role with regard to determining how funding is to be spent. No change is anticipated to the current budget development and program execution processes.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

CIVIL WORKS PROGRAM

Question. General Van Antwerp, in your role as the Chief of Engineers, what do you see as the major water resource challenges facing this Country in the future?

Answer. The facilities owned and operated by, or on behalf of, the Corps of Engineers are aging and may not have undergone a recent major rehabilitation. As stewards of this infrastructure, we are working to ensure that its key features continue to provide an appropriate level of service to the Nation. Sustaining such service poses a technical challenge in some cases, and proper maintenance is becoming more expensive as this infrastructure ages.

Question. What level of funding would be necessary to maintain the progress realized in the Civil Works Program through the enacted appropriations levels for the past couple of years?

Answer. Sir, while I cannot give you an exact number at this time, I believe that approximately $6 billion should be sufficient to maintain and continue the funding level appropriated over the last couple of years.

Question. If the administration's budget proposal is enacted, what will be the impact on meeting the Army Corps' O&M backlog? The construction backlog?

Answer. The budget of the President is viewed as the appropriate mix of construction and O&M funding as well as the appropriate level for those respective activities. The operations and maintenance backlog and the construction backlog do not represent a prioritization of work either within the two accounts or between different accounts in the Corps. For instance, some work in the backlog is higher priority, whereas other work may be a lower priority relative to funding needs in other Corps areas. The proposed fiscal year 2009 funding for O&M and construction does not significantly reduce the O&M and construction backlogs.

Question. What is the percentage of the Nation's commerce that come into or leaves this country that goes through a Corps built and maintained harbor?

Answer. Sir, we estimate that 95 percent of our Nation's foreign commerce goes through our Federally maintained harbors and channels.

Question. Could you characterize the proportion of the discretionary budget of the Federal Government that is directed toward building and maintaining this Country's water infrastructure today versus 30 years ago?

Answer. One way is to compare absolute budget amounts over time. For example, the discretionary budget of the United States is five times larger today than it was 30 years ago while the Corps' discretionary budget has doubled in size over the past 30 years. Another comparison is a relative comparison over time. Thirty years ago, slightly more than 1 percent of the discretionary budget of the Federal Government was designated to the Corps of Engineers to build and maintain the country's infrastructure. Today less than one-half of 1 percent of the Federal Government's discretionary budget is proposed for the Corps of Engineers to build and maintain the country's infrastructure.

In 1978 the Corps of Engineers' budget relative to the total discretionary budget allowance = $2.778 billion/$259.940 billion = .0106 or 1.06 percent. In 2008, the Corps of Engineers' budget relative to the total discretionary budget of the Nation = $5.586 billion/$1,153.798 billion = .0048 or 0.48 percent.

Question. Could you provide a historical perspective on the value of the Nation's inland waterways for National security and economic security?

Answer. The Corps navigation services play an essential role in ensuring that commercial goods move smoothly along the Nation's ports and waterways distribution chain. A smooth, well-functioning navigation system is crucial to the Nation's economy. Inland and intracoastal waterways directly serve 38 states throughout the Nation's heartland as well as the States on the Atlantic seaboard, the gulf coast and the Pacific Northwest. The shippers and consumers in these States depend on the inland waterways to move about 630 million tons of cargo valued at over $73 billion annually. States on the gulf coast and throughout the Midwest and Ohio Valley especially depend on the inland and intracoastal waterways. Texas and Louisiana each ship over $10 billion worth of cargo annually, while Illinois, Pennsylvania, West Virginia, Kentucky, Mississippi, Alabama, and Washington State each ship between $2 billion and $10 billion annually. Another eight States ship at least $1 billion annually. According to research by the Tennessee Valley Authority, this cargo moves at an average transportation savings of $10.67 per ton compared to other modes of transportation. The unit cost to transport commodities over inland waterways is two to three times lower than other forms of transportation. Corps navigation projects also help limit air pollution emissions by enabling tows with many barges to move cargo long distances on considerably less fuel than trains or trucks would need to move the same amount of cargo the same distance.

The inland waterways have played a key role in National defense and military strategy. During World War II, large quantities of strategic commodities were moved on the inland and intracoastal waterways. During the war period, the total annual ton-mileage more than doubled the record peacetime movements on the Mississippi, Ohio, and Illinois Rivers. The Gulf Intracoastal Waterway played a crucial

role in moving strategic commodities, particularly crude and refined petroleum, and in 1944 carried five times as much freight as in 1939. Barges were credited with transporting over 1.7 billion barrels of petroleum and petroleum products, equal to more than 7 million tank car loads, or 73,000 trains of 100 cars each. The Gulf and Atlantic Intracoastal Waterways provided a protected route for the daily delivery of some 1.3 million barrels of petroleum, in contrast with oceangoing tankers that were vulnerable to submarine attack. The waterways also served the shipbuilding and repair industries. During World War II the number of inland shipbuilding and repair facilities increased from 85 to 140. At the end of the war the Army also shipped grain down the Mississippi as part of the European civilian relief program.

The waterways continue to move strategic cargo destined for military facilities, especially petroleum products such as gasoline, distillate and jet fuels, military cargo and equipment. Moving military vehicles and equipment by barge has provided increased security and simplified loading and unloading compared to rail, and has saved fuel and wear-and-tear compared to over-the-road moves.

Another key role of the waterways today is for the movement of oversized cargo that would be difficult or impossible to move by road or rail. Waterways are used to move industrial plant components, including nuclear reactors and other power plant equipment, offshore oil platforms, as well as automobile factory presses and even rocket boosters from assembly plants to Cape Canaveral.

Question. How much unobligated funding did the Corps carry over from fiscal year 2008 to fiscal year 2009?

Answer. Mr. Chairman., our total carryover of unobligated appropriated Civil Works funds from fiscal year 2007 to fiscal year 2008 was $7.4 billion. Our estimated carryover into fiscal year 2009 is estimated to be $5.2 billion, including supplemental funding.

Question. To what do you attribute this large carryover?

Answer. In brief, the carryover is attributable to a surge in supplemental funding and changes in internal processes. Of the total projected carryover of $5.2 billion, about $3.5 billion is Flood Control and Coastal Emergencies and Construction funds that were appropriated for reconstruction of New Orleans area protection and that will be obligated through fiscal year 2011. Another $600 million is other supplemental funds that were appropriated for the rehabilitation of projects damaged in the numerous storm and hurricane events in the past few years, but that cannot be obligated through fiscal year 2008. Finally, $1.1 billion is regularly appropriated funds. Carryover of regular funds is projected to grow from around $300 to $400 million in the years preceding fiscal year 2006 to the $1.1 billion figure due to changes in contracting and reprogramming processes in response to the guidance in the fiscal year 2006 conference report and fiscal year 2008 statement of managers. These changes emphasize carrying over funds where necessary to fully fund contracts, and limiting the reprogramming of funds. The Corps plans to reduce carryover in the future by improving its scheduling and estimating practices prior to projects receiving funds, and by focusing on project execution, such as metrics for obligations and milestones, once funds are received.

Question. What tools could we give you to help manage the program better?

Answer. Mr. Chairman, I believe recent Congressional direction has improved Corps business practices with regard to the management of appropriations. Our goal is to plan well and to execute funds as planned, rather than to simply maximize expenditures. In the interest of administrative efficiency, we would welcome greater flexibility in allocating funds among operation and maintenance activities, and we would like to explore the possibility of reducing prior notification requirements for reprogramming, while remaining focused on executing as planned. This would involve giving clear guidance to the field on when and when not to reprogram, and then freeing them to operate within the framework of that guidance. This also would involve continuing to provide periodic reports to Congress on reprogramming, to ensure the necessary oversight.

Question. General Van Antwerp, the fiscal year 2008 Omnibus required you to submit a report by May 1, 2008 concerning the positive and negative impacts of the revised policy on continuing contracts to the execution of the Civil Works Program. Can you give us a preview of this report?

Answer. This report will discuss changes in Corps processes that were incorporated into execution plans and acquisition strategies to ensure that implementation of programs, projects, and activities (PPAs) complies with Congressional guidance. It will discuss impacts of the changes and offer recommendations.

QUESTIONS SUBMITTED TO ROBERT W. JOHNSON

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

DROUGHT

Question. What is the prediction for the drought situation across the West in fiscal year 2009? We are entering our 9th year of the drought in western North Dakota.

Answer. As a general rule, for every year of drought as many years of above-normal precipitation is needed to counter the effects of drought. Without significant snow pack or substantial rainfall, current drought conditions are expected to continue. Precipitation outlooks are generally unreliable beyond 3 months. Reclamation itself does not forecast weather or drought conditions. Reclamation tracks current drought conditions based on information provided by other agencies focused on weather, including the National Oceanic and Atmospheric Administration's Climate Prediction Center (http://www.cpc.noaa.gov/), and the Drought Monitor, managed by the National Drought Mitigation Center (http://www.drought.unl.edu/dm/monitor.html).

ENERGY AND WATER ACT

Question. There are a number of projects in the fiscal year 2008 Energy and Water Act that were not included in the President's fiscal year 2009 budget request. Can you provide us the capability amounts needed for those projects?

Answer. The projects are California Bay-Delta Restoration and Central Valley Project Restoration Fund. The capability statements are below:

Project Name in Hill Request.—California Bay-Delta Ecosystem Restoration (CA)

Bureau Project.—California Bay-Delta Restoration (CA)

Appropriation.—California Bay-Delta Restoration

Authorization.—The Reclamation Act of 1902, as amended and supplemented, June 17, 1902; Public Law 89–561, Feasibility Studies, September 7, 1965; Public Law 96–375, Feasibility Studies, October 3, 1980; Reclamation Projects Authorization and Adjustments Act of 1992, title XXXIV of Public Law 102–575, October 30, 1992; and Public Law 104–333, the Omnibus Parks and Public Lands Management Act of 1996, title XI, California Bay-Delta Environmental Enhancement Act, November 12, 1996; Public Law 107–66, Energy and Water Development Appropriations Act, 2002, November 21, 2001; Public Law 108–7, Consolidated Appropriations Resolution, 2003, February 20, 2003; Public Law 108–137, Energy & Water Development Appropriations Act, 2004, December 1, 2003; and Public Law 108–361, Calfed Bay-Delta Authorization Act, October 25, 2004.

CALFED BAY-DELTA PROGRAM

[Summarized Financial Data]

	Federal	Non-Federal	Total
Total Estimated Cost	(1)	(1)	(1)
Allocations through fiscal year 2007 [2]	$292,778,000		$292,778,000
Approved by Congress fiscal year 2008	40,098,000		40,098,000
Budget Request for fiscal year 2009	32,000,000		32,000,000
Balance to Complete after fiscal year 2009	(1)	(1)	(1)
Amount Requested by Member (H)	40,000,000		40,000,000
Amount Requested by Member (S)	42,000,000		42,000,000
Additional Capability for fiscal year 2009	10,000,000		10,000,000

[1] Unknown.

[2] The $292.7 million reflects funds appropriated to the California Bay-Delta Restoration Account in fiscal year 1998 through fiscal year 2000 and fiscal year 2006 thru fiscal year 2007. Does not include funds provided in the fiscal year 2002, fiscal year 2003, fiscal year 2004 and fiscal year 2005 Water and Related Resources Appropriation, Central Valley Project.

Location and Description.—CALFED is a collaborative effort among 25 State and Federal agencies and representatives of California's environmental, urban, and agricultural communities to improve water quality, fish and wildlife habitat, and water supply reliability in the San Francisco Bay/Sacramento-San Joaquin River Delta (Bay-Delta), the hub of the State's water distribution system. The Bay-Delta is California's principal source of drinking water for more than 22 million Californians, supplying irrigation water for the State's $27 billion agricultural industry, and is the largest wetland habitat and estuary in the West supporting 750 plant and animal species. Ultimately, California's trillion-dollar economy is at risk if environmental and water management problems to restore the ecosystem are not resolved.

The California Bay-Delta Environmental Enhancement Act (Bay-Delta Act), enacted in late 1996, authorized a total of $430 million over 3 years (fiscal year 1998 to fiscal year 2000) for ecosystem restoration activities in the Bay-Delta region. From fiscal year 1998 to fiscal year 2000 a total of $190 million was provided through this account to support ecosystem restoration, as well as $30 million for other than ecological Bay-Delta activities. Existing agency authorities and appropriation language in 2002 and 2003 allowed Federal agencies to continue Program implementation after the Bay-Delta Act sunseted the end of 2000, until such time as the new authorization was enacted in 2004.

Project Status.—Lead CALFED agencies released the Final Programmatic Environmental Impact Statement/Environmental Impact Report and Preferred Alternative on July 21, 2000. Stage 1 of Phase III implementation activities (the first 7 years of a 30-year program) began with the signing of the Record of Decision (ROD) on August 28, 2000, formally approving a long-term plan for restoring the Bay-Delta ecosystem and improving water management. Program components include ecosystem restoration, watershed management, water supply reliability, storage, conveyance, an environmental water account, water use efficiency (conservation and recycling), water quality, water transfers, levees, and science. All aspects of the Program are interrelated/interdependent and will incorporate a high level of stakeholder participation and science-based adaptive management during implementation.

On October 25, 2004, the President signed the CALFED Bay-Delta Authorization Act, Public Law 108–361, authorizing the Secretary of the Interior to implement water supply technology and infrastructure programs aimed at increasing and diversifying domestic water resources. The Act provided Federal authorization through fiscal year 2010 for four new and expanded authorities—Environmental Water Account (EWA), the Levee Stability Program, specific conveyance projects, and oversight activities identified in sec. 103(f)(1) thru (f)(4). The Act authorized up to $389 million to be appropriated for these four activities, and it requires a number of reporting requirements, including annual updates to Congress.

Additional Capability for Fiscal Year 2009.—The additional $10 million would be used to support the CALFED Bay-Delta Program to provide improved water supply and water quality in the Bay-Delta. The full capability presented here represents the specific projects and programs that were recommended for implementation in the budget request. Reclamation has the capability to use the additional funds requested under existing and new authority to support the following programs:

Storage Program.—Reclamation, in coordination with the State of California, is continuing feasibility investigations and environmental documentation for four proposed CALFED storage projects: Shasta Enlargement, Upper San Joaquin River Basin, Los Vaqueros Enlargement, and North of Delta Offstream Storage (NODOS; aka Sites Reservoir). Planning studies will focus on refinement and evaluation of alternative plans, benefit/cost analysis, and environmental compliance. Draft Feasibility Reports and NEPA documentation are due for completion in 2008 and Final Feasibility Reports and environmental documents are due for completion and submittal to the Department of the Interior in 2010.

Conveyance.—Reclamation is continuing feasibility studies for: (1) increased capacity of the intertie between the State Water Project California Aqueduct and the Central Valley Project Delta Mendota Canal, (2) San Luis Reservoir Lowpoint Improvement Project, (3) actions at Franks Tract to improve water quality in the Delta, evaluation of a screened through Delta facility on the Sacramento River, coordinating actions for relocating drinking water intake facilities for in-Delta water users, including assessing the feasibility of the project and developing a finance plan, and evaluating the environmental benefits of re-operating the Delta Cross Channel; and (4) recirculation of export water to reduce salinity and improve dissolved oxygen in the San Joaquin River.

Additional funds would be used to support alternative conveyance options under the Bay-Delta Conservation Plan (BDCP) and the Delta Vision Strategic Plan in coordination with the State of California.

Water Quality.—Reclamation is continuing implementation of activities that will help meet water quality standards and objectives for which the Central Valley Project has responsibility. Projects will include those within the preferred alternative proposed by the San Joaquin River Water Quality Management Group, of which Reclamation is a participant. The approach focuses on managing salt loading in the San Joaquin River in areas where the highest salt loads originate and incorporates an element of real-time management, to manage salt loading into the San Joaquin River, while not redirecting impacts to the Delta. Specific activities include continued implementation of the Westside Regional Drainage Plan, water quality monitoring, wetlands management, and other actions identified in the program to

meet water quality standards and objectives in the lower San Joaquin River. Additional funds would be used for implementation of activities that reduce salt discharges into the San Joaquin River that are consistent with the Westside Regional Drainage Plan.

Ecosystem Restoration.—Under Ecosystem Restoration Reclamation is participating as the Federal co-lead agency for NEPA in the BDCP. The BDCP contributes to the objectives of CALFED's Ecosystem Restoration Program. BDCP supports planning for projects that improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta system to support sustainable populations of diverse and valuable plant and animal species. Additional funds would be used to support the environmental documents for alternative conveyance under BDCP and in support of implementation of the Delta Vision Strategic Plan toward broad restoration of the Delta.

Science.—Reclamation is continuing to participate as a key agency, in coordination with the Interagency Ecological Program (IEP) agencies and the CALFED Science Program, with investigations to determine causes for the decline in the Delta of pelagic organisms. Reclamation is also participating with expert evaluations and scientific assessments of Program elements and assisting the CALFED agencies with the establishment of performance measures, and monitoring and evaluating the performance of all Program elements. Additional funds will contribute to Reclamation's participation in both the IEP and the Pelagic Organism Decline studies.

Environmental Water Account.—Reclamation is continuing as the lead Federal agency in this cooperative water and operations management program whose purpose is to provide protection to the fish of the Bay-Delta estuary through environmentally beneficial changes in the operations of the State Water Project (SWP) and the Central Valley Project (CVP), at no uncompensated water cost to the Projects water users. The future of an EWA through 2011 is being discussed; a ROD will be signed in the next few months at which time the agencies will determine the future of an EWA.

Water Use Efficiency (WUE).—Reclamation does not have the authority for a grant program for WUE grants. Any funding would need to come with authority to manage such a program.

Planning and Management Activities.—Reclamation is continuing to support administration of storage, conveyance, water use efficiency, environmental water account, ecosystem restoration, science and water transfer consistent with our CALFED appropriation. Consistent with Public Law 108–361, activities also include: (1) Program support, (2) Program-wide tracking of schedules, finances, and performance, (3) multi-agency oversight and coordination of Program activities to ensure Program balance and integration, (4) development of interagency cross-cut budgets and a comprehensive finance plan to allocate costs in accordance with the beneficiary pays provisions of the Record of Decision, and (5) coordination of public outreach and involvement, including tribal, environmental justice, and public advisory activities in accordance with the Federal Advisory Committee Act (5 U.S.C. App.), and (6) development of Annual Reports.

ADDITIONAL CAPABILITY FOR FISCAL YEAR 2009

Program	President's Request	Additional Capability
Storage Program	$6,450,000	.....
Conveyance	7,050,000	$4,000,000
Water Quality	5,000,000	3,000,000
Ecosystem Restoration	1,500,000	2,000,000
Science	3,000,000	1,000,000
Environmental Water Account	7,000,000	.....
Water Use Efficiency (WUE)	.....	.....
Planning and Management Activities	2,000,000	.....
Total	32,000,000	10,000,000

Submission of this capability statement does not reflect departmental support. The Department does not support the addition of funds for any program or project that would result in the reduction of funding for other programs or projects in the President's budget.

Problem Areas.—These additional capabilities are for Reclamation activities only. There are other Federal agencies responsible for implementing critical aspects of the

Program. For example, funding for levee improvement projects in the Delta, which is an important component of the CALFED program, is not within Reclamation's authority to implement and not part of these additional capabilities.

Congressional Location and Representation.—State of California

Congressional Districts.—Statewide

Senators.—Dianne Feinstein (D), Barbara Boxer (D)

Congressional Members Requesting Additional Funding.—Senator Dianne Feinstein

Project Name in Hill Request.—Trinity River Restoration (CA)

Bureau Project.—Central Valley Project Improvement Act/Central Valley Project, Trinity River Division (CA)

Appropriation.—Central Valley Project Restoration Fund

Authorization.—Public Law 98–541, To Provide for the Restoration of the Fish and Wildlife in the Trinity River Basin, California, and for Other Purposes, October 24, 1984; Public Law 104–143, Trinity River Basin Fish and Wildlife Management Reauthorization Act of 1995, May 15, 1996; Central Valley Project Improvement Act, Title XXXIV, Public Law 102–575

WATER AND RELATED RESOURCES CVP—TRINITY RIVER DIVISION

[Summarized Financial Data [1]]

	Federal	Non-Federal	Total
Approved by Congress 2008	$10,295,000	$3,039,000	$13,334,000
Budget Request for fiscal year 2009	10,317,000	3,133,000	13,450,000

[1] Includes Water and Related Resources only, does not include Restoration funds.

CENTRAL VALLEY PROJECT—RESTORATION FUND

[Summarized Financial Data [1]]

	Federal	Non-Federal	Total
Approved by Congress 2008	$59,122,000	.....	$59,122,000
Budget Request for fiscal year 2009	48,579,000	.....	48,579,000

[1] The summarized financial data is based on the Central Valley Project Restoration Fund.

TRINITY RIVER DIVISION WATER & RELATED AND RESTORATION FUND

[Summarized Financial Data]

	Federal	CVP Restoration Fund	Non-Federal	Total
Total Estimated Cost [1]	$166,432,952	([2])	.....	$166,432,952
Allocations through fiscal year 2007 [1]	107,921,637	$7,126,498	.....	115,048,135
Approved by Congress 2008	6,938,000	4,000,000	.....	10,938,000
Budget Request for fiscal year 2009	7,140,000	1,000,000	.....	8,140,000
Balance to Complete after fiscal year 2009	44,433,315	([2])	.....	44,433,315
Amount Requested by Member (S)	.....	4,000,000	.....	4,000,000
Additional Capability for fiscal year 2009	.....	600,000	.....	600,000

[1] Does not include Grass Valley Creek (Buckhorn Debris Dam).
[2] N/A.

Location and Description.—The Trinity River Division is located in Trinity County in northwestern California. The Trinity River Restoration Program was initiated in 1984 to restore and maintain the fish and wildlife stocks of the Trinity River Basin to levels that existed just prior to construction of the Trinity River Division. The Central Valley Project Improvement Act of 1992 further supported restoration objectives, acknowledged the Federal Government's trust responsibilities, specified minimum releases of 340,000 acre feet per year, and established completion dates for a Flow Evaluation Study. The current phase of the program resulted from the Trinity River Mainstem Fishery Restoration Environmental Impact Statement and Record of Decision (ROD) signed on December 19, 2000. It calls for establishment of a strong science program, significant physical/mechanical restoration actions in the mainstem, as well as increased releases to the river from the historical 25 percent up to 48 percent of the average annual inflow to Trinity Reservoir.

Project Status.—Significant progress has been made in many aspects of the program, with four bridge modifications completed and open to traffic (April 2005), one house acquired and relocated (March 2006), and all floodplain infrastructure modifications completed to allow for peak releases of up to 11,000 cubic feet per second (cfs) depending on water year type (April 2007). The largest release for fishery restoration purposes since completion of the dams in 1963, 7,000 cfs, was made on May 10, 2005, followed by an even larger release of 10,200 cfs in May 2006. Construction of the first major channel rehabilitation project (over 1 mile in length) was completed in November 2005. Four sites were constructed in 2006, and three more in 2007. Eight channel rehabilitation sites will be constructed in the summer and fall of 2008, with an additional eight sites planned for 2009. The remaining 23 rehabilitation sites are in the initial planning stages and scheduled for construction at the rate of 6–8 per year during the period of 2010 to 2012. Fisheries and related studies have been funded at $4.0 to $4.5 million per year with the objective of monitoring long term progress toward juvenile salmonid production goals, habitat creation, returning adult spawners, and harvest.

Additional Capability for fiscal year 2009.—Reclamation has the capability to use an additional $600,000 in fiscal year 2009 funds to fully obligate the channel rehabilitation construction contracts planned for the summer of fiscal year 2009, resulting in important new fishery habitat. Planning, design, and environmental compliance activities for the next set of channel rehabilitation projects scheduled for fiscal year 2010–2012, and related monitoring activities in fiscal year 2009 are adequately funded.

Submission of this capability statement does not reflect departmental support. The Department does not support the addition of funds for any program or project that would result in the reduction of funding for other programs or projects in the President's budget.

Problem Areas.—Earmarking of funds in the Restoration Fund could impact other programs and projects. Funding priorities of the Restoration Fund are established through a deliberative process, including stakeholder input that assesses the relative benefits and urgency of restoration and infrastructure projects that are competing for funds.

Congressional Location and Representation.—State of California

1st Congressional District.—Mike Thompson (D)

2nd Congressional District.—Wally Herger (R)

Senators.—Dianne Feinstein (D), Barbara Boxer (D)

Congressional Members Requesting Additional Funding.—Senator Dianne Feinstein

RURAL WATER

Question. You funded only two rural water projects in your budget. Can you explain the rational for this?

Answer. The fiscal year 2009 President's budget balances several priorities. This includes funding for ongoing construction projects such as rural water, while maintaining existing infrastructure and other ongoing priorities, all within the established budget targets. The President's budget includes $39 million for rural water projects; $26.2 million is allocated to the Mni Wiconi rural water system and $12.76 million is allocated to the Garrison rural water supply system.

The criteria used for funding rural water projects give first priority to operation and maintenance of rural water systems. This priority is consistent with previously enacted Federal legislation and for the protection of the Federal investment. Once operation and maintenance needs are met, funds are allocated for rural water construction. For rural water construction, the criteria and number of considerations consist of two factors: (1) Percent of ongoing projects completed, and (2) projects serving tribal communities. These evaluation factors allow Reclamation to finish some of the ongoing rural water projects within the constrained budget in the near future.

Question. Don't the Fort Peck/Dry Prairie and the Rocky Boys projects in Montana also have a Tribal component? What would it take to get them funded?

Answer. Yes, both projects have tribal components. The Assiniboine and Sioux Tribes of the Fort Peck Reservation sponsor for the Fort Peck Reservation/Dry Prairie Rural Water System in northeast Montana. The Chippewa Cree Tribe of the Rocky Boys Reservation sponsors the Rocky Boys/North Central Regional Water System in north-central Montana.

The outstanding costs for construction of the Fort Peck Reservation/Dry Prairie and the Rocky Boys/North Central projects are approximately $247 million and $314 million, respectively.

Within the funding available, Reclamation focused on funding projects with greater percentage completion.

Question. If I am understanding you correctly, these ongoing projects need to continue to have Congress add funds to them so that maybe they might eventually be far enough along that you might budget for them. Correct?

Answer. The fiscal year 2009 President's budget balances several priorities including funding for ongoing construction projects such as rural water, while maintaining existing infrastructure and other ongoing priorities. Additionally, all projects are within the budget targets that have been established. There is no correlation between projects included in the President's budget and Congressional write-ins.

Question. The Lewis and Clark rural water project has been funded for the previous 4 years, even in fiscal year 2007, when the administration prepared a spending plan under the continuing resolution. Why was this project not funded for fiscal year 2009? It certainly makes one wonder if there could have been a hint of politics in your decisionmaking process since Senator Johnson is up for reelection this year. I realize that this may just be a coincidence, but it does make one question the prevailing belief by some folks that all recommendations by the administration are merit-based or competitive allocations of funding but anything that Congress provides is self serving or tainted by political considerations.

Answer. Given the need to work within the framework of today's budget realities, as well as the need to be attentive to priorities associated with existing water and power infrastructure throughout the West, Reclamation is unable to fund the needs of all of the ongoing rural water projects.

Question. Will the MR&I funding amount that you proposed for the Garrison Diversion Unit provide for a useable increment of work on either the tribal or non-tribal systems?

Answer. The funding amount would provide for some increment of work for both the State and tribal programs, particularly on smaller contract items. Sponsors of larger projects such as the Northwest Area Water Supply System, the Southwest Pipeline, and the Standing Rock Sioux Tribe's new intake and water treatment plant would likely have to find other sources of funding to cost-share construction.

Question. How long would it take to complete the project at this funding rate?

Answer. The State and the Tribal Municipal, Rural, and Industrial grant programs are programs rather than singular projects. Therefore, completion is equal to reaching the construction ceilings established in the Dakota Water Resources Act.

Question. How much higher will the cost of the Garrison MR&I project be due to this drawn out schedule?

Answer. The Garrison Tribal and State MR&I are grant programs consisting of numerous projects. It is difficult to predict the ultimate cost of each project since cost is a function of both funding levels and inflation of construction costs. We agree and fully understand that total construction costs increase as schedules are extended. As an example, the Dakota Water Resources Act increased the State MR&I grant program by $200 million in the year 2000. That indexed amount is now approximately $260 million.

WATER FOR AMERICA

Question. We have had to carry language annually for the last several years for the granting program that was an integral part of Water 2025. Will we be required to carry similar language for the Water for America initiative?

Answer. The Water for America Initiative is largely being undertaken within Reclamation's existing authority. Additional authority is only needed to provide grants under the Challenge Grant Program and the Water Conservation Field Services Program. Reclamation transmitted a legislative proposal to the Congress in August 2008. As an interim measure, the inclusion of annual authority in the fiscal year 2009 appropriations act to issue grants and cooperative agreements may be necessary.

SAN JOAQUIN VALLEY

Question. If the San Joaquin River Restoration Fund legislation is not enacted in fiscal year 2009, how will those receipts be allocated within the Central Valley Project Restoration Fund?

Answer. If the $7,500,000 in Friant surcharge receipts are included in the Central Valley Project Improvement Act Restoration Fund fiscal year 2009 appropriations, the Department would propose that Reclamation use the funds to continue on going San Joaquin River Settlement activities, within existing authorities.

TITLE XVI

Question. The administration consistently says it is unable to support title XVI projects because of funding constraints. How do you justify this position on authorized programs and at the same time seek funding for unauthorized?

Answer. Although Reclamation supports efforts to increase local water supplies through increased recycled water use, title XVI projects must compete with other needs within Reclamation for funding priority in the President's budget request. The budget request for $7 million in fiscal year 2009 for title XVI reflects a balance of competing priorities.

Question. How much of a backlog currently exists in the title XVI Program?

Answer. Of the 43 title XVI projects specifically authorized and 2 demonstration projects undertaken through the general authority, 21 projects are actively being pursued and 4 are complete. The Federal cost share for the active projects, after fiscal year 2008, is nearly $400 million. The Federal cost share for the 12 projects currently not being pursued is estimated at $260 million.

Question. Of this program backlog, how much water could be generated if projects were constructed and operational?

Answer. The maximum treatment and delivery capacity for the 21 active title XVI projects is estimated at 640,000 acre-feet per year.

RESEARCH AND DEVELOPMENT

Question. Do you believe that research and technology demonstrations are important to solve our water supply needs?

Answer. For many years, the Bureau of Reclamation has funded internal and external collaborative research focused on improving our ability to provide water and power to the American public in a cost-effective and environmentally sound manner.

This research has produced great returns on the investment by: reducing costs of maintaining Reclamation facilities; improving water management and delivery; making new supplies available and affordable; reducing water losses; increasing power generation; reducing environmental impacts; and increasing the safety of workers.

Demonstrations are an important factor in gaining confidence in new tools and solutions. Water users and stakeholders often employ research and technology as a result of a successful demonstration. The Science and Technology Program have funded numerous successful demonstrations of research products, including: innovative coatings to prevent corrosion on spillway gates; new water supply prediction models; biocontrol of salt cedar; new methods to prevent fish entrainment; use of ballast filters to keep invasive mussels out of water supply systems; application of flow deflectors to prevent stilling-basin erosion; and biocontrol of aquatic weeds.

The Desalination and Water Purification Research program has funded external research on advanced water treatment technologies for several years. Reclamation provides priorities for the research and technical review of research proposals. More than 140 research projects and reports have been completed and are available to the public, covering a wide range of research and technology development for treatment of saline and brackish waters.

Some of these research studies have been expanded into demonstration projects that are of sufficient size to develop more accurate estimates of full-scale costs. This has been especially helpful when the technologies being demonstrated have been studied only in the laboratory or have had limited "real-world" testing. This demonstration testing has also provided time to identify potential institutional, economic, environmental, and social issues.

Question. Should there be cost sharing requirements these R&D projects?

Answer. Nearly all of the research that Reclamation funds involve cost-sharing or contributions from outside partners.

The Science and Technology Program have partnership contributions totaling nearly $5.6 million for fiscal year 2008. This is almost a one-to-one match in funding. While cost sharing is encouraged for this research, it is not a requirement. This enables us to fund highly innovative and high risk research, a special focus of Federal research investment.

Both the Desalination and Water Purification Research program (DWPR) and the title XVI program require cost sharing. These are programs that provide funding to external non-Reclamation organizations to carry out research. The cost share helps to show the commitment of the recipient and provides a higher probability that the recipient will apply the results. One important exemption is that the DWPR program exempts a yearly programmatic limit of $1,000,000 from cost share for universities. Without this exemption, it is very difficult for universities to find cost share either as cash or in-kind services.

Question. Where do you think research should be focused?

Answer. The S&T Program focuses on the challenge that face 21st century water managers, specifically issues that other agencies or the private sector are not already researching. These include problems related to water supply, water delivery, infrastructure maintenance, hydropower production, and decision support. Some research funding is reserved for emerging, high-priority issues, such as climate change and the spread of invasive mussels into western water systems.

Desalination Research—National Academy of Science Review

The National Academy of Science has released their report, "Desalination: A National Perspective". The 2 year study was funded by Reclamation's Research and Development Office and the Policy Program Services Office, along with the U.S. Environmental Protection Agency, to examine the state-of-the-art in advanced water treatment technologies and recommend priorities for Federal research.

The review panel recommended that Federal research be focused upon the following:

—Assess environmental impacts of desalination intake and concentrate on management approaches.
—Develop improved intake methods at coastal facilities to minimize impingement of larger organisms and entrainment of smaller ones.
—Assess the quantity and distribution of brackish water resources nationwide.
—Analyze the human health impacts of boron while considering other sources of boron exposure, to expedite water-quality guidance for desalination process design.
—Research configurations and applications for desalination to utilize waste heat.
—Understand the impact of energy pricing on desalination technology over time.

These recommendations are being used to prioritize future Reclamation investment in desalination research.

Research at the new Brackish Groundwater National Desalination Research Facility is focused on solutions for concentrate management, renewable energy/desalination hybrids, development of small-scale desalination systems for rural communities, and technologies for treatment of produced waters.

Desalination and water reuse research being carried out in partnership with the WateReuse Foundation is focused on the following priority areas: policy, social sciences, and institutional issues; microbiology and disinfection; chemistry and toxicology; and treatment technologies for water reuse and desalination.

DESALINATION

Question. Can you update us on the status of National Brackish Groundwater National Desalination Research Facility? Have any research activities been initiated at the facility?

Answer. The testing and shakedown of systems at the new Brackish Groundwater National Desalination Research Facility (BGNDRF) has been completed and research activities have begun. Studies are being carried out by Sandia National Laboratory on zero discharge desalination. Reclamation has been developing a test system and will soon begin testing on a new high flux membrane developed under an Office of Naval Research Grant. New Mexico State University is developing an improved electrodialysis process that will be moved to the BGNDRF for testing. The Bureau of Reclamation has been in contact with several organizations to discuss ideas for testing.

A cooperative agreement has been developed with New Mexico State University to carry out desalination research at the facility, beginning at the start of fiscal year 2009. This provides $1,100,000 to carry out research at the BGNDRF, as well as, $2,200,000 for research, education, and training/outreach/technology transfer.

MIDDLE RIO GRANDE

Question. We made changes to the collaborative program in the fiscal year 2008 Energy and Water Act, to provide for all of the organizations involved in the Middle Rio Grande to more effectively work together. Are these changes working as intended? Is there anything that can be done to make this program work more effectively?

Answer. The fiscal year 2008 Energy and Water Act did several things for the collaborative program. While all of these changes were intended to benefit the program, the long term benefit to the program is not yet known. The Act officially established the Executive Committee. While lack of permanent authority has not hampered Reclamations ability to carry out program activities, explicit permanent authority would provide long term stability to the program.

The Army Corps of Engineers also received their own funding stream in fiscal year 2008 for implementing the 2003 Biological opinion and the collaborative program long term plan. They still requested program support funding from the collaborative program in fiscal year 2008.

The 15 percent cap on Reclamation's administrative expenses has been adhered to in a transparent manner. This no longer appears to be a divisive issue for non-Federal program members. The hiring of a new program manager and a renewed program focus on fiscal responsibility seems to have addressed this situation for the time being.

EXECUTIVE ORDER

Question. I am sure you have looked at the President's Executive order (EO) on earmarks. Have you made any determination as to how you will comply with this in fiscal year 2009?

Answer. The Department has made a determination as to how it will comply with the Executive order, which is based on direction issued by the Office of Management and Budget. OMB guidance provides direction relative to operations under the Continuing Resolution for 2009 that we are complying with.

Question. The Executive order indicates that any funding directed by Congress is an earmark, but by definition, the President can propose the exact same thing and it is not. This is absurd. If we provide funding for an authorized project and the administration proposes funding for an authorized project, how are the two different?

Answer. The Executive order identifies the difference in the following definition: earmarks are funds provided by the Congress for projects, programs, or grants where the congressional direction circumvents otherwise applicable merit-based or competitive allocation processes, or specifies the location or recipient, or otherwise curtails the ability of the executive branch to manage its responsibilities pertaining to the funds allocation process. The U.S. Supreme Court has made it clear that committee reports and other legislative history materials do not bind executive agencies.

Question. The Executive order appears to have a major impact on how we appropriate funding to your agency. If we have to put all of the projects in bill language in order to ensure that you comply with congressional direction, we will. How will that impact the way you execute your fiscal year 2009 program?

Answer. Based on the Executive order, earmarks that are in law can be funded. Earmarks that are not in statute may not be funded unless the decision to fund them is based on authorized, transparent, statutory criteria and merit-based decisionmaking and to the extent consistent with applicable law.

Question. Can you describe the merit-based or competitive allocation process that you use to determine which projects are proposed for funding in the budget request?

Answer. Our process begins at the regional level with a merit-based, competitive evaluation of projects for funding. The bureau sets priorities among the regional requests in order to submit a budget request to the Department. At the Department, the bureau's request competes with and is prioritized along with the other bureau budgets for development of a request that is submitted to the Office of Management and Budget. OMB conducts an evaluation and prioritization across the Government that leads to the development of the President's budget.

Question. This is somewhat rhetorical, but why is this process anymore transparent than how the Congress prepares an appropriation bill? Is there public input into your decisions?

Answer. As part of its Managing for Excellence initiative, the Bureau of Reclamation has established a policy on collaboration with customers and stakeholders to identify and provide opportunities for effective participation, where appropriate, to meet its mission. Reclamation meets with customers and stakeholders to develop and foster a participative relationship and to provide quality service. The degree of collaboration is largely dependent upon the complexity of the issue being addressed. Reclamation initiates collaboration at the earliest stage possible; and shares information with customers and stakeholders prior to key decisions being made.

ANIMAS-LA PLATA

Question. What is the status of the Animas-La Plata project? When do you anticipate construction to be complete?

Answer. As of June 2008, the overall project was 62 percent complete. Construction work on 3 of the project's primary features; Ridges Basin Dam, Durango Pumping Plant, and Ridges Basin Inlet Conduit, is progressing well and is approximately 96 percent complete. Work is proceeding according to schedule with the mitigation area lands, including improvements being transferred into operation and mainte-

nance status in October 2008. Progress on the Navajo Municipal Pipeline includes award of the first construction contract for Horizontal Directional Drilling, achieving a preliminary settlement on the construction of the first 7 out of 29 miles of pipeline, and nearing design completion on the city of Farmington Reach. Construction is expected to be completed in 2012.

YUMA DESALTING PLANT

Question. We have provided direction for the last several years that the Yuma Desalting Plant should be maintained and demonstrated to be operated at one-third capacity. What is the status of the plant? Will we be able to get to one-third capacity this year?

Answer. To date, the United States has met salinity requirements, established in Minute 242 of the 1944 U.S.-Mexico Water Treaty of 1944 (Treaty) with Mexico, through bypassing 108,000 acre-feet of saline agricultural return flows. Due to the need for more operating information about the Yuma Desalting Plant (YDP) and the on-going drought in the Southwest, Colorado River water users in the Lower Basin and Reclamation began discussing a jointly funded pilot run of the YDP. A 90-day demonstration run was completed in 2007, which provided some operational information to assist in planning for future operations. This jointly funded pilot run is for longer duration and would provide additional operating information needed to ascertain future plant operation needs and costs.

The maximum anticipated cost of the run, including preparing the plant to operate, is estimated to be at $23 million. Funding partners include the Metropolitan Water District of Southern California, Southern Nevada Water Authority, and Central Arizona Water Conservation District. In return for funding, the partners would receive a share of the water produced.

Preparations are underway for the pilot run of the YDP. The run is scheduled in the summer of 2009. Preparations for plant operations fall into three major categories: (1) readying the plant, (2) meeting appropriate compliance and regulatory requirements, and (3) preparing a funding agreement. Plant equipment is currently being inspected, tested, and repaired, with costs estimated at $2.6 million. These repairs will be completed in order to conduct the run (e.g., replacement of selected piping segments and the upgrade of chlorination and ammonia systems).

For the pilot run, the YDP would operate for about 12 months, producing an estimated quantity of 30,000 acre-feet of water. Operations are currently anticipated to include 1 month to stabilize pretreatment, 2 weeks at 10 percent of full capacity, 2 weeks at 20 percent of full capacity, and 10 months at 33 percent of full capacity.

LOAN GUARANTEE

Question. I have noticed in your budget that you are providing $1 million to initiate implementation of the Loan Guarantee Program for rural water projects. As more than half of your projects are more than 50 years old, I expect that this program has raised considerable interest in the West. How do you envision this program working?

Answer. Reclamation is in the process of developing and publishing rules for implementation of the program. The law provides for three categories of projects: (a) rural water supply projects, (b) repair and rehabilitation of Reclamation facilities, and (c) improvements to water infrastructure directly related to Reclamation projects.

Reclamation's budget request for fiscal year 2008 considered only category (b) projects, and was intended as a pilot year for the program. However, because the final rule has not been published yet, we expect to use the fiscal year 2008 budget request to accomplish necessary program outreach efforts as well as provide training for agency personnel in fiscal year 2009. In addition, we anticipate initiating a few pilot projects in fiscal year 2010. Following development of detailed eligibility criteria for category (a) projects, Reclamation's future appropriation request will include funding for these rural water supply projects as well.

Generally, the steps involved in issuing loan guarantees will be as follows: (1) Reclamation will estimate the need and potential requests of eligible projects as identified in the statute, and make appropriations requests accordingly; (2) Reclamation will determine if a borrower's proposed project can be considered under the criteria given in the statute and the rules being developed; (3) Borrowers will apply for a loan from a lending institution; (4) The lender will determine whether the borrower meets its risk criteria; (5) Once the lender approves the application, the borrower and lender will meet with Reclamation to request consideration for a loan guarantee; (6) Reclamation will review the application based on prioritization criteria to be identified in the rules, as well as availability of appropriations, and ap-

prove or deny the request; (7) Following approval, and completion of all other requirements, such as environmental compliance, permits, etc. a final notice of guarantee will be issued to the lender and the loan funds will be disbursed.

Question. What will be the eligibility criteria?

Answer. Eligibility criteria are being developed through the formal rulemaking process, and will include factors such as financial capability for repayment, engineering need and feasibility, historical diligence in performing routine O&M, environmental impacts, and efficiency opportunities.

Question. Will this solve the recapitalization problems for many of the older projects in the West?

Answer. The loan guarantee program will not likely solve all of the recapitalization problems of older projects in the West, but it will be a valuable tool to assist in meeting this challenge.

QUESTIONS SUBMITTED BY SENATOR PATTY MURRAY

ODESSA SUBAREA SPECIAL STUDY

Question. I am pleased to see that the Odessa Subarea Special Study is progressing on schedule and that the Bureau last month released the "Appraisal-Level Investigation—Summary of Findings" report. It is my understanding that this report identified the water supply and delivery alternatives that have been selected for further study. And I was happy to see that the President's budget included funding for this important study.

Now that you have narrowed down the alternatives to be studied, can you please tell me how this better understanding of what remains to be done will shape your timeline?

It is my understanding that now that the path forward has become more clear, an increase in the annual funding level will be needed to make sure that the study is completed in a timely fashion. Can we expect to see future requests from the Bureau to reflect this?

Answer. An expedited study schedule has been developed at the request of the State of Washington to respond to commitments it has made to constituents to seek a solution as quickly as possible to address the urgency of the declining Odessa Ground Water Aquifer. Reclamation plans to complete feasibility-level engineering investigations; economic analyses; environmental compliance activities, including requirements for National Environmental Policy Act requirements under the expedited study schedule Reclamation would prepare a combined planning report and final environmental impact statement by the end of fiscal year 2011.

Given the current budget climate it will be difficult to fund the study at the level needed to complete on schedule (fiscal year 2011). The State of Washington has been Reclamation's Study partner and has provided substantial funding to date for the Study which is one of its highest priorities in the Columbia River Basin.

COLUMBIA BASIN PROJECT, POTHOLES SUPPLEMENTAL FEED ROUTE

Question. As you know, the Columbia Basin Project is an important tool for farmers in my home State of Washington. And securing a reliable water supply for the Potholes Reservoir is a key element to ensure efficient operation of the Project. I worked with my colleagues to include funding for the Potholes Reservoir Supplemental Feed Route in the fiscal year 2008 appropriations bill.

Can you please tell me how the Bureau is currently working to carry out its efforts on the Supplemental Feed Route and how this fits into your larger list of priorities at the Project?

Answer. The Columbia Basin Project is designed to collect return flows in Potholes Reservoir from irrigation in the northern half of the project for delivery to the southern half. Return flows do not provide all the water for the southern half and have to be augmented by direct feed from water pumped from the Columbia River at Grand Coulee Dam. The feed route, developed in 1980, has served well but is strained due to increased demand and water conservation measures that reduced returns. Reclamation completed a study funded by the State of Washington to evaluate and select a supplemental route that could supply one quarter of the yearly average feed need.

With the completion of the study, the State provided funds to enlarge a road crossing on the Frenchman Hills Wasteway. This work was completed in March 2008 and will provide a supplemental feed capacity of approximately 25,000 acre/feet when land acquisition is completed. On the Crab Creek portion of the supple-

mental feed route, the State is providing funds to study sedimentation into Moses Lake. This study is underway and will be completed next year.

Fiscal year 2008 funds are being used to begin the purchase of land rights and to design and develop specifications for several improvements needed to implement the supplemental route. Improvements include: an outlet structure on Pinto Dam and Brook Lake, Grant County Road 16 crossing on Crab Creek, and conceptual designs for various wildlife enhancements structures along the creek

Given the current budget climate we have been unable to provide funding to this effort. Fortunately, the State as part of their Columbia River Water Management Program has been able to make significant contributions to assist in this effort.

SUBCOMMITTEE RECESS

Senator DORGAN. The hearing is recessed.

[Whereupon, at 11:08 a.m., Thursday, April 10, the subcommittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

WEDNESDAY, APRIL 16, 2008

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 1:58 p.m., in room SD–138, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Feinstein, Reed, Domenici, Bennett, Craig, and Allard.

DEPARTMENT OF ENERGY

NATIONAL NUCLEAR SECURITY ADMINISTRATION

STATEMENT OF THE HON. THOMAS P. D'AGOSTINO, ADMINISTRATOR

ACCOMPANIED BY:

ADMIRAL KIRK DONALD, DEPUTY ADMINISTRATOR FOR NAVAL REACTORS

MAJOR GENERAL BOB SMOLEN, DEPUTY ADMINISTRATOR FOR DEFENSE PROGRAMS

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. We're going to call the hearing to order. We appreciate, very much, all of you being here, and especially to our witnesses, we're pleased that you've joined us.

We're starting a couple of minutes early, we will have a vote that starts at 2:15 in the Senate, so the committee members will leave here probably at 2:20, we'll go vote, and come back. So, we will have a brief interruption, for which we apologize.

We are here to take testimony from the National Nuclear Security Administration (NNSA) on the fiscal year 2009 budget request of three NNSA programs—weapons activities, naval reactors and the Office of the Administrator. We'll cover the budget request of the Defense Nuclear Nonproliferation Program in a separate hearing in 2 weeks' time.

Today we have two panels. Administrator Tom D'Agostino will be our witness on the first panel. He will be joined by Admiral Donald—the Deputy Administrator for Naval Reactors, and by General Smolen, Deputy Administrator for the Defense Programs, to help respond to questions.

Our second panel will consist of the three National Weapons Laboratory Directors—Dr. Mike Anastasio of Los Alamos, Dr.

George Miller of Lawrence Livermore, and Dr. Tom Hunter of Sandia.

The three Directors play an important role in the stewardship and the certification of our nuclear weapons stockpile, and I appreciate them being willing to respond to our request to come to Washington.

The total NNSA budget request for fiscal year 2009 is nearly $9.1 billion, by far the largest program in the Department of Energy, making up about 36 percent of the Department of Energy's budget.

Within that budget request, $6.6 billion is for weapons activities, $1.2 billion for nuclear non-proliferation programs, $828 million for naval reactors and $404 million for the Office of the Administrator.

The naval reactors budget seeks $47 million above fiscal year 2008 enacted level, the primary driver of that is to support work in Idaho on naval spent nuclear fuel. The reactors program is highly respected, rarely draws much attention from the Congress or the public, and in many ways, that's a very good thing. And Admiral Donald, I commend you and your organization for your work, and appreciate your being here today.

The Weapons Activity Programs stand in contrast to the Naval Reactors Program in both size, and also in the sense that it does draw a significant amount of attention from the Congress, and from the public. Given the program's focus on the safety, security and reliability of our nuclear weapons, that's a good thing. In fact, I would say Congress and the American people should continue to pay an even greater amount of attention to issues that surround nuclear weapons.

The $6.6 billion budget for weapons activities represent the single largest program in this Energy and Water bill. It's larger than the investments in the Corps of Engineers, for example, the Office of Science, or the funding to clean up the former nuclear weapons complex.

The $6.6 billion weapons activities request in the President's budget is $321 million above the fiscal year 2008 enacted level. That is the largest proposed increase, other than the Office of Science.

A small, but telling, illustration is that the Department's budget proposes to cut $200 million from the effort to clean up the former nuclear weapons complex that created the special nuclear material in our current stockpile. That means this Department will unfortunately fail to meet regulatory milestones to clean up radioactive-contaminated waste. We had a hearing about that recently.

Yet, in the same budget, the administration creates a new account to fund $77 million for the NNSA to tear down non-contaminated buildings. And I can support the efforts to tear down unneeded buildings, but it's clear the administration is prioritizing that budget by failing to meet its legal obligations in the other area, on which we've held a hearing just recently.

I mentioned that the Weapons Activity Program attracts public attention. Two areas that I want to mention are the Complex Transformation and the Reliable Replacement Warhead (RRW). NNSA currently has its Complex Transformation-preferred alternative out for public comment. I commend NNSA for holding nu-

merous public meetings on the plan, and for extending the written comment period. That makes a lot of sense to me.

Two basic comments I hear from people are that the Complex Transformation-preferred alternative fails to close any site-through consolidation, and that significant investment in infrastructure are being proposed that may or may not be needed. I hope we can explore some of those areas in questioning today.

The other NNSA issue that draws considerable attention is the proposed Reliable Replacement Warhead. The premise behind RRW is that we can produce a new nuclear weapon that is, in many cases, smaller, safer, reliable, and less costly than the current stockpile. I understand that premise, but I do have some significant concerns about a program that is not set in a construct of an overall strategic defense policy, analyzing the impact of such a program on our international nuclear non-proliferation efforts.

Last year, the Armed Services Committee, through the leadership of Congresswoman Tauser, in the House, created the Congressional Commission on Strategic Posture of the United States. This is a congressionally appointed panel to review the role of nuclear weapons in our national strategic defense.

This subcommittee supported that effort, and also called on the administration to submit a comprehensive nuclear weapons strategy for the 21st century. The idea behind both of these directives is that we need to understand the role nuclear weapons will play in our country's future, and develop a national policy that is reflective of that understanding.

The RRW, I believe, skips that step. If the RRW is pursued without such a broad policy review, it will have the de facto effect of creating that national policy.

For that reason, I supported, ultimately, in conference, zeroing out the funding request for the RRW in fiscal year 2008. Furthermore, it's not my intention to fund the administration's $10 million request for RRW in the fiscal year 2009. I believe we must wait for the work of the congressionally appointed panel and the next administration's Nuclear Posture Review before we move forward with a program that has such significant national and international policy implications.

Having said that, I want to make another comment, as well. In addition to recommending that we not fund, in my chairman's mark, the $10 million, I believe very strongly that we need to retain our critical skills at our national laboratories. They are a national treasure for a lot of reasons, but especially those that are engaged in programs dealing with safeguarding our—and making certain that—our stockpile is certifiable and reliable. It's very important that we retain the key personnel and not have our national laboratories losing the kind of strength—intellectual strength—that I fear would happen if we don't adequately fund them. The question isn't whether we should fund them; I believe I would join my colleague from New Mexico in feeling very strongly that we want to have a strong funding base for our national laboratories. But, I exclude from that, at this point, the specific funding for a program called RRW until other conditions are met. And they may or may not be met in the future.

I want to make one additional comment, and that is, Senator Domenici has served on this panel for a long, long, long time, as chairman and ranking member, and he has been tireless in his efforts to promote a good number of public policies that have become law and have advanced the interests of this country. We agree on many things, disagree on a few things here and there, but it's been a pleasure to work with him, and this will be his last spring—I was going to say spring cleaning, but that wouldn't be the case——

Senator DORGAN. This will be his last set of spring hearings that we hold for the agencies under our jurisdiction. And I did want to take the opportunity to say to Senator Domenici how much I appreciate working with him, and let me call on him for an opening statement.

OPENING STATEMENT OF SENATOR PETE V. DOMENICI

Senator DOMENICI. Thank you very much, Mr. Chairman. As the time grows near for this terminating date, I find that there is more and more business that I see out—that we haven't finished. But I have kind of concluded that that's the way it's going to be any time in my life, so this is as good a time as any to leave it to somebody else after January or February of this coming year. However, there are a number of things we ought to try to get done.

I'm sorry that we don't agree on the RRW, because it seems to me that we've made this too complicated. The truth of the matter is you look out in the world and, you know, in Europe, England, Russia, the United States—we're the countries with big nuclear arsenals. And all of them, except us, have already done their RRW, or are heavily engaged in it. They have new weapons, new structures, new weapons, new weapons systems. Many of them are already being done for 30 and 40 year out—that they'll be good for 30 or 40 years—meaning, to me, that they have already have accomplished what we might have accomplished with an early-on RRW.

But, we'll get there, and in due course, the things that were included in it that we were going to try to do, we've got to hope, very much, that they will get done. Because, what we were talking about was not more weapons, but less. We weren't talking about bigger weapons, but rather smaller ones, we were talking about weapons that are safer, in all respects. That's what RRW would have done had it proceeded. That's why I say, it will get done, whether it's RRW or another way, let's hope, but within the next 3 or 4 years, we'll see our way clear to do that.

Senator, I very much appreciated your opening remarks. I think you're going to be—this subcommittee is kind of one that most people didn't pay attention to for a long time. I think the fact that we will get you as chairman, coming from outside of the domain of the laboratories, I think you will bring some Senators into the web of trying to listen and understand the importance of this subcommittee. I felt, many times, that too few Senators cared very much about what was going on in this subcommittee.

I recall, for the lab directors, when we started—now it seems like it should just be yesterday, but it was a long time ago—when we started Science-based Stockpile Stewardship. I told you all in New Mexico many times that I regretted that, when we made the

change and started moving in that direction rapidly, and funding it, and doing the things we ought to do, that I found myself on the floor of the Senate with, literally, no one paying attention, nobody challenging the work we had done, and no votes occurring. We produced the bill, many times, without a single vote on the floor, Senator. And it was Harry Reid and I, and we'd go down there, and sometimes Harry would have to go somewhere, and I'd be alone, and we'd pass the bill. And we're now finding that the issues are very important issues, and a lot more people ought to be involved one way or another. I hope you can get them involved, because that will make for it being better for everybody.

The past 15 years we have accomplished quite a bit in adapting to the 21st century security demands, and making much scientific investments in the laboratories. Critics of the weapons program have claimed that nothing has changed, that we have not moved beyond the cold war. It couldn't be more wrong.

From my vantage point, a lot has changed. In 1992, the Bush administration initiated a moratorium on nuclear testing, after Congress voted, the administration implemented it, and it still holds today. In response, Congress and the Clinton administration worked in a bipartisan manner to establish a Science-based Stockpile Stewardship I just alluded to it. I'm proud to say that we accomplished our goals, and in the process, made the United States the world leader in high-performance computing—just an incidental item—but it was caused by Science-based Stockpile Stewardship's requirements, which drove and made demands upon the industry, and they produced.

In terms of weapons policy, there's been a considerable shift. In 2004, President Bush set a goal of cutting nuclear stockpile in half by 2012. With support from Congress in dismantling efforts, that goal was met in 2007, 5 years early. Having reached that target, the President ordered an additional 15 percent cut.

Today we have the smallest deployed stockpile since the Eisenhower administration, and we are on-schedule to meet the arms reduction laid out by the Moscow Treaty in 2002, by the Bush administration.

Recognizing that the cold war is over, the administration has also reduced the role of nuclear weapons in our strategic defense, consistent with the Nuclear Posture Review of 2001. I support the premise that we can make even further reductions in our stockpile, by maintaining our scientific expertise, with the right production capabilities to reverse course, if necessary. We did not need to keep a large number of warheads—we don't need to keep a large number in reserve.

I also believe that so long as we must maintain our stockpile, we must make every effort to deploy the safest, most secure technology possible. In terms of production and handling, we should also work to eliminate hazardous material that possesses significant threats to our workers and to our environment.

Nobody can predict how long we will need a stockpile. So long as we have nuclear weapons, we must manage them and the weapons complex responsibly. We must continue to look for ways to do things better, to stop doing things so we—make us irresponsible.

Mr. Chairman, this budget provides a modest amount of funding—$10 million—for the RRW design. I've stated most of what I would want to say, and you have most of what you would say. The requested funds would pay for an analysis, not weapons production. I support completion of the study as soon as possible, to provide policy makers with the facts needed to make an informed decision regarding our nuclear deterrent, but I understand your position, and I have not yet decided whether I would challenge you with a vote on the floor. Perhaps after you have done it, we'll talk a little, and maybe I wouldn't do that. But at this point I feel rather strongly about it, and sorry that we could not reach agreement.

As I said, France, Russia, the United Kingdom., and China—I didn't say before—are all in continual process of replacing and updating their weapons, investing in new infrastructure, and facilities that will operate through the middle of the century—I indicated that a while ago—even as our U.S. stockpile continues to decrease.

I'd like to close with a comment from the—on the NNSA complex, the transformation effort. I have sent formal comments to NNSA regarding their transformation proposal. While I will spare the subcommittee any full review, I believe the proposal misses the mark on science investment for the laboratories, and lack of investment in high-performance computing at Sandia National Laboratories. This is a capability that cannot be taken for granted.

I'm extraordinarily proud of what the labs and their staff have done in support of the United States national security mission, beginning with the Manhattan Project, the cold war, the international threat and the reduction efforts, the Science-based Stockpile Stewardship Program—the labs have always provided answers to the toughest questions facing our Nation, and will continue.

In my final year, I will push NNSA to better define its scientific mission, and develop a strategy for investment in scientific excellence. Science and engineering is the lifeblood of the laboratories, and serves as our best recruiting tool to attract world-class scientists to support our national security needs.

Mr. Chairman, I appreciate your providing the laboratory directors this opportunity. It's a rare occasion that we would have all three before us, and I thank you for making it happen.

Thank you.

Senator DORGAN. Senator Domenici, thank you very much.

Senator Craig has agreed to waive his opening statement, Senator, I appreciate that very much. A vote will start momentarily, and we will have to recess in about 10 minutes.

So, what I would like to do, is ask Administrator D'Agostino to make his statement, and then we will see whether we get to questions. We'll have a brief recess and come back and finish the hearing.

Administrator D'Agostino, let me say that we appreciate your work, we know you've assumed the reins in a very challenging time, we appreciate the work of Admiral Donald and General Smolen, and appreciate your being here. You may proceed.

STATEMENT OF HON. THOMAS P. D'AGOSTINO

Mr. D'AGOSTINO. Thank you, Mr. Chairman. I appreciate being here, Senator Domenici, Senator Craig, as well. I appreciate the op-

portunity to discuss the President's fiscal year 2009 budget request for the NNSA and your active commitment and engagement in our program itself.

We have a number of fundamental national security responsibilities for the United States, and I'm here to discuss the NNSA overall mission. I'm pleased to have with me, as you've noted, Deputy Administrator Admiral Kirk Donald, and Major General Bob Smolen for Defense Programs, and particularly pleased that the lab directors are here. As you know, it's been many years since they've had an opportunity to testify, and I think having the lab directors—provide them an opportunity to talk about something so important as our stockpile, is an opportunity that Members of Congress ought to get firsthand. So, I appreciate, sir, you calling them here.

NNSA is examining how to proceed, which addresses evolving national security needs in a manner that anticipates significant changes in the future, in how we manage our national security programs, our physical assets, and our people. The fiscal year 2009 request will go a long way towards making significant progress in many areas of focus, including those that we have embarked upon already in 2008.

We anticipate that our request of $9.1 billion will enable us to accomplish the following: First, begin the process of changing from a cold war nuclear weapons complex, to a 21st century national security enterprise, which includes shrinking the size of the nuclear weapons complex, and consolidating special nuclear materials at fewer sites, increasing funding for critical facilities that are needed to support a nuclear deterrent, including funding for a chemistry and metallurgy research replacement facility, increasing funding for cyber-security by 22 percent over the amount provided in 2008, improving cost savings associated with supply chain management—building upon the already $5 million of savings we've documented in 2007, we anticipate having those savings multiply to about $30 million in 2008, and envision taking cost savings even further in 2009.

Second, this program will further advance nuclear non-proliferation and radiological terrorism and activities to counter nuclear terrorism, including continuing our planned increases in budget requests for non-proliferation activities, which build upon the doubling of spending for these efforts, since September 11, 2001; increased funding for nuclear counterterrorism activities by 40 percent over the amount provided in 2008; increasing spending by 14 percent to secure highly-enriched uranium and other radiological materials, as part of a global threat reduction initiative; and, continue and completing activities under Bratislava Agreement with the Government of Russia.

Third, this program will secure and maintain an aging stockpile, including continuing our defense programs "Getting the Job Done" initiative, by staying focused on deliverables to the Defense Department; increasing the number of weapons dismantlements by 26 percent over the number of dismantlements in 2007; and, addressing current and anticipated challenges associated with certifying the stockpile, without requiring underground testing.

Fourth, ensuring the safety and reliability of the 103 operating naval nuclear propulsion plants, and continuing development work on nuclear propulsion technology to support required capabilities, as well as meeting future threats to U.S. security.

And finally, expanding our technical excellence, while developing the next generation of national security scientific and engineering talent. This effort is especially important to our weapons laboratories, and will require us to make important decisions to invest in certain programs and capabilities, and ensure our labs are run efficiently.

We seek to reduce the overall size of the nuclear weapons complex, and we believe it will allow for an increased focus in the areas of non-proliferation, nuclear counterterrorism, nuclear forensics, and support to the intelligence community.

Before concluding and taking your questions, I want to briefly mention a few items. As you know, nuclear weapons remain a cornerstone of our Nation's strategic defense posture, even as we continue to reduce the size of the stockpile. I'm pleased to acknowledge that, a few weeks ago, the Defense Department and Department of Energy submitted to Congress a classified white paper on the future of the nuclear weapons stockpile. While our current stockpile remains safe, secure and reliable, the supporting infrastructure has aged, with many of our facilities well over 50 years old. Maintaining the current infrastructure is not an option—it is too old, it is too expensive, it is too big, and it does not address all of our national security needs. Addressing these issues is possible, and can be accomplished with relatively flat budgets over the next 10 to 15 years.

In addition, this administration is driven by the Defense Department and the combatant commanders belief that the effort to study replacement concepts is important to the long-term assurance of the stockpile. We believe this is a key ingredient towards reducing the size of the stockpile beyond already the 50 percent reduction we have accomplished since 2001, and the further 15 percent reduction ordered by the President, President Bush, in December of last year.

Finally, our ability to effectively dispose of plutonium metals and materials coming out of our increased dismantling programs, and our work to consolidate materials, is critical to the effort to reduce the worldwide nuclear danger. This is viewed by the administration as a critical national security non-proliferation program. Just as the global threat reduction program seeks to repatriate secure, highly-enriched uranium from around the world and convert that material into beneficial energy use, so does the plutonium disposition program seek to eliminate excess plutonium with the added benefit of energy production.

We're working to comply with the direction given in the Fiscal Year 2008 Consolidated Appropriations Act, while preserving our vital national security mission focus.

PREPARED STATEMENT

Thank you, Mr. Chairman, I look forward to working with you and members of the committee on these programs, and answering your questions.

[The statement follows:]

PREPARED STATEMENT OF HON. THOMAS P. D'AGOSTINO

Thank you for the opportunity to discuss the President's fiscal year 2009 Budget Request for the National Nuclear Security Administration (NNSA). I want to thank all of the members for their strong support for our vital national security missions.

In the 8th year of this administration, with the support of Congress, NNSA has achieved a level of stability that is required for accomplishing our long-term missions. Our fundamental national security responsibilities for the United States include:

—assuring the safety, security and reliability of the U.S. nuclear weapons stockpile while at the same time considering options for transforming the stockpile and the complex infrastructure that supports it;
—reducing the threat posed by proliferation of nuclear weapons, material and expertise; and
—providing reliable and safe nuclear reactor propulsion systems for the U.S. Navy.

NNSA is examining how to proceed into the future to address evolving national security needs in a manner that anticipates significant changes in how we manage our national security programs, our assets and our people. To that end, the fiscal year 2009 budget request for $9.1 billion, a decrease of $35 million from the fiscal year 2008 Consolidated Appropriations Act, supports NNSA's crucial national security mission.

The fiscal year 2009 request will go a long way toward making significant progress in many areas of focus, including those that we have embarked upon in fiscal year 2008. NNSA anticipates that this request will enable the accomplishment of the following results:

—moving from a nuclear weapons complex to an integrated national security enterprise, including:
  —making decisions regarding transformation of the nuclear weapons complex based on the analyses in the Complex Transformation Supplemental Programmatic Environmental Impact Statement this year;
  —shrinking the size of the nuclear weapons complex and consolidating special nuclear material at fewer sites;
  —increasing funding for critical facilities, including an increase in funding for the preliminary design of the Uranium Processing Facility and Chemistry and Metallurgy Research Replacement facility over the amount provided in fiscal year 2007;
  —increasing funding for cyber security by 22 percent over the amount provided in fiscal year 2007; and
  —improving cost-savings associated with supply chain management, building upon nearly $5 million in savings in fiscal year 2007.
—advancing nuclear nonproliferation and countering nuclear and radiological terrorism, including:
  —increasing the amount of funds provided directly to NNSA nonproliferation activities by 7 percent over the funding amount provided in fiscal year 2007 (not including the Mixed Oxide (MOX) Fuel Fabrication Facility);
  —increasing funding provided to nuclear counter terrorism activities by 40 percent over the amount provided in fiscal year 2007;
  —increasing the rate at which Highly Enriched Uranium and other radiological and source materials are secured as part of the Global Threat Reduction Initiative (GTRI) program by 14 percent; and
  —and continuing and completing activities under the Bratislava agreement with the Government of Russia.
—securing and maintaining an aging stockpile, including:
  —continuing our Defense Program's "Getting the Job Done" initiative by staying focused on delivering products to Department of Defense in a timely and cost-efficient manner;
  —increasing the number of weapon dismantlements by 26 percent over the number of weapons dismantled in fiscal year 2007; and
  —addressing current and anticipated challenges associated with certifying the stockpile without requiring underground testing.
——expanding our technical excellence while developing the next generation of national security scientific, engineering and program management talent, including:
  —developing an expanded vision of the future role of our national laboratories in supporting NNSA's national security mission; and

——expanding NNSA's efforts in nuclear nonproliferation, counterterrorism, forensics, and support to the intelligence community.

Our testimony today will focus on the Weapons Activities, Naval Reactors, and Office of the Administrator accounts.

WEAPONS ACTIVITIES OVERVIEW

Nuclear weapons remain a cornerstone of our Nation's strategic defense posture and will likely remain so throughout this century, even as we continue to reduce the size of our stockpile. Our nuclear deterrent stockpile remains safe, secure and reliable. The supporting infrastructure, however, is aged—many of our critical facilities are over 50 years old. Stockpile Stewardship is working and has been successful to date at finding and remedying the technical challenges facing our aging stockpile. Additionally, we continue to reduce the size of the stockpile to meet the President's mandate to have the smallest nuclear stockpile consistent with our national security objectives. As a result, today the stockpile is half of what it was in 2001, and by 2012, the United States will have the smallest stockpile since the 1950s. Additional reductions in the stockpile are possible, but these reductions will require changes to the weapons complex and the composition of the stockpile.

Our national security enterprise is a national asset and our weapons laboratories remain unrivaled as the pinnacle of American scientific, engineering and technical expertise. Development and maintenance of our nuclear deterrent force has made possible American leadership in nuclear nonproliferation, nuclear counterterrorism, advanced computing, and high-energy density physics. None of these programs would be possible at its current level without technical advances made by the weapons program. As we continue transforming the infrastructure and maintaining our nuclear deterrent force into the 21st century, our goal is to do so without jeopardizing the advancements in other vital NNSA national security programs made possible by our investment in weapon activities.

Let there be no doubt: today's nuclear weapons stockpile is safe, secure and reliable and has not required post-deployment nuclear testing to date, nor is nuclear testing anticipated or planned. However, while today's stockpile remains safe, secure and reliable, the weapons laboratories, the Department of Defense and the NNSA are concerned about our future ability to maintain the stockpile in the future. The Stockpile Stewardship Program has worked well, so far, to discover and resolve problems that in the past would have required nuclear testing. However, the collective judgment of the Directors of our national weapons laboratories is that maintaining certification of the finely-tuned designs of the aging cold war stockpile through Life Extension Programs (LEPs) only, absent nuclear testing, necessarily entails increasing risk overtime. Although recent studies have placed the life of our plutonium pits at 85 to 100 years, other exotic materials used in our warheads degrade at different rates and many of their aging properties are still not well understood. The metallurgical and chemical issues we face with our aging warheads continue to be a technical challenge for our best scientists and the risk of catastrophic technical failure occurring as our warheads age cannot be ruled out absolutely. The one certainty we do know is that warhead certification in the absence of testing will become more difficult, especially as life extensions and component aging move the warhead further away from originally-tested designs.

After 9/11 we realized that the security threat to our nuclear warheads had fundamentally changed. The security features in today's stockpile are commensurate with technologies that were available during the cold war and designed for with the threats anticipated at that time. Major enhancements in security are not easily available via retrofits in the life extension programs.

To understand the challenges facing our stockpile, an analogy is in order. Today's Mustang remains a high-performance automobile, has about the same dimensions and weighs only a few hundred pounds more than the first Mustangs, and has all the modern safety and security features we expect today—air bags, anti-lock brakes, GPS navigation, satellite radio, theft deterrent and alarm systems. The 1965 version had none of these features, not even seat belts! We deploy warheads today that have 1970–1980's safety, security and anti-terrorism features. It does not mean that these warheads are not safe and secure, but we can do better and we should do better. Based on our initial assessments, I believe that the reliable replacement warhead concepts provide opportunities to incorporate the latest technological advances for precluding unauthorized use in a post-9/11 threat environment.

To address these challenges, the administration has proposed two efforts to maintain the viability of the deterrent well into the 21st century. The first of these is Complex Transformation. Our goal is to transform the large, costly and inefficient cold war nuclear weapons complex that cannot meet the full production require-

ments of our customer into an integrated, modern and cost effective nuclear security enterprise. Complex Transformation involves more than just transforming an aging physical infrastructure; it seeks to transform our contracting and procurement processes and overall management of the enterprise to embrace the best in business and human capital practices. Complex Transformation also must be accomplished in a way that continues to leverage our core competencies in nuclear weapons design and maintenance to advance the Nation's leadership in counterterrorism, nonproliferation, physical and cyber security, and to support the intelligence community. Our Complex Transformation strategy relies on four pillars:

—Transform the nuclear stockpile through the Stockpile Stewardship Program in partnership with the Department of Defense;
—Transform to a modernized, cost-effective nuclear weapons complex to support needed capabilities in our physical infrastructure;
—Create an integrated, interdependent enterprise that employs best business practices to maximize efficiency and minimize costs; and
—Advance the science and technology base that is the cornerstone of our nuclear deterrent forces and remains essential for long-term national security.

Infrastructure transformation is a major part of Complex Transformation. Some major facilities date back to the Manhattan Project and cannot cost effectively meet today's safety and security requirements. In other cases, new facilities are needed to restore capabilities that have been put in standby since the end of the cold war but may be needed to support future life extension programs. With the support of Congress, we produced tritium in 2007 for the first time in 18 years and the Tritium Extraction Facility (TEF) at Savannah River is now on-line. Similarly, construction of the Highly Enriched Uranium Materials Facility (HEUMF) at the Y–12 National Security Complex in Oak Ridge will allow us to consolidate uranium storage and improve security with a significantly-reduced security footprint. And at Los Alamos National Laboratory, the Chemistry and Metallurgy Research Replacement (CMRR) project will allow us to continue the plutonium pit surveillance and actinide research vital to maintaining the stockpile and the Nation's nuclear deterrent. These three projects are representative of a Complex Transformation that has already commenced.

Our plan for Complex Transformation, detailed in the draft Supplemental Programmatic Environmental Impact Statement (SPEIS), seeks to consolidate special nuclear material at fewer sites and locations within the nuclear weapons complex, close or transfer hundreds of buildings that are no longer required for the NNSA mission, and reduce NNSA's overall footprint by as much as a third over the next 10 years. By eliminating multi-site redundancies and consolidating both missions and capabilities at our sites, we expect to dramatically improve our efficiency and cost effectiveness.

The second effort we believe is necessary to maintain the viability of the nuclear deterrent well into the 21st century involves continued study of reliable replacement concepts. We believe continued work on these concepts is necessary in order to allow the next administration and Congress to make informed decisions regarding the future composition of the stockpile. Continued study of reliable replacement concepts has been identified by U.S. Strategic Command, the Navy and the Air Force as essential to long-term maintenance of an effective nuclear deterrent force. These concepts, coupled with a responsive nuclear infrastructure, offers promise for further reductions in reserve warheads maintained as a hedge against technical failure. These concepts are specifically envisioned to address long term reliability issues that can affect our existing stockpile resulting from component aging, and refurbishment of aging components, that move us further from the original designs validated by underground nuclear testing. In short, we believe these concepts could provide a means to mitigate the technical risks inherent in a life extension-only approach. Moreover, reliable replacement concepts would not add new military capabilities to the stockpile, and would introduce safety, surety and antiterrorism features that cannot easily be retrofitted into the current stockpile.

In our efforts to advance Complex Transformation and examine the potential promise of reliable replacement concepts, we have not lost focus on meeting our day-to-day commitments to the Department of Defense (DOD). Last year, we reconstituted a limited plutonium pit manufacturing capability and produced new pits for the W88 warhead, and maintained on-time delivery of the LEP B61 weapons to the Air Force. In fiscal year 2008, the Department will continue to manufacture W88 pits, maintain a limited pit manufacturing capability of six pits per year.

Meeting the needs of DOD, maintaining the safety, security and reliability of the stockpile, and commencing Complex Transformation would not be possible without the support of our dedicated Federal and contractor workforce of 37,000 employees. Retaining our current workforce and attracting the next generation of national secu-

rity scientific and engineering talent is challenging because the number of qualified university graduates continues to decrease each year.

The scientific capabilities and infrastructure developed for the nuclear weapons mission are utilized by DOD, the Department of Homeland Security, and the intelligence community, are recognized as essential to fulfilling their responsibilities. NNSA laboratories have been participating jointly with other Government agencies in addressing a wide range of national security challenges—all of which leverage the core mission of nuclear weapons development and sustainability. Recent examples include:

—Supporting war fighter needs in Iraq with improvised explosive device (IED) modeling and analysis;
—Supporting DOD and the Federal Bureau of Investigation in nuclear weapons emergency render-safe and post-event technical forensics;
—Providing solutions to the intelligence community in their nuclear counterterrorism and nonproliferation efforts by drawing upon our nuclear weapons expertise;
—Developing and deploying integrated systems for countering aerosolized bioterrorist releases and bio-decontamination technologies; and
—Developing and deploying portal detector technology to prevent smuggling of special nuclear material.

Basic research at our national security laboratories has provided technology for airborne detection of toxic chemicals, critical infrastructure modeling for disaster response, and modeling of response strategies for potential influenza pandemics.

It is important to recognize that certain major capabilities are needed at each of our national security laboratories if they are to continue to effectively contribute to national security. By leveraging the science that gave us the atomic bomb that helped win World War II and the technical innovations that helped win the cold war, today's national security labs are tackling tomorrow's national security challenges. Maintaining a core scientific and technical base at our labs will continue to attract outstanding talent to meet our future national security challenges.

Weapons Activities also provides tangible support to nuclear nonproliferation objectives. A major priority within Defense Programs has been weapons dismantlement. The United States remains committed to its obligations under the Nuclear Nonproliferation Treaty (NPT). In 2004, the President directed a 50 percent reduction in the size of the stockpile, and, in December 2007, he ordered an additional 15 percent cut. The result will be a nuclear stockpile one quarter the size it was at the end of the cold war and the smallest since the Eisenhower administration. During fiscal year 2007, DOE achieved a 146 percent increase in the rate of nuclear weapon dismantlement over the fiscal year 2006 rate, almost tripling our goal of a 49 percent rate increase.

NAVAL REACTORS OVERVIEW

Also contributing to the Department's national security mission is the Naval Reactors Program, whose mission is to provide the U.S. Navy with safe, militarily effective nuclear propulsion plants and ensure their continued safe, reliable and long-lived operation. Nuclear propulsion enhances our warship capabilities by providing the ability to sprint where needed and arrive on station, ready to conduct sustained combat operations when America's interests are threatened. Nuclear propulsion plays a vital role in ensuring the Navy's forward presence and its ability to project power anywhere in the world.

The Naval Reactors Program has a broad mandate, maintaining responsibility for nuclear propulsion from cradle to grave. Over 40 percent of the Navy's major combatants are nuclear-powered, including aircraft carriers, attack submarines, guided missile submarines, and strategic submarines, which provide the Nation's most survivable deterrent force.

FISCAL YEAR 2009 BUDGET REQUEST PROGRAMMATIC DETAIL

The President's fiscal year 2009 budget request for NNSA totals $9.1 billion, a decrease of $35.0 million or 0.4 percent less than the fiscal year 2008 consolidated appropriations level. We are managing our program activities within a disciplined 5-year budget and planning envelope, and are successfully balancing the administration's high priority initiatives to reduce global nuclear danger as well as future planning for the Nation's nuclear weapons complex within an overall modest growth rate.

The NNSA budget justification contains information for 5 years as required by section 3253 of Public Law 106–065, the National Defense Authorization Act for Fiscal Year 2000. This section, entitled Future-Years Nuclear Security Program, re-

quires the Administrator to submit to Congress each year the estimated expenditures necessary to support the programs, projects and activities of the NNSA for a 5-year fiscal period, in a level of detail comparable to that contained in the budget.

The fiscal year 2009–2013 Future Years Nuclear Security Program—FYNSP—projects $47.7 billion for NNSA programs though 2013. This is a decrease of about $2.3 billion over last year's projections. The fiscal year 2009 request is slightly smaller than last year's projection; however, the out-years increase starting in fiscal year 2010.

Weapons Activities

Defense Programs

The fiscal year 2009 budget request for the programs funded within the Weapons Activities Appropriation is $6.62 billion, an approximately 5.1 percent increase over the fiscal year 2008 Consolidated Appropriations level. It is allocated to adequately provide for the safety, security, and reliability of the nuclear weapons stockpile and supporting facilities and capabilities.

Directed Stockpile Work (DSW) activities ensure the operational readiness of the nuclear weapons in the Nation's stockpile through maintenance, evaluation, refurbishment, reliability assessment, weapon dismantlement and disposal, research, development, and certification activities. The fiscal year 2009 request is organized by Life Extension Programs, Stockpile Systems, Reliable Replacement Warhead, Weapons Dismantlement and Disposition, and Stockpile Services. The request places a high priority on accomplishing the near-term workload and supporting technologies for the stockpile along with longterm science and technology investments to ensure the capability and capacity to support ongoing missions.

The fiscal year 2008 Consolidated Appropriations Act did not contain funding for the Reliable Replacement Warhead (RRW). The administration believes that the characteristic features of the RRW are the right ones for ensuring the future of our Nation's nuclear deterrent force. The fiscal year 2009 request includes $10 million to continue the design definition and cost study. The request also continues efforts called out in the Explanatory Statement referenced in section 4 of Public Law 110–161 to address issues raised in the recent JASON's summer study of the feasibility of certifying RRW designs without nuclear testing.

Campaigns are focused on scientific and technical efforts essential for the certification, maintenance and life extension of the stockpile. The Stockpile Stewardship Program has allowed NNSA to maintain the moratorium on underground testing and move to "science-based" certification and assessments for stewardship by relying on experiments, modeling, simulation, surveillance and historical underground nuclear testing experience. The Science and Engineering Campaigns are focused to provide the basic scientific understanding and the technologies required for the directed stockpile workload and the completion of new scientific and experimental facilities. In the Inertial Confinement Fusion Ignition and High Yield Campaign, the National Ignition Facility (NIF) will focus on completing the first experiment on NIF with a credible chance of demonstrating laboratory-scale ignition in 2010. The Advanced Simulation and Computing Campaign will continue to improve capabilities through development of faster computational platforms in partnership with private industry, and with state of the art techniques for calculations, modeling and simulation, and analysis of highly complex weapons physics information. The Readiness Campaign consists of technology-based efforts to reestablish and enhance manufacturing and other capabilities needed to meet planned weapon component production.

The fiscal year 2009 request makes several changes in the location of programs within Weapons Activities. The Pit Manufacturing and Certification Campaign recently concluded with the successful manufacturing and certification of the W88 pit. Pit manufacturing related activities are moved to the Direct Stockpile Work Stockpile Services program and pit certification activities are transferred to the Science Campaign. In addition, in the Science Campaign, the Advanced Certification program will continue efforts begun in fiscal year 2008 at the direction of the Congress to review, evaluate and implement key recommendations from the JASON's RRW study regarding approaches to establishing an accredited warhead certification plan without nuclear testing. Work being performed to understand potential improvised nuclear device designs and responses is being transferred to the nuclear weapons incident response account.

Secure Transportation Asset

The Secure Transportation Asset's fiscal year 2009 budget request is an increase of $9.5 million to $221.1 million. This funding request supports the increase to transportation capacity necessary for the dismantlement of nuclear weapons, departmental initiatives to consolidate and disposition nuclear material, and the im-

plementation of the current operational doctrine to protect nuclear weapons and material in transport.

Readiness in Technical Base and Facilities (RTBF) and Facilities and Infrastructure Recapitalization Program (FIRP)

In fiscal year 2009, we are requesting $1.89 billion for the maintenance and operation of existing facilities, remediation and disposition of excess facilities, and construction of new facilities. Of this amount, $1.72 billion is requested for RTBF, an increase of $83.1 million from fiscal year 2008 operating levels, with $1.41 billion reserved for Operations and Maintenance. The Operations and Maintenance portion also includes the Institutional Site Support program which supports facility transition and capability consolidation. The request includes $308.0 million for RTBF Construction.

This request also includes $169.5 million for the Facilities and Infrastructure Recapitalization Program (FIRP), a separate and distinct program that is complementary to the ongoing RTBF efforts. The FIRP mission, which we expect to be completed in fiscal year 2013, is to restore, rebuild and revitalize the physical infrastructure of the nuclear weapons complex, in partnership with RTBF. This program assures that facilities and infrastructure are restored to an appropriate condition to support the mission, and to institutionalize responsible and accountable facility management practices. The Integrated Prioritized Project List (IPPL) is the vehicle that FIRP will rely on to prioritize and fund out-year projects to reduce legacy deferred maintenance. These projects significantly reduce the deferred maintenance backlog to acceptable levels and support the Stockpile Stewardship mission and transformation of the complex.

This request also includes $77.4 million for the newly established Transformation Disposition (TD) Program. TD is NNSA's facility and infrastructure (F&I) retirement program for old, cold war-era structures. The NNSA owns over 35 million gross square feet of footprint and over 25 percent of the footprint may become excess as a result of complex transformation. TD is established with the goal of reducing non-process and contaminated excess F&I. This includes facilities that are excess to current and future NNSA mission requirements, including those contaminated structures which are not currently the responsibility of the Office of Environmental Management. This program supports the performance measure of reducing the total square feet, improves management of the NNSA facilities and infrastructure portfolio, and reduces long-term costs and risks. The TD Program will set the groundwork for a smaller complex.

All of these activities are critical for the development of a more responsive infrastructure and will be guided by decisions based on the Complex Transformation Supplemental Programmatic Environmental Impact Statement (SPEIS) and other factors such as funding and national security requirements. Since a significant fraction of our production capability resides in World War II era facilities, infrastructure modernization, consolidation, and sizing consistent with future needs is essential for an economically sustainable Complex. Facilities designed according to modern manufacturing, safety, and security principles will be more cost-effective and responsive to future requirements. For example, a facility could be designed to support a low baseline capacity and preserve the option, with a limited amount of contingency space to augment capacity, if authorized and needed, to respond to future needs.

Having a reliable plutonium capability is a major objective of NNSA planning and is a key requirement if the Nation is to maintain an effective deterrent, regardless of the composition of the stockpile. Options for plutonium research, surveillance, and pit production are being evaluated as part of the Complex Transformation NEPA process, with a decision anticipated in 2008. The preferred alternative in the draft Complex Transformation SPEIS proposes that Los Alamos National Laboratory facilities at Technical Area 55 (TA–55) provide plutonium research, surveillance and pit production capabilities. This alternative includes the proposed Chemistry and Metallurgy Research Replacement—Nuclear Facility (CMRR–NF) to achieve the objectives of (1) closing the aging existing Chemistry and Metallurgy Research (CMR) facility, (2) replacing essential plutonium surveillance and research capabilities currently at Lawrence Livermore National Laboratory and those being conducted in Plutonium Facility 4 (PF–4) in TA–55, and (3) achieving a net manufacturing capacity of 50–80 pits per year by allowing surveillance activities now occurring in PF–4 to be conducted in CMRR.

Completion of the Highly Enriched Uranium Materials Facility (HEUMF) would allow a reduction of the overall size of the high security area at the Y–12 National Security Complex. If NNSA ultimately decides to build a Uranium Processing Facility (UPF) at Y–12, then Y–12's high security area would be reduced from 150 acres to 15 acres. This reduction combined with the engineered security features of the

HEUMF and UPF, would allow NNSA to meet the Design Basis Threat (DBT) at significantly reduced costs, to lower non-security costs, and to provide a responsive highly enriched uranium manufacturing capability.

Environmental Projects and Operations

The Environmental Projects and Operations/Long-Term Stewardship Program is requested at $40.6 million in fiscal year 2009. This program serves to reduce the risks to human health and the environment at NNSA sites and adjacent areas by: operating and maintaining environmental clean-up systems; performing long-term environmental monitoring activities; and integrating a responsible environmental stewardship program with the NNSA mission activities. The increase in this program is necessary to continue compliance with statutory requirements and to provide Long-Term Stewardship activities for two additional NNSA sites.

Nuclear Weapons Incident Response

The Nuclear Weapons Incident Response (NWIR) Program serves as the United States' primary capability for responding to and mitigating nuclear and radiological incidents worldwide. The fiscal year 2009 request for these activities is $221.9 million, of which $31.7 million is dedicated to the continued implementation of two national security initiatives that will strengthen the Nation's emergency response capabilities—the National Technical Nuclear Forensics (NTNF) and the Stabilization Implementation programs.

The NTNF program will continue the development of capabilities to support pre- and post-detonation activities and enhance technical nuclear forensics capabilities. The continued development of this capability will facilitate the thorough analysis and characterization of pre- and post-detonation radiological and nuclear materials and devices, including devices used in nuclear detonations as well as interdicted devices. Developing forensic capabilities of this nature is crucial to the overall objective of identifying the origin and pathways of interdicted nuclear materials, warheads and improvised nuclear devices.

Stabilization is a capability aimed at using advanced technologies to enhance the U.S. Government's ability to interdict, delay and/or prevent operation of a terrorist's radiological or nuclear device until national assets arrive on the scene to conduct traditional "render safe" procedures. NNSA has actively sponsored new research in this area and, additionally, continues to leverage emerging technologies that have been demonstrated successfully by the DOD in support of the global war on terrorism. In the implementation phase, NNSA will transfer these matured projects into operational testing to selected teams across the country, potentially followed by their transition into the collection of tools available to Federal response teams.

Physical and Cyber Security

The fiscal year 2009 budget request for Defense Nuclear Security is $737.3 million, a 7.7 percent decrease from the fiscal year 2008 appropriation. The fiscal year 2009 request supports the base program and the program's focus on sustaining the NNSA sites 2003 Design Basis Threat baseline operations and implementing the 2005 DBT Policy upgrades with the Nevada Test Site reaching compliance in fiscal year 2009. Starting in fiscal year 2009, there is no longer an offset in this account or in the departmental administration account for the security charges associated with reimbursable work. These activities will be fully funded by the programs with direct appropriations.

During fiscal year 2009, the program will focus on eliminating or mitigating identified vulnerabilities across the weapons complex. Measures will include additional protective force training, acquiring updated weapons and support equipment, improving physical barrier systems and standoff distances, and reducing the number of locations with "targets of interest." Physical security systems will be upgraded and deployed to enhance detection and assessment, add delay and denial capabilities, and to improve perimeter defenses at several key sites. There are no new construction starts.

The fiscal year 2009 budget request for Cyber Security is $122.5 million, an 11 percent increase from the fiscal year 2008 appropriation. The fiscal year 2009 budget request is focused on sustaining the NNSA infrastructure and upgrading elements designed to counter cyber threats and vulnerabilities from external and internal attacks. This funding level will support cyber security revitalization, enhancements in assets and configuration management, and identify emerging issues, including research needs related to computer security, privacy, and cryptography.

Additionally, the Cyber Security funding will provide for enhancement, certification, and accreditation of unclassified and classified computer systems to ensure the proper documentation of risks and justification of associated operations for systems at all sites. The funding within this request will also be applied to foster great-

er cyber security awareness among Federal and contractor personnel. NNSA will sponsor a wide range of educational initiatives to ensure that our workforce possesses the ever-expanding cyber security skills critical to safeguarding our national security information. Funding provided to NNSA sites will be conditioned upon their implementation of a risk-based approach to cyber security management and policy.

Naval Reactors

The Naval Reactors fiscal year 2009 budget request of $828 million is an increase of $20 million from the fiscal year 2008 request. Naval Reactor's development work ensures that nuclear propulsion technology provides options for maintaining and upgrading current capabilities, as well as for meeting future threats to U.S. security.

The majority of funding supports Naval Reactor's number-one priority of ensuring the safety and reliability of the 102 operating naval nuclear propulsion plants. This work involves continual testing, analysis, and monitoring of plant and core performance, which becomes more critical as the reactor plants age. The nature of this business demands a careful, measured approach to developing and verifying nuclear technology, designing needed components, systems, and processes, and implementing them in existing and future plant designs. Most of this work is accomplished at Naval Reactors' DOE laboratories. These laboratories have made significant advancements in extending core lifetime, developing robust materials and components, and creating an array of predictive capabilities.

Long-term program goals have been to increase core energy, to achieve life-of-the-ship cores, and to eliminate the need to refuel nuclear-powered ships. Efforts associated with this objective have resulted in planned core lives that are sufficient for the 30-plus year submarine (based on past usage rates) and an extended core life planned for CVN 21 (the next generation aircraft carrier). The need for nuclear propulsion will only increase over time as the uncertainty of fossil fuel cost and availability grows.

Naval Reactors' Operations and Maintenance budget request is categorized into six areas: Reactor Technology and Analysis; Plant Technology; Materials Development and Verification; Evaluation and Servicing; Advanced Test Reactor (ATR) Operations and Test Support; and Facility Operations.

The $204 million requested for Reactor Technology and Analysis will support work that ensures the operational safety and reliability of reactor plants in U.S. warships and extends the operational life of Navy nuclear propulsion plants. This work includes continued development of the Reactor System Protection Analysis for the next generation aircraft carrier, CVN 21. These efforts also support continued work on core design concepts for submarines.

The increasing average age of our Navy's existing reactor plants, along with future extended service lives, a higher pace of operation and reduced maintenance periods, place a greater emphasis on our work in thermal-hydraulics, structural mechanics, fluid mechanics, and vibration analysis. These factors, along with longer-life cores, mean that for years to come, these reactors will be operating beyond our previously-proven experience base.

The $104 million requested for Plant Technology provides funding to develop, test, and analyze components and systems that transfer, convert, control, and measure reactor power in a ship's power plant. Naval Reactors is developing components to address known limitations and to improve reliability of instrumentation and power distribution equipment to replace aging, technologically obsolete equipment. Development and application of new analytical methods, predictive tests, and design tools are required to identify potential concerns before they become actual problems. This enables preemptive actions to ensure the continued safe operation of reactor plants and the minimization of maintenance costs over the life of the ship. Additional technology development in the areas of chemistry, energy conversion, instrumentation and control, plant arrangement, and component design will continue to support the Navy's operational requirements.

The $106 million requested for Materials Development and Verification supports material analyses and testing to provide the high-performance materials necessary to ensure that naval nuclear propulsion plants meet Navy goals for extended warship operation and greater power capability. These funds support the test assemblies for use in ATR, post irradiation examination of the materials tested at ATR, and destructive and non-destructive examinations of spent navy nuclear fuel and reactor component materials.

The $264 million requested for Evaluation and Servicing sustains the operation, maintenance, and servicing of Naval Reactors' operating prototype reactor plants. Reactor core and reactor plant materials, components, and systems in these plants provide important research and development data and experience under actual operating conditions. These data aid in predicting and subsequently preventing problems

that could develop in fleet reactors. With proper maintenance, upgrades, and servicing, the two prototype plants will continue to meet testing needs for at least the next decade.

Evaluation and Servicing funds also support the implementation of the dry spent fuel storage production lines that will put naval spent fuel currently stored in water pools at the Idaho Nuclear Technology and Engineering Center (INTEC) on the Idaho National Laboratory (INL) and at the Expended Core Facility (ECF) on the Naval Reactors facility in Idaho into dry storage. Additionally, these funds support ongoing decontamination and decommissioning of inactive nuclear facilities at all Naval Reactors sites to address their "cradle to grave" stewardship responsibility for these legacies and minimize the potential for any environmental releases.

The $60 million requested for Advanced Test Reactor Operations and Test Support sustains the ongoing activities of the INL ATR facility, owned and operated by the Office of Nuclear Energy (NE), Science and Technology.

In addition to the budget request for the important technical work discussed above, facilities funding is required for continued support of Naval Reactor's operations and infrastructure. The $32 million requested for facilities operations will maintain and modernize the program's facilities, including the Bettis and Knolls laboratories as well as ECF and Kesselring Site Operations (KSO), through capital equipment purchases and general plant projects.

The $22 million requested for construction funds will be used to support the project engineering and design of KAPL infrastructure upgrades and ECF M290 receiving and discharge station, to support the design and construction of production support complex at NRF, and to support the construction of a materials research technology complex.

Office of the Administrator

This account provides for all Federal NNSA staff in Headquarters and field locations except those supporting Naval Reactors and the Office of Secure Transportation couriers. The fiscal year 2009 budget request is $404.1 million, essentially level with the fiscal year 2008 appropriation reflecting a leveling of staffing growth.

This budget request is consistent with the funding needed for personnel support in an account that is comprised of over 70 percent salaries and benefits. Staffing is projected to increase by 95 to a total of 1,942 FTE in fiscal year 2009, in support of new hires brought on-board at the end of fiscal year 2008 and beginning of fiscal year 2009 to meet increased requirements in Defense Nuclear Nonproliferation and Emergency Operations program goals as well as address NNSA workforce planning skill mix issues. Information Technology (IT) for the Federal staff is also included in this account, and the fiscal year 2009 request is level with 2008.

The out-year budget for this account projects a 3.7 percent increase in fiscal year 2010, followed by about 4 percent annually in the ensuing years. There remain significant challenges in managing this account due to the essentially uncontrollable impacts of escalation on payroll and benefits for NNSA staff that consume such a high percentage of this account.

Historically Black Colleges and Universities (HBCU) Support

A research and education partnership program with the HBCUs and the Massie Chairs of Excellence was initiated by the Congress through Congressionally directed projects in the Office of the Administrator appropriation in fiscal year 2005. The NNSA has established an effective program to target national security research opportunities for these institutions to increase their participation in national security-related research and to train and recruit HBCU graduates for employment within the NNSA. The NNSA goal is a stable $10 million annual effort. However, the fiscal year 2008 Consolidated Appropriations Act (Public Law 110–161), included $22.1 million in congressionally directed projects in support of the HBCU programs within the Office of the Administrator account, for both new and existing projects. In fiscal year 2009, the Office of the Administrator appropriation will provide funding of $3.6 million in continuing support for HBCU activities for institutions not yet ready to engage in direct NNSA mission support. The Weapons Activities appropriation will provide up to $6 million; the Defense Nuclear Nonproliferation appropriation will provide up to $3 million; and the Naval Reactors program will fund up to $1 million of HBCU efforts in fiscal year 2009 in multiple research partnerships directly supporting mission program activities.

APPROPRIATION AND PROGRAM SUMMARY TABLES AND OUT-YEAR APPROPRIATION SUMMARY TABLES—FISCAL YEAR 2009 BUDGET

NATIONAL NUCLEAR SECURITY ADMINISTRATION—OVERVIEW

[In thousands of dollars]

	Fiscal Year 2007 Current Appropriations	Fiscal Year 2008 Original Appropriation	Fiscal Year 2008 Adjustments	Fiscal Year 2008 Current Appropriation	Fiscal Year 2009 Request
National Nuclear Security Administration:					
Office of the Administrator	358,291	405,987	−3,850	402,137	404,081
Weapons Activities	6,258,583	6,355,633	−58,167	6,297,466	6,618,079
Defense Nuclear Nonproliferation	1,824,202	1,673,275	−15,279	1,657,996	1,247,048
Naval Reactors	781,800	781,800	−7,114	774,686	828,054
Total, NNSA	9,222,876	9,216,695	−84,410	9,132,285	9,097,262
Rescission of Prior Year Balances	.....	−322,000	.....	−322,000	.....
Total, NNSA (OMB Scoring)	9,222,876	8,894,695	–84,410	8,810,285	9,097,262

OUT-YEAR APPROPRIATION SUMMARY—NNSA FUTURE-YEARS NUCLEAR SECURITY PROGRAM (FYNSP)

[In thousands of dollars]

	Fiscal Year 2009	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013
NNSA:					
Office of the Administrator	404,081	419,848	436,266	451,771	469,173
Weapons Activities	6,618,079	6,985,695	7,197,844	7,286,912	7,460,318
Defense Nuclear Nonproliferation	1,247,048	1,082,680	1,076,578	1,111,337	1,133,982
Naval Reactors	828,054	848,641	869,755	880,418	899,838
Total, NNSA	9,097,262	9,336,864	9,580,443	9,730,438	9,963,311

OFFICE OF THE ADMINISTRATOR—OVERVIEW APPROPRIATION SUMMARY BY PROGRAM

[In thousands of dollars]

	Fiscal Year 2007 Current Appropriation	Fiscal Year 2008 Original Appropriation	Fiscal Year 2008 Adjustments	Fiscal Year 2008 Current Appropriation	Fiscal Year 2009 Request	Change
Office of the Administrator	[1] 358,291	383,487	−3,490	379,997	404,081	+24,084
Congressional Directed Projects	.....	22,500	−360	22,140	.....	−22,140
Total, Office of the Administrator	358,291	405,987	[2] −3,850	402,137	404,081	+1,944

[1] Reflects the Congressionally approved appropriation transfer of $17,000,000 (07–D–04) from a source within the Weapons Activities appropriation and $1,000,000 from the fiscal year 2007 supplemental in support of the Defense Nuclear Nonproliferation program.

[2] Reflects a rescission of $3,850,000 as cited in the Fiscal Year 2008 Consolidated Appropriations Act (Public Law 110–161).

Public Law Authorization: Fiscal Year 2008 Consolidated Appropriations Act (Public Law 110–161) and National Nuclear Security Administration Act, (Public Law 106–65), as amended.

OUT-YEAR APPROPRIATION SUMMARY

[In thousands of dollars]

	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013
Office of the Administrator	419,848	436,266	451,771	469,173

WEAPONS ACTIVITIES—FUNDING PROFILE BY SUBPROGRAM

[In thousands of dollars]

	Fiscal Year 2007 Current Appropriation	Fiscal Year 2008 Original Appropriation	Fiscal Year 2008 Adjustments	Fiscal Year 2008 Current Appropriation	Fiscal Year 2009 Request
Directed Stockpile Work	1,430,192	1,413,879	−12,627	1,401,252	1,675,715
Science Campaign	267,758	290,216	−2,592	287,624	323,070
Engineering Campaign	161,736	171,075	−1,527	169,548	142,742
Inertial Confinement Fusion Ignition and High Yield Campaign	489,706	474,442	−4,236	470,206	421,242
Advanced Simulation and Computing Campaign	611,253	579,714	−5,177	574,537	561,742
Pit Manufacturing and Certification Campaign	242,392	215,758	−1,927	213,831	.....
Readiness Campaign	201,713	159,512	−1,424	158,088	183,037
Readiness in Technical Base and Facilities	1,613,241	1,652,132	−14,751	1,637,381	1,720,523
Secure Transportation Asset	209,537	213,428	−1,905	211,523	221,072
Nuclear Weapons Incident Response	133,514	160,084	−1,429	158,655	221,936
Facilities and Infrastructure Recapitalization Program	169,383	181,613	−1,622	179,991	169,549
Environmental Projects and Operations	.....	8,669	−77	8,592	40,587
Transformation Disposition	.....	.....	.....	.....	77,391
Defense Nuclear Security	656,653	806,434	−7,201	799,233	737,328
Cyber Security	104,505	101,191	−904	100,287	122,511
Congressionally Directed Projects	.....	48,000	−768	47,232	.....
Subtotal, Weapons Activities	6,291,583	6,476,147	−58,167	6,417,980	6,618,445
Security Charge for Reimbursable Work	−33,000	−34,000	.....	−34,000	.....
Use of Prior Year Balances	.....	−86,514	.....	−86,514	−366
Total, Weapons Activities	6,258,583	6,355,633	−58,167	6,297,466	6,618,079

Public Law Authorization: Fiscal Year 2008 Consolidated Appropriations Act (Public Law 110–161) and National Nuclear Security Administration Act, (Public Law 106–65), as amended.

OUT-YEAR FUNDING PROFILE BY SUBPROGRAM

[In thousands of dollars]

	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013
Weapons Activities:				
Directed Stockpile Work	1,762,079	1,789,979	1,760,218	1,776,388
Science Campaign	309,091	295,192	296,662	299,902
Engineering Campaign	148,863	146,565	150,475	153,907
Inertial Confinement Fusion Ignition and High Yield Campaign	434,007	381,173	373,005	377,762
Advanced Simulation and Computing Campaign	526,373	510,808	514,405	520,645
Pit Manufacturing and Certification Campaign	.....	.....	.....	.....
Readiness Campaign	170,003	161,139	161,130	164,295
Readiness in Technical Base and Facilities	1,904,398	2,153,557	2,275,909	2,372,916
Secure Transportation Asset	249,555	261,543	268,134	269,325
Nuclear Weapons Incident Response	229,661	235,211	242,425	250,947
Facilities and Infrastructure Recapitalization Program	192,945	196,379	195,096	194,779
Environmental Projects and Operations	37,288	39,026	37,468	36,040
Transformation Disposition	89,457	88,589	88,008	87,863
Defense Nuclear Security	818,285	817,809	793,856	814,928
Cyber Security	113,690	120,874	130,121	140,621
Total, Weapons Activities	6,985,695	7,197,844	7,286,912	7,460,318

NAVAL REACTORS—FUNDING PROFILE BY SUBPROGRAM

[In thousands of dollars]

	Fiscal Year 2007 Current Appropriation	Fiscal Year 2008 Original Appropriation	Fiscal Year 2008 Adjustments	Fiscal Year 2008 Current Appropriation	Fiscal Year 2009 Request
Naval Reactors Development:					
Operations and Maintenance (O&M)	747,648	739,100	−6,726	732,374	771,600
Program Direction	31,380	32,700	−297	32,403	34,454
Construction	2,772	10,000	−91	9,909	22,000
Total, Naval Reactors Development	781,800	781,800	−7,114	774,686	828,054

Public Law Authorizations: Public Law 83–703, ''Atomic Energy Act of 1954'';''Executive Order 12344 (42 U.S.C. 7158), ''Naval Nuclear Propulsion Program''; Public Law 107–107, ''National Defense Authorizations Act of 2002'', title 32, ''National Nuclear Security Administration''; John Warner National Defense Authorization Act for Fiscal Year 2007, (Public Law 109–364); Fiscal Year 2008 Consolidated Appropriations Act (Public Law 110–161); National Nuclear Security Administration Act, (Public Law 106–65), as amended.

OUT-YEAR FUNDING PROFILE BY SUBPROGRAM

[In thousands of dollars]

	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013
Naval Reactors Development:				
Operations and Maintenance	782,087	811,651	827,164	831,084
Program Direction	35,754	37,054	38,354	39,754
Construction	30,800	21,050	14,900	29,000
Total, Naval Reactors Development	848,641	869,755	880,418	899,838

Senator DORGAN. Administrator D'Agostino, thank you very much. There are about 8 minutes remaining on this vote, I think what we will do is recess the subcommittee for about 10 minutes, and we will reconvene.

We'll call the subcommittee back to order.

COMPLEX TRANSFORMATION PREFERRED ALTERNATIVE

Mr. D'Agostino, again, thank you for your testimony. I will ask a couple of questions and then call on my colleague, Senator Domenici who will be here momentarily.

Your Complex Transformation Preferred Alternative, Mr. D'Agostino, calls for keeping all 8 nuclear weapons complex facilities. Some, including myself, are surprised that there's not a recommended closure of at least one site, or even one site.

As I understand it, OMB had the Cost Analysis Improvement Group do an assessment of the NNSA's Complex Modernization Programs, and one of the findings said that there were potential economic benefits from the relocation of the uranium operations from Y–12 to another site. The assessment highlighted the vulnerability of Y–12 and the fact that other than the HEUMF plant, virtually all other Y–12 buildings will require replacement.

I understand the final decision has not been made, but I believe you do specify Y–12 as the uranium center for the weapons complex.

Mr. D'AGOSTINO. Right.

Senator DORGAN. So, can you tell us—how did you come to this decision to retain the NNSA mission at Y–12?

Mr. D'AGOSTINO. Absolutely.

Senator DORGAN. As opposed to moving it?

Mr. D'AGOSTINO. Yes, sir, Mr. Chairman, I'd like to do that.

We did commission the Cost Analysis Improvement Group as well as an additional independent group—we had two independent teams—look at our preferred alternative, particularly from a cost standpoint.

The one thing I will start off with is, most of these studies typically do not take into account the value of the workforce that's needed to operate and deal with special materials, and uranium and the other materials, the work that happens at the Tennessee area, clearly there's a set of material there that requires a special workforce.

And, we actually have very good evidence, when we moved material out of Rocky Flats, on how difficult it is to re-establish a capability dealing with special materials. It took us much longer than expected, and cost a lot more money than we ever expected it to cost. I'm talking, in particular, in this case, about the plutonium issue.

But, in the case of Y–12, the evidence was clear that the CAIG said there was no clear winner on the decision whether to move those capabilities out, or not. In fact, it was neck-in-neck, dead even. And one of the things that came out of that was our desire to do what we're calling a "Phase II Cost Study", which is part of the Preferred Alternative process.

We put out a draft Preferred Alternative, and during the time when we're gathering public comment and input, we were also doing a Phase II Cost Study, to further evaluate these other factors, such as moving people, moving equipment, moving the material.

And, from my standpoint, it was very clear to me that because things were even from the CAIG report, the Cost Analysis Improve-

ment Group, that to err on the side of the people on the draft alternative, and then go evaluate, and do this additional study, before we get to a final position on a preferred alternative.

So, we are doing those Phase II cost studies for these materials.

Senator DORGAN. Are you going to keep us informed of those results?

Mr. D'AGOSTINO. Absolutely, sir.

Senator DORGAN. Let me ask you, as well, about the Kansas City plant. You have already decided to build a newer and more efficient facility there, and you're deciding to keep the new facility in Kansas City, as opposed perhaps to, considering moving it to other existing NNSA sites. Some have said Pantex at Sandia might be mentioned as alternatives.

My understanding is that the Kansas City site has done good work, has good people there, and I don't, with my question, mean to take anything away from them, but——

Mr. D'AGOSTINO. Right.

Senator DORGAN [continuing]. Let me ask, how have you come to a decision to retain the mission in Kansas City, when you could build the new plant at another site, when you weigh all of the alternatives, can you explain that to us?

Mr. D'AGOSTINO. Absolutely.

Senator DORGAN. And I understand, let me also say, you're seeking to have the General Services Administration (GSA) construct the new Kansas City plant, and then the NNSA will lease the facility. That means this subcommittee will never approve construction funds, because we won't be required to. Why did you pursue the GSA route for the new facility—do you use GSA in this manner for other large facilities as well, and do you have a cost analysis that would tell us whether it is cheaper to lease than for the NNSA to own?

Mr. D'AGOSTINO. Certainly. Regarding the Kansas City plant, one thing was clear, that we were in 3 million square feet in Kansas City, and we were spending $100 million more a year than we really needed to. So, the important thing is to deliver products to the Defense Department—and you're right, sir, the Honeywell organization out there has a tremendous reputation, they have a 99.99 percent quality and delivery record over many years.

But what was clear is that we needed to get out of that World War II facility. It was just costing too much. It's consistent with the theme of too old, too big, too expensive, and we needed to rightsize that facility.

So, we're going to shrink that footprint by over 60 percent, and save about $100 million a year.

Senator DORGAN. I'm not questioning whether you should do it, I was questioning the location, and also the decision to go through——

Mr. D'AGOSTINO. Right. Through the GSA.

Senator DORGAN [continuing]. GSA, which really bypasses our committee, in terms of construction funding.

Mr. D'AGOSTINO. So, from the standpoint of the location, since it's clear that I needed to get out of that current facility, I had the option of looking around, and you know, whether to put it at

Pantex, at Kansas City, or at—I'm sorry, at Sandia—or any other site across the complex.

And given Honeywell's—and that plant, in general's, high level of performance, given the quality of the workforce, I did not feel it was worth trying to move people—based on our experience of closing down Rocky Flats and closing down the Mound Plant—to satisfy that same mission.

And we decided, sir, to look at ways to acquire the project, if you will, and the GSA does do this for the Federal Government, and we felt that the lease approach made the most sense, it delivered the product, it had the lowest life cycle costs for the Government, plus it allowed—in the long term—as we expect missions to change over the number of years, it gives us an opportunity to be a bit more flexible—us, the Federal Government—to be a bit more flexible on how we satisfy the requirements.

Senator DORGAN. I'm just trying to understand where the approval is for doing this, if it doesn't go through an Appropriations subcommittee. Is there carte blanche authority for you to go to GSA——

Mr. D'AGOSTINO. No, sir.

Senator DORGAN [continuing]. And say, "I want to build a building?"

Mr. D'AGOSTINO. Absolutely not. We go through OMB first to get the facility appropriately scored, then it comes into the Environment and Public Works Committee, here in Congress, as part of a GSA package to get approval by Congress.

Senator DORGAN. The authorizing committee has signed off on this? Is that correct?

Mr. D'AGOSTINO. I don't know if it's considered an authorizing committee——

Senator DORGAN. It would be.

All right, thank you for that answer. I have other questions I want to submit to you in writing.

Mr. D'AGOSTINO. Sure.

NAVAL REACTORS PROGRAM

Senator DORGAN. Admiral Donald, there's been some discussion about new nuclear-powered Navy ships beyond aircraft carriers and submarines, most of it has been on a new class of cruisers. Could you comment on that, and what resources the Naval reactors program would need if the decision was made to build new nuclear-powered ships?

Admiral DONALD. Yes, sir. Thank you for the question. The Navy right now is in the process of what's called an Analysis of Alternatives for the new ship, which is the cruiser that would replace the Aegis-class cruisers currently in service. We've completed the part of the Analysis of Alternatives that applies to the propulsion plant. The remaining part really is about defining the specific mission and capabilities that the ship needs from a combat system and a radar system perspective.

Once that's done, then a decision would be made as to whether or not that ship would be nuclear-powered, or not. And, again, that's under review right now by the Secretary of the Navy, and the Chief of Naval Operations.

Should we—should it be chosen to be a nuclear-powered ship, we would—our plan would be to use existing components of existing designs to the greatest extent possible to help in cost, and get the most capability you can for the cost. But what it would really involve for us, was, in addition to the specific components that you have to buy, the reactor plant that you'd buy, itself, you'd also have to do some amount of redesign to fit those components into the ship, whatever type of ship they chose to buy.

So, in addition to component purchases, and the specifics of the plan itself, some re-design work would have to go into it, and likely some facilitization of existing manufacturing capabilities, that would have to be considered as well, sir.

Senator DORGAN. Admiral, thank you very much.

Senator Domenici?

MATERIALS, MISSIONS, AND MANPOWER

Senator DOMENICI. I was wondering if I might—you go ahead.

Administrator D'Agostino, your testimony makes a thorough case of the consolidation of materials, missions and manpower. However, in 13 pages of written testimony, I find only—find that only the reference to science and a handful of examples, primarily focused on past scientific achievements. There's absolutely no mention of scientific path forward, or a strategy to sustain the scientific excellence of the labs.

Could you please explain to us what this budget provides in terms of long-term planning to sustain science capabilities at the laboratory?

Mr. D'AGOSTINO. Certainly. We have an item in our budget—it's not a big item, it's about $5 million—to work on upgrading the accelerator at Los Alamos. But, more importantly, we have a number of facilities——

Senator DOMENICI. What is that for, again?

Mr. D'AGOSTINO. For the, upgrading the accelerator, the LANSCE Accelerator, however, it's clearly not enough to do any significant work in fiscal year 2009. In order to really do that work, it will likely cost well over $100 million to upgrade that accelerator—that's done a tremendous job over the past decades, in getting the scientific information that we need.

Our focus——

Senator DOMENICI. So, you're saying—you're telling this committee you need LANSCE in order to round out the scientific capability of the lab, and all you could get out of this year was $5 million?

Is that——

Mr. D'AGOSTINO. Well, I think there's more than that, Senator. I was going to add to that, if I could.

Senator DOMENICI. Go ahead.

Mr. D'AGOSTINO. For one thing, we—with the support of this subcommittee—we have now finished the DARHT project. I think in about 2 days, or so, we will actually be signing, doing the formal completion of the DARHT project at Los Alamos, which as you know, is a tremendous technical achievement.

We're in the mode now, sir, of actually operating all of these tools that have been appropriated over the last number of years, the NIF

facility is in its final stages of construction. As you know, sir, the MESA Project was completed 3 years early, and is now an active part of supporting our stockpile, particularly the work on the W76, and so, the concern I have is consistent with what you've described, what is the long-term science for Los Alamos, and what's our long-term strategy across the complex?

Our near-term strategy, sir, is to utilize the tools that we've built up over the last decade during Stockpile Stewardship, and there was a lot of utilization that we do need that is so important to do.

The concern that we have, and Director Anastasio may get a chance to talk about this, is what is that particular capability for Los Alamos? We haven't answered that question yet, but we're in the process of working with the Office of Science to lay out that right path for the laboratory. I think MESA and NIF will do that Livermore and Sandia, quite well.

Senator DOMENICI. Now, Administrator, we're approaching the 2-year anniversary of the new management team's take-over of Los Alamos. It appears to me that things are on the right track, with several of the deliverabilities met in pit manufacturing, super computing and improved site security. What is your impression of the operation at LANL?

Mr. D'AGOSTINO. Senator, I would say, I'm very impressed with what has happened over the last 2 years. A lot of people will point to maybe one incident or two, I look at the overall trend, and when I look at the overall trend, I see good indication—from security, for example, the laboratory has actively reduced its amount of classified removable media from over 80,000 pieces, now it's less than 5,000 pieces.

It has consolidated its vaults—we used to have 142, or 143 vault-type rooms. We're already down to 114, and I think the Director is trying to get that number down to the 20 to 40 range of vault-type rooms. We've centralized our classified document storage, and the accident rate has decreased by 35 percent at the laboratory.

From a project management standpoint, the laboratory is delivering on over 90 percent of its project deliverables on these milestones that we track in our systems—these are tremendous accomplishments—they've improved facility management by 11 percent, and all of this within a very difficult financial situation.

So, Los Alamos has done this on the basis of hard management, and my hat's off to the Director for putting that through.

We actually have similar types of changes going on at some of our other laboratories, and in addition to the programmatic accomplishments that you just described, a lot of times what gets ignored is the hard management part of the laboratory.

Senator DOMENICI. I didn't mean to isolate this one out, and thereby indicate that you weren't making advances on all of them, I just chose Los Alamos, because it had received so much adverse criticism——

Mr. D'AGOSTINO. Right.

Senator DOMENICI [continuing]. Two and three years ago, and had some security problems. It was bantered around up here as a laboratory that couldn't get things done, and I just wanted your observations for the first—it's only been 2 years for the new management, and you've told the committee what you think.

Mr. D'AGOSTINO. Yes, sir, thank you. I do think we have a bit more to go, but we're heading in the right direction, and I'm very encouraged by it, but conscious, as well.

Senator DOMENICI. I have a lot more, but I want to yield after one last question.

The budget provides $10 million advance for feasibility work on the RRW. You've been present when we've had an exchange between the chairman and myself, regarding whether or not we should fund that, and his view that we should not, my view that we should.

Ten million—but that's not enough to complete the research. It is my understanding that an additional $55 million is needed to complete this phase of the study. Can you tell me what will be gained if Congress provides the full $65 million needed to complete the feasibility study? What would, then, be the next steps? And back up and tell me why we need the $10 million, which we're going to have an argument about—somebody out there ought to be defending it—are you one who defends the $10 million?

Mr. D'AGOSTINO. I'm in defense of the $10 million, sir. I do think—I want to emphasize, I think it's important to emphasize—that this is a study, this is not about building a warhead.

From my view, the gain and the understanding is to help inform future administrations of an approach to better manage our nuclear weapons stockpile. I'm very concerned that if we continue down the path of rebuilding our cold war stockpile exactly the way we built it in the past, that we will lock in very difficult materials that we have had to deal with in the past, that are causing us so much problems now.

So, from that standpoint, what we would gain, in my view, is an opportunity for future administrations to actually understand what an RRW concept can actually deliver, in terms of driving the size of the stockpile down, and adding safety and security—additional safety and security—into our nuclear weapons stockpile. I think this is a matter of making sure everyone's fully informed, and making sure that it's clear, this is not a decision to build a warhead.

Your last part of the question was, why the $10 million, sir? It was clear in the very early days of January of this year that we hadn't achieved a consensus, and you know, we needed an opportunity to make sure that we had to drive home what this Reliable Replacement concept was all about. The $10 million in the budget request is there to make sure that all of the work that has happened over the last 2 years on this topic—and there has been some excellent work—did not get lost just because we immediately cut off funding on day one.

We take the views of congressional appropriations seriously, when we got the bill, Deputy Administrator Smolen issued a note out to the complex saying, "Stop work on RRW." And that literally means, stop work. And, you know, there's no way to really tie a ribbon around the information that you have appropriately, but we want to be able to close off that work appropriately, and at least put together some information for future administrations.

Senator DOMENICI. Thank you very much.

Senator DORGAN. If I might—I'm going to call on Senator Craig, and use the early bird rule back and forth, Senator Craig, Senator Reed then Senator Bennett.

My understanding is last year the administration was already beginning to put some amount of money in the Air Force budget—going beyond the Navy piece, with respect to RRW. That presumes, of course, that that program was going to be a continuum. And I, I mean, I—we have a disagreement about these issues——

Mr. D'AGOSTINO. Right, right.

Senator DORGAN. But, I think it's very important that we understand, how this fits in a much broader context of nuclear weapons policy. I appreciate the comments of Senator Domenici.

Senator Craig?

STATEMENT OF SENATOR LARRY CRAIG

Senator CRAIG. Mr. Chairman, thank you.

Gentlemen, thank you.

And Administrator D'Agostino, before I come to you with a question, I want to first thank the Admiral for the work we've done together at the lab. As you know, Idaho's lab was not a nuclear—a weapons lab. However, NNSA does work at the INL, mainly through the Navy nuclear program, and its use of the Advanced Test Reactor (ATR).

In 1967, the ATR was commissioned to support the Navy Nuclear Propulsion Program, tackling nuclear fuels reliability and material testing issues. And, of course, we know that history—probably one of the more successful ones, if not the most successful in the extension of life of our Navy's—our national nuclear fleet.

Last April, DOE designated the Advanced Test Reactor, the ATR, as a National Scientific User Facility, and that's where the cooperation of the Navy came in, and this would not have happened without the support that you've given us, and I want to thank you for that.

Today, the ATR, the National User Facility, is open for businesses and universities from all over the Nation, and they're able to use the facility for research and educational purposes. The INL also works on certain NNSA waste, such as sodium debris from Sandia National, and we also have some highly-enriched uranium weapons-grade materials for non-weapons research purposes.

Now, my question of you, Administrator. I want to talk to you about Building 651, and Building 691. As you know, infrastructure at most of our labs continues to be a problem, and a top priority, it is true at the Idaho lab. Our scientists and engineers perform research and development in facilities that oftentimes back-date into the 1950s.

These are facilities at the lab that were constructed in the 1990s to recycle the Navy's spent nuclear fuel. These two building have never been used, they're basically brand new, and sitting there. And I understand that for a relatively small investment, these facilities could be upgraded and used.

Your office looked at these facilities in the past to find alternative uses, funds have been made available in 2006, and in the Omnibus bill last year for the required upgrades, however, no work has begun, or is expected to begin any time soon. It's my under-

standing, understanding is that even Congress has provided the funds, there is a disagreement over the right mission, and who will be responsible for the facilities. So, my question is a relatively simple one—can you tell me what happened to the $5 million that was appropriated in 2006?

FUNDING OVERSIGHT

Mr. D'AGOSTINO. As to the specifics, I can't tell you at this point exactly what would happen. What I can talk about are the two buildings and how we looked at it from a Departmental view——

Senator CRAIG. Yes.

Mr. D'AGOSTINO [continuing]. If I could, Senator.

Senator CRAIG. Please.

Mr. D'AGOSTINO. Okay.

Those buildings, we looked at originally, a couple of years ago, as potential areas to store plutonium while we were trying to deinventory the plutonium we have at Hanford, as a—what I would call—an interim storage location.

Senator CRAIG. Those are the right words for Idaho, thank you.

Mr. D'AGOSTINO. Yes, thank you.

Well, the idea was getting the material out of Washington State, ultimately our plan was to disposition that material through the mixed oxide facility in South Carolina.

At the time, Savannah River was not in a position to accept plutonium in South Carolina, and we had a deep desire to try to reduce our security costs in Hanford, because we don't want to declare it a permanent site. And these buildings looked attractive to be studied, and in fact, they were studied.

The end result of that study was that in order to upgrade one of the buildings—and I believe it was Building 651—it would cost in excess of $300 million just to finish the building and put the security features in place.

Senator CRAIG. For the purpose you were looking at it for?

Mr. D'AGOSTINO. For the original purpose, that's right, sir. And we felt that that was a lot of—well, it just didn't make financial sense to move plutonium twice, spend $300 million just for an interim site. It made more sense to move it once.

Since that time, of course, we've started construction on a mixed oxide facility, and now we're in the position of shipping material directly to South Carolina, which is a safer and more secure way of doing it, and ultimately not resulting in material that potentially accumulates, and the emission associated with it. The MOX construction is underway, from that standpoint.

So, when we looked, it didn't make sense to use Idaho as a waystation, if you will——

Senator CRAIG. Right.

Mr. D'AGOSTINO. For plutonium. And ultimately that's what ended up happening. I can provide to your staff, sir, the analysis that was done in that case, if that makes sense.

Senator CRAIG. It does. And I appreciate that, also, answer, and I don't mean to sound as direct, as it might—answer the question.

Mr. D'AGOSTINO. Right, the $5 million?

Senator CRAIG. What happened to the 2006 appropriation of $5 million that was re-established in the 2007 budget, and somehow

nothing has materialized? Because this was a general upgrading of the buildings for future use?

Mr. D'AGOSTINO. Right.

Senator CRAIG. Okay, if you would do that, I would appreciate it.

Mr. D'AGOSTINO. Absolutely.

Senator CRAIG. Because it's the anomaly that it's in—it was put in over in the House, it's in your budget in buildings that aren't in your responsibility, as I understand it.

Mr. D'AGOSTINO. That's right. And——

Senator CRAIG. Thank you. So, I'm—we're just searching for some money.

Mr. D'AGOSTINO. That's right. And I think ultimately, because we had—there's, of course as you're probably aware, $14 million that was appropriated for this activity in the 2008 Omnibus, as well. And what we want to do—you mentioned earlier in your question about sodium debris bed material from Los Alamos——

Senator CRAIG. Right.

Mr. D'AGOSTINO. So, some of that money we would use for that purpose. But it would not require all of that money.

Senator CRAIG. Okay.

Mr. D'AGOSTINO. So, we'll be coming back, ultimately, with a reprogramming request.

Senator DORGAN. Administrator——

Senator CRAIG. Thank you.

Senator DORGAN [continuing]. He wants to know where the $5 million is, if you'd let us know, we'd appreciate that.

Mr. D'AGOSTINO. Absolutely.

Senator DORGAN. Thank you.

Senator CRAIG. Thank you.

Senator DORGAN. Senator Reed.

Senator CRAIG. Thank you, Mr. Chairman.

Senator DORGAN. Thank you, Senator Craig.

RELIABLE REPLACEMENT WARHEAD

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

Mr. D'Agostino, can you tell us what the scope of work is in the NNSA budget for 2009 for the RRW concept? I ask that, because last year there was a specific RRW design line, attributed specifically to RRW, but then there was engineering and science work throughout the budget that was also attributed to the concept of RRW. Can you focus on what the scope of work is in this budget?

Mr. D'AGOSTINO. This budget has $10 million specifically in the RRW line, and the purpose of that money is to close on the cost and schedule and put—essentially tie the ribbon around, and gather in one spot, all the work that has gone into RRW.

What you're, I believe, referring to, from previous years, is the fact that there is very similar elements of our program, for example, in the Surety Campaign, for example, that Campaign's responsibility is to develop Surety technologies that could be applied to any future system or existing nuclear weapons system that we have. It's not focused on RRW.

The RRW line was focused on a particular design put forth by Lawrence Livermore National Laboratory, the ultimate lab design that was chosen.

Senator REED. But this work such as a Surety function, is that being coordinated with RRW, in the sense of, they're explicitly considering the possibility of moving forward with RRW development?

Mr. D'AGOSTINO. No, it's not—the Surety line is to develop a generic suite of Surety tools to be used, whether in RRW or not. But ultimately, what would have to happen, is once it's been decided that a Surety technology that was developed in this campaign was going to be used in RRW, we would have to stop work in that campaign, move it over to that Surety line. I think it's important for our laboratories to have the flexibility to continue to develop Surety technologies, because this effort is part of activities that bolster the skills that are so important to maintain.

Not just to maintain the stockpile—and particularly to modify it as it changes and ages—but also to hone the exact skills that we use to understand and defeat nuclear terrorism. If we happen to come across an Improvised Nuclear Device, these are the exact same people that will be deciding which wire to cut—the green wire or the red wire. And they only do that based on developing these generic skills.

Senator REED. Let me continue in another aspect of this, for many, many years, but certainly the last 15 or so—there's been an investment in facilities, to improve existing facilities and capabilities for the Stockpile Stewardship Program to maintain nuclear weapons without testing. And, in fact, about 15 years ago, the daunting technical problems associated with RRW would never have been considered.

But nevertheless, because we've been investing in the complex, we are now considering an RRW, and yet we're told now that there has to be more new investment in the complex for RRW. Can you talk about—comment upon that?

Mr. D'AGOSTINO. Absolutely, in fact, I will be very straightforward—we would need new investment, more new investment, to maintain our existing stockpile. We do not have the infrastructure to maintain our stockpile now. But the investment we need, just to maintain a nuclear deterrent whether it's a RRW-type future or life extension future—they're two different avenues.

What we're doing right now, is making the investments that would not preclude, essentially, going down either track. So, we're making the investments that cover both options.

A quick example would be plutonium infrastructure. My view is, we don't need two plutonium infrastructures in this country, we only need one, and so we have to look at maintaining one, smaller, safer, plutonium infrastructure. I think that plutonium infrastructure could be at Los Alamos. Same thing with uranium, and the like.

So, if we said RRW is not in our future—if the Congress says that, I understand how those decisions get made—that would drive the Administrator, myself or whoever follows me, to say, "Well, we absolutely need to make investments in facilities that we have decided to hold off making investments in."

Beryllium oxide, and beryllium metal work, for example, is one area that we decided 4 years ago—beryllium is bad, bad stuff, we don't want to work with it, we're not going to spend $300 million in Tennessee to reconstitute a capability we'd prefer never to have again in our stockpile.

That is still an open question—if we stayed with the existing legacy stockpile, at some point—and it won't be this year—but some future Administrator will be here, in front of this committee saying, "I need to build a beryllium oxide capability, and a beryllium metal capability." And it's just a fact of life, because our current stockpile relies upon beryllium.

Senator REED. Just a quick follow-up, but if you go the other pathway will a future Administrator be here saying they have to build some specific facilities unique to RRW?

Mr. D'AGOSTINO. No, because I believe, for example, one of the elements of RRW will simplify work on plutonium. Right now, we think we can simplify it and do it in a much smaller space. If we have to reconstitute a capability to work with plutonium, for the cold war stockpile, we would need much more space than we currently are planning for right now.

So, RRW takes a lot of materials off of the table that we'll never have to use again. And that's my main focus, is to get rid of as much of the hazardous material as I can. Physics doesn't allow us to get rid of uranium and plutonium at this point, but about everything else, we can do.

Senator REED. Thank you.

Mr. D'AGOSTINO. Yes, sir.

Senator DORGAN. Senator Bennett.

SUBTERRANEAN NUCLEAR TESTS

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

Mr. D'Agostino, I want to thank you for the wonderful trip that you arranged for me to visit Sandia, Los Alamos and Livermore, I learned a great deal, and I'm grateful to you and all of those who acted as host for that. I look forward to learning more. All I really learned was that, I don't know very much and sometimes that's the beginning of wisdom.

I'm impressed by all of the work you've done, and by your computer capability, and I want to just ask, for the record, do you foresee the need to resume underground nuclear testing at a time in the future—at a time in the foreseeable future?

Mr. D'AGOSTINO. Of course, if I could predict that far ahead, I probably wouldn't be in this business, but we think we have a handle in the near term on knowing what issues we have in our current stockpile. And, as you probably were aware, there are concerns that we have—the stockpile remain safe and reliable right now, but these are very complicated devices, they're not static, I think General Chilton called it a "chemistry project in motion." You've got very hazardous materials, and radiation and exotic materials together for long periods of time. So, they're very complicated.

I can't give you a definitive answer on that, but what I can say is we are very confident now that the tools that we have, and that the country's invested in over the last decade, can deal with most issues.

I know I'm not giving you a direct yes or no answer, sir——

Senator BENNETT. Yes, yes.

Mr. D'AGOSTINO. Because I can't give you one.

Senator BENNETT. Well, I left you an out, and let me repeat it again, with the same out—and I understand, by the way, that no Administrator, no one sitting in your position representing any administration would ever say "never."

Mr. D'AGOSTINO. Right.

Senator BENNETT. But, with the understanding—do you have any idea in the foreseeable future, that you might have to renew underground testing?

Mr. D'AGOSTINO. No.

Senator BENNETT. Okay.

It's important that we have that on the record——

Mr. D'AGOSTINO. Yes.

Senator BENNETT [continuing]. I got it from your predecessor, I need it for the people in Utah, to understand that we keep asking that question.

Mr. D'AGOSTINO. Right.

Senator BENNETT. Now, I was pleased that you requested an increase of 22 percent over fiscal year 2008, with respect to cyber-security.

Mr. D'AGOSTINO. Right.

CYBER-SECURITY

Senator BENNETT. As I mentioned to you, this is an issue I've been interested in now for a number of years. It may be difficult in this setting—which is not classified—but could you discuss the threat that NNSA and the other labs face from cyber attacks?

Mr. D'AGOSTINO. Absolutely. I'll discuss it in broad terms, if I could, and that is the laboratories and the Federal infrastructure that we have are literally bombarded with tens of thousands of attacks on a regular basis. Now, that doesn't mean all of them get through, because the people we have at our laboratories are very good at this. But, we are noticing a very significant increase in the amount of cyber-attacks.

Quite frankly, we put forth a 22 percent increase in the cyber-security investment area in this budget request. In all likelihood, we're going to have to continue that kind of ramp-up into the future, in order to develop the tools necessary to counter this threat.

A lot of the times, the security focus always is on physical—guns, guards, gates—because most of us can see that and understand that. In this case, there is the sense that the information that's possessed is extremely valuable, and we have to ramp-up on the cyber side.

So, we've got a long road ahead of us, and we have a lot more to do in this area. From a detail standpoint, I don't know if I want to get into too much detail.

Senator BENNETT. No, I have further questions, but I don't think this setting is the appropriate place to ask them. I think we can ask—have there, has there been a significant increase in, say, 12 months or 18 months? Or has it been just a steady kind of attack?

Mr. D'AGOSTINO. I see an ever-increasing rate, so the acceleration rate is increasing——

Senator BENNETT. It's logarithmic rather than arithmetic?
Mr. D'AGOSTINO. Yes, sir.
Senator BENNETT. I see, okay.
Thank you very much.
Thank you, Mr. Chairman.
Senator DORGAN. Senator Bennett, thank you very much.
Senator Feinstein.

STATEMENT OF SENATOR DIANNE FEINSTEIN

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

And welcome, gentlemen, particularly you, Mr. D'Agostino, and I want to thank you, you know, we've talked on the RRW and other things, and as I've said to you privately, I'll say to you publicly—you have always been a straight shooter, and I very much appreciate that. And so you have very high credibility with me.

I want you to understand that I support the chairman in his mark, if he does remove the $10 million for the RRW. And that's really based on the fact that we need to have this congressionally appointed bipartisan commission examine United States strategic posture and nuclear weapons policy. And it's due to report its findings and recommendations to Congress and the President by December 1, of this year. And the Defense Authorization bill also required the next President to conduct a nuclear posture review, and report by December 1, 2009.

I really think the Congress—before it goes ahead with what, in my view, is a new nuclear warhead, should have these two things under its belt—should understand what's going to happen, how the strategic triad will or will not be changed, what our nuclear posture will be. And then, I think, it's easier to make this decision.

LAWRENCE LIVERMORE FINANCIAL ISSUES

You also called me about Lawrence Livermore, and I'd like to ask you a couple of questions about it. You indicated to me that there were going to be 250 voluntary retirements, and about 500 involuntary retirements made. And the lab, because of the fact that it was an LLC, a limited liability corporation, the costs were higher.

And as I began to think about that—you know, the corporate management was supposed to make the lab more economically competitive, in addition to bringing good management. I understand the lab has lost its tax-exempt non-profit status? Is that correct? It is. And that the new management has underestimated retirement and health benefit costs? Is that correct?

Mr. D'AGOSTINO. I don't know if that's—mis-estimated might be a reflection of the times, on these costs, are increasingly going up.

Senator FEINSTEIN. And, has the yearly management fee increased from $8 million to $46 million?

Mr. D'AGOSTINO. Yes, ma'am, consistent with the terms of the contract.

Senator FEINSTEIN. Who receives those fees?

Mr. D'AGOSTINO. The limited liability corporation, which is composed of the University of California, Beditel, and a few other contractors, Washington Group.

I think there's one other fact——

Senator FEINSTEIN. I didn't know that when I talked to you, I've learned it since then, and it does cause me some concern. And so, let me ask you, what do you think about this management team?

Mr. D'AGOSTINO. Actually, I think very highly of the management team, and I'll say why.

First of all, we've got 2 years under our belt using a limited liability approach at a similar laboratory, Los Alamos.

And we've seen significant changes and improvements in management and efficiency at Los Alamos—I don't want to repeat an answer, but there are a series of improvements—11 percent improvement in maintenance of facilities, for example, at Los Alamos, significant reduction in the amount of security material that is around the laboratory, improvement in worker safety and worker health at the laboratory. As you may know, there's a term called "days away reportable," and total reportable cases at Los Alamos, we're now heading in the right direction, and we're starting to see, right now at Livermore, the same types of trends—a shift, an improvement in the safety of the workforce.

So, I have strong faith in the management team at that laboratory, and this approach of governance, which is a big difference from what it was before.

I now have a Board of Governors at Lawrence Livermore, for example. Norm Patis is the chairman, and I can go to him and express my concerns as a shareholder—I represent all of the shareholders in the country that have invested in that laboratory. And he, as the chairman, has the ability to act to provide corporate resources to help the laboratory.

We've seen it work at Los Alamos, and I'm actually excited about the opportunity to see it at Lawrence Livermore, as well.

There were three main reasons why we're in the situation of having to do an involuntary separation.

Senator FEINSTEIN. Let me be clear on this. My concern is that the fees go up at the time you lay off people. This is a very hard time to lay off people. And, it's a very hard time to lay off these people, because I don't know what available jobs there are for physicists and very highly skilled personnel, if these are whom you are going to involuntarily lay off. And at the same time, the management part of it is collecting increased fees. I'm not sure that's the right thing.

Mr. D'AGOSTINO. I will admit, Senator, that it sends a very strange signal. My job, and ultimately the job of the lab director is to put the lab in the best competitive situation. Right now, the costs of doing work at Lawrence Livermore are too high. The customers that come to Dr. Miller tell him this is an expensive lab to work at.

The lab has a tremendous future. It's has a future that's anchored by the National Ignition Facility, but also by its assets in intelligence, and in nuclear counterterrorism work, which I think are going to be very important to the country, whether we have a small stockpile or a large one—nuclear counterterrorism work is incredibly important, and we need to get those resources and that work into the laboratory.

It's an incredibly difficult decision, it's one that I do not take lightly, I can assure you, in this whole process. But I will admit,

it looks strange when you look at fees going up at the same time workforce is having to be reduced.

Senator FEINSTEIN. Well, I really question this. In the interest of full disclosure, Mr. Chairman, my husband is chairman of the Board of Regents of the University of California. And, you know, my responsibility is a little different. And I would really question—and I would ask you to look into—why the fees would go up at a time when you have to lay off 500 people involuntarily, let alone 250 voluntarily. It doesn't seem right.

Thank you, Mr. Chairman.

Senator DORGAN. Senator Feinstein, thank you very much.

I'm going to submit some additional questions to all three witnesses.

Senator Domenici wishes to make a final comment, and then I'm going to call the second panel to the witness table.

Senator Domenici?

RELIABLE REPLACEMENT WARHEAD

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

Let me say first, General, I'm sorry we didn't have any questions for you, but I think we'll have some, we'll submit them.

I do want to say, however, that your presence and your rank and the fact that you are involved in very serious issues that confront us with reference to stockpile of the future and RTW—you're involved heavily in that, and you have long-term experience and that kind of makes me wonder what we need a brand-new group of people appointed by some—by the Congress to do the study work on this $10 million program and the future of it, when people like you are doing that work, in a formal way, and are very, very well-prepared, and prepared to tell us the answer to most of the questions, and we won't be using you for awhile, until we get that report, I guess.

But I want you to clarify for me, Mr. Administrator, I think I'm confused now as to what the $10 million would be used for?

Mr. D'AGOSTINO. What it would be used for?

Senator DOMENICI. Yes.

Mr. D'AGOSTINO. The $10 million would be used to make sure that past work has been adequately captured. So the money that we've invested over the last couple of years on this activity doesn't get lost.

Additionally, the money would be used to help answer the questions that were asked, and put forth in the fiscal year 2008 Omnibus Appropriations Act on advanced certification. One of the topics in the advanced certification omnibus line, talked about establishing this activity in order to address the JASON Report concerns about Reliable Replacement Warhead.

In order to address those concerns, we need to further develop and mature, one or two aspects of the design on RRW, so we can do that work to answer that question posed by Congress. We could have put that money in the advanced certification line, but I think what we wanted to do is make it crystal clear that we weren't trying to play games. These are activities that are associated with maturing some of the design elements to answer the advanced certification questions.

Senator DOMENICI. All right. So, General, you're fully aware with this, are you not?

General SMOLEN. Yes, sir, I am. And answering some of the JASON questions was as part of this, but there is a distinction. The RRW piece does refine the data that remains, but it's not really incurred yet.

Senator DOMENICI. Yes. Well, I'm having—now that you talked today with me, I'm even having more difficulty understanding why we wouldn't be doing it. I don't want to argue now with the chairman, we'll argue later, but what you tell me it's for, it's much—it seems to me to be almost common sense when you're stopping this program, and you don't know how long before you start it up again that, some of the things you've described we're going to do, we ought to do.

It has nothing to do with pushing the program ahead, it has to do with just tying a ribbon around it, and making sure we don't lose what we've done. And I don't understand the Jason answers as well as that, they may very well be what is concerning some people about this.

But I'd like you to help me later on, on that—I don't want to go out on a limb in fighting with the chairman on the floor, or anywhere else, if I don't understand that second part. But if that second part is as simple as the first part, and has so little to do with the future of an RRW, the program, than I feel like, number one, is it worth taking on? If it is worth taking on, it's rather easy to explain.

And I thank you both for that, and I want to repeat for the record, for you, Mr. Administrator, I had a lot to do with forming NNSA.

Mr. D'AGOSTINO. Yes, sir.

Senator DOMENICI. I worked closely with those who tried hard for a number of years to find somebody who could run the program. And I'm very, very disturbed that those who are looking for somebody to run the program—including this Senator who is helping—had you right in the backyard while we looked all over the Army, the military, the security network, and we put people in that didn't know how to do anything. In fact, they had NNSA going backward. And we found you.

And I've got to tell you, I don't only agree with the Senator from California about your integrity, you've got that, but you're doing a terrific job with a very complex relationship, because these three labs are complex with relationship of the work you do, because they're nuclear deterrent laboratories.

But we want you to pay attention to their future, too.

Mr. D'AGOSTINO. Yes, sir.

Senator DOMENICI. Because they must be around, and we want you to particularly be concerned about science in these laboratories. That's what they're for.

Thank you.

Thank you, Mr. Chairman.

Senator DORGAN. Well, Senator Domenici, you and I share a self-described common trait—we both lack understanding on this. I'm trying to understand it, as well, and you indicate you are.

Senator DOMENICI. That's right.

Senator DORGAN. And I would only observe, with respect to the RRW program, that there are a couple of things at work here. One is, what do we do, if anything? And number two is, when do we do it? And the only point I have made is there are larger and significant international issues that relate to our question about a nuclear weapons policy.

So, we will nonetheless have a longer discussion——

Senator DOMENICI. Right.

Senator DORGAN [continuing]. Perhaps in private, perhaps in the subcommittee and maybe on the floor.

Senator DOMENICI. And we will know what we're talking about before then.

Senator DORGAN. Well, maybe not.

But we'll enjoy it nonetheless.

Senator DOMENICI. We'll try.

Senator DORGAN. But, you know, these issues are very serious—very serious—and have substantial consequences, and I appreciate what you have said, I appreciate what Senator Feinstein has said, and our subcommittee will work through this.

Let me thank the subcommittee—had we asked General Smolen a lot of questions, I know he would have answered them very well, he spent part of his career in Minot, North Dakota.

General SMOLEN. Yes, sir.

Senator DORGAN. So, he was fully prepared.

We do intend to submit questions to the three of you, and we appreciate you being here, and ask that you would respond to written questions, and thank you very much.

Mr. D'AGOSTINO. Yes, sir.

Senator DORGAN. I'm going to call the next panel forward—this is a time when we have, for the first time in a long time—asked the directors of the three laboratories involved in weapons programs to come and testify before the Senate subcommittee.

I want to say that I—we have done that for a very specific reason. I think it is important to, for us to hear directly from the directors of the laboratories involved in this important work.

Dr. Mike Anastasio of Los Alamos is with us, Dr. George Miller of Lawrence Livermore is with us, and Dr. Tom Hunter of Sandia.

We have invited them all and are appreciative that they've taken time to come to Washington, DC to present testimony. The entire testimony in your submitted testimony will be made a part of the permanent record, I would ask the three of you to summarize your testimony, if you will, and we will begin with Dr. Anastasio.

Dr. Anastasio, why don't you proceed with your testimony followed by Dr. Miller, and followed by Dr. Hunter?

You may proceed.

STATEMENT OF DR. MICHAEL R. ANASTASIO, DIRECTOR, LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO

Dr. ANASTASIO. Chairman Dorgan, Ranking Member Domenici, and other distinguished members of the subcommittee, thank you for the opportunity to testify about the Stockpile Stewardship Program. I am Michael Anastasio, the Director of the Los Alamos National Laboratory, and I'd like to personally thank the sub-

committee for its strong support over very many years for this program that's so important to the country.

As I look to the future, until there's a policy change, I must assume the Nation will continue to have a nuclear deterrent. And consequently, our role is to do everything we can to ensure that we remain confident in that deterrent for our national security.

The Stockpile Stewardship Program that the country has been following has been the right approach. To remain confident while minimizing the need to ever do nuclear testing again.

We knew this would be a hard, because the science needed requires advances that are well beyond anything we'd ever done before. And that meant new tools—experiment and computational, and the people who can use them.

We've been making excellent overall progress over the last 12 years, with many examples of remarkable accomplishments, even though not all of these new tools are yet in place.

And to try to illustrate this, I thought I would just tell one little story as an example to illustrate. And imagine you're trying to understand what's going on inside a nuclear—or a mock—nuclear weapon. And you need to take a three-dimensional movie picture using x-rays.

But unlike a medical x-ray, the object you're exploring is exploding in front of your eyes, and the length of the movie you're trying to take is only a millionth of a second long. And to make sure you can stop the action that you're watching, the exposure time of this image can only last for a few ten-billionths of a second. That's DARHT, the new facility we're bringing online at Los Alamos, where we have just recently demonstrated that we can meet all, in fact, exceed, the technical requirements to accomplish the job I just described.

But that's not all. Once you have this image, or this movie, now you have to say, well, what implications does that have for the overall nuclear performance of this device? And for that we need to be able to use computer simulations to predict the nuclear performance instead of doing a test.

In the summer, the roadrunner computer that we've been developing with IBM, we anticipate will be the first computer in the world to ever achieve sustained performance of the petaflop, that's quadrillion calculations per second. I like a million billion better than quadrillion, maybe that speaks better. But we need a computer of that kind of horsepower.

Senator DORGAN. Doctor, is that the same as 1,000 trillion?

Dr. ANASTASIO. That is 1,000 trillion, yes sir.

Senator FEINSTEIN. Good for you.

Senator DORGAN. That's much simpler.

Dr. ANASTASIO. Okay, thank you.

But whatever it is, it's that level of computational power that we need to try to, to try to answer that predictive question, what nuclear performance will we get.

So that gives a little, I think, example of what we're trying to do. And there are many other accomplishments of outstanding science, that I describe at Los Alamos or the other three labs—or the other two labs.

I think that just as a momentary sideline, I think it's also important to understand that this very same science, the tools and the people, that's being used to meet other national challenges, from countering proliferation and terrorism to global climate modeling, and alternate energy sources, the Stockpile Stewardship Program is the program that's putting that science in place.

And if I think about the progress we've made, I think the most important thing, on progress in Stockpile Stewardship is that we now understand the status of the current stockpile, and the technical issues that control performance, better than we ever have. And that's reflected in the annual assessment letters that each of the three laboratory directors—and our predecessors—have sent in over the last 12 years.

So, with all of this, I have confidence in the stockpile today. But, I am concerned about the risks to success for the future. And let me describe two concerns—two areas of risk.

First, the risk to the long-term vitality of science at Los Alamos, to support our broad national security missions. The confluence of an aging infrastructure, demanding increasing standards for safety, security and the environment, a recent focus on near-term deliverables, and declining operation budget—operating budgets—are squeezing out science at the laboratory.

My second long-term concern is the continuing accumulation of change to the stockpile, and these changes will increase performance uncertainties, and pose increasing risk in a low margin, legacy cold war weapons stockpile. And by following a remanufacturing approach in a life extension program, we require a cold war production complex using the technologies and processes which are increasingly expensive, not fully functional, and do not provide an agile response.

To manage these growing stockpile risks, we should be doing more science, by increasing the use of our advanced tools, and further developing them. With a constrained NNSA budget, and the growing infrastructure costs, we are actually doing less science. The basic tenants of the Stockpile Stewardship Program are at risk.

The good news is that the progress we've made in understanding opens up alternative paths that we could go forward with, rather than a life-extension program. Such a path could include a transformed stockpile, with increased performance margins, hence reducing risks.

By also eliminating difficult materials, it could remit a transformed complex, further transformed than the NNSA plan is already outlining, and further reducing infrastructure costs.

PREPARED STATEMENT

So, in conclusion, it's my view that it's time for the Nation to set a path for the future, and provide a commensurate budget that will reduce and take on addressing these risks that I've outlined. Los Alamos remains committed to do all we can in our role as a national security science laboratory.

As so with that, I thank you for the opportunity to testify today, and I'd be happy to answer any questions.

[The statement follows:]

PREPARED STATEMENT OF DR. MICHAEL R. ANASTASIO

Chairman Dorgan, Ranking Member Domenici, and distinguished members of the subcommittee, thank you for the opportunity to provide a statement on the status and future of the Stockpile Stewardship Program. Today, the three directors of the national security laboratories are testifying before Congress about the Stockpile Stewardship Program for the first time since 2002 and much has happened in the interim.

The Los Alamos National Laboratory remains committed to sustaining confidence in the United States' nuclear weapons stockpile through a more fundamental science-based understanding of weapons performance, safety, and security. I am keenly aware of the daunting technical challenges demanded by this mission, requiring the best science, engineering, and technology that we can muster. I am responsible for providing this set of capabilities and skills for today and, equally important, ensuring that they are sustainable over the long term.

The three Department of Energy/National Nuclear Security Administration laboratories and their employees, working with the National Nuclear Security Administration production complex, are the basis and key driver for the successes of the Stockpile Stewardship Program. I personally appreciate the strong, vital support this subcommittee has provided over the years to enable us to execute our responsibilities.

Los Alamos National Laboratory in particular has been at the forefront of both nuclear weapons development and the Stockpile Stewardship Program. As you know, beginning with its designation as Site Y of the Manhattan Project, Los Alamos National Laboratory's core mission has been to conceive, develop, and sustain the U.S. nuclear deterrent. Currently, 61 percent of the Laboratory's fiscal year 2008 budget is allocated to carrying out our stockpile stewardship responsibilities (and associated security activities) and this mission is our highest priority. As a national security science laboratory, Los Alamos also applies this same science and engineering expertise to reducing threats from the proliferation of weapons of mass destruction and terrorism, and to provide for the Nation's energy security.

Today, I will focus my comments on our core mission and will shape my remarks around three main themes:

—A perspective on the evolution and content of the Stockpile Stewardship Program;
—An evaluation of the success of the Stockpile Stewardship Program over its 12-year evolution; and
—An assessment of the critical challenges and risks posed to retaining confidence in the Nation's nuclear stockpile as we look to the future.

DEVELOPMENT OF THE STOCKPILE STEWARDSHIP PROGRAM

My first key theme is that the Stockpile Stewardship Program has been the correct program for the United States, even though it presents extreme technical challenges.

With the end of the cold war, the Nation was at a crossroads with regard to our nuclear deterrent. Was the nuclear stockpile still required for the national defense? How long could the nuclear test moratorium, which began with a decision in 1992 by the United States to voluntarily cease underground tests of nuclear weapons, continue?

In 1995, the United States embarked on an ambitious effort to sustain the nuclear weapons stockpile without nuclear testing, an effort for which we could not guarantee success. Many felt that maintenance of adequate confidence in the stockpile required following the scientific method with the ability to continue at least partial yield nuclear tests to address the inevitable issues that would arise. As one of the participants, I can tell you it was a very dynamic period, with much expert debate within the scientific and defense communities that considered a range of possible options. The policy decision was made for a moratorium on nuclear testing coupled with implementation of a science-based Stockpile Stewardship Program. This decision was a very significant policy shift because the scientific and engineering capabilities needed to confidently execute this program did not then exist.

Congress, the White House, the relevant executive branch agencies, and the national laboratories outlined a core set of requirements that would be needed to take on this challenge. All involved understood that it would take at least a decade to bring together all the complicated elements of the new Stockpile Stewardship Program. It was also understood that success was in no way guaranteed because of the unprecedented scale of cutting edge science needed to accomplish this mission.

The approach relies upon developing, and validating through inter-laboratory peer review, a more fundamental scientific and engineering understanding of the per-

formance, safety, and security of weapon operations. This fundamental approach is based on a much more extensive range of non-nuclear above-ground testing and a vastly improved simulation capability—calculations with high resolution both in spatial description and in physical models. These calculations are necessary for addressing issues requiring extrapolation beyond tested regimes. The existing nuclear test database is used as a crucial resource for challenging the validity of these improved simulations. Ultimately, expert judgment and rigorous peer review assures that critical conclusions are drawn from the best available data, appropriate high-resolution simulation outputs, and results from the suite of evolving testing capabilities. Sound science is always at the core of our confidence.

In addition, enhancements to our weapon surveillance tools to accurately characterize the status of the weapons and the continued support of the production complex to extend the life of aging weapons were critical. The Stockpile Stewardship Program was described not as something with a fixed end-point, but as a new way of maintaining the Nation's nuclear weapons deterrent into the future.

Tools of Science-Based Stockpile Stewardship

With the loss of the ability to test the integrated operation of a weapon, more technically sophisticated and more frequent non-nuclear above-ground tests were essential. We judged at the time that these tests should include at a minimum:

—subcritical experiments to elucidate the dynamic behavior of plutonium driven by high explosives (now proceeding at the U1a facility at the Nevada Test Site);
—advanced radiographic experiments with multiple images and enhanced spatial resolution to provide multiple sequential views of high-explosive implosion dynamics with very fine detail (e.g., Dual Axis Radiographic Hydrotest Facility);
—ignition experiments to explore the fusion process crucial to the operation of modern warheads (e.g., National Ignition Facility); and
—enhanced surveillance tools for destructive and nondestructive testing and analysis to characterize the status of the stockpile.

At the same time, we judged that our computer simulations would need to be enhanced at least 1 million times in order to incorporate the known physics and scientific resolution. We judged that this computational requirement was the minimum necessary to model subsystem behavior and predict integrated weapons safety, reliability and performance without underground testing.

All of these capabilities were first-of-a-kind, requiring technical advances beyond the existing state of the art at the time. Because of technical challenges and funding limitations, all of these needed capabilities are still not yet fully in place 13 years later.

Production Complex and Life Extension Programs

Hand in hand with all the above capabilities was the need to have a production complex, working together with the laboratories, which could respond to any potential issues discovered through the weapons systems surveillance process. In addition, weapons would be returned for remanufacture to their original specifications in order to extend their life into the future so that they would regain their original characteristics. This requires the full suite of cold war production capabilities.

I am convinced that the Stockpile Stewardship Program has been the right program for the United States. What the Nation committed to over a decade ago is a very challenging set of integrated scientific capabilities that provide a means to validate the reliability of our strategic deterrent. For success, a balanced funding profile, between near-term actions and long-term capability investment was needed. A compromise of any one of the Stockpile Stewardship components will have significant consequences on the overall program. We have been able to sustain confidence in the nuclear deterrent through a program whose elements were beyond the state of the art at the program's inception—a remarkable testament to the people throughout the National Nuclear Security Administration complex.

THE STOCKPILE STEWARDSHIP PROGRAM HAS BEEN A SUCCESS

My second key theme is that the Stockpile Stewardship Program has been extremely successful since its inception.

Annual Assessment

President Clinton stated on August 11, 1995, "In this regard, I consider the maintenance of a safe and reliable nuclear stockpile to be a supreme national interest of the United States. I am assured by the Secretary of Energy and directors of our nuclear labs that we can meet the challenge of maintaining our nuclear deterrent under a CTB through a science-based stockpile stewardship program without nuclear testing."

For the 12th consecutive year in September 2007, the Laboratory Directors each signed their annual assessment letter reporting that there was no requirement for nuclear testing at this time to maintain the certification. I have had the honor to be involved each of these 12 years, personally signing a letter on five occasions. Today, these letters also include the additional assessments required by section 3141 of the Fiscal Year 2003 National Defense Authorization Act.

My 2007 assessment was based on the following comprehensive data set analysis:

—The details contained in the joint Los Alamos National Laboratory—Sandia National Laboratories 2007 annual assessment report based on the ongoing theoretical, analytical, experimental, and computational activities throughout the year.

—Assessments by applicable Los Alamos National Laboratory technical experts and managers on the adequacy of science-based tools and methods, tools and methods employed by the manufacturing infrastructure, and nuclear test readiness.

—An evaluation of the health of the stockpile by my Director's Red Team for annual assessment, an independent group of technical experts from Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories.

—The extensive and detailed technical reviews that I personally conducted of each warhead with technical experts on the Los Alamos National Laboratory warhead design and engineering teams.

Equally important, I assessed the current status of each weapon's nuclear package, the health of the overall Stockpile Stewardship Program, and the areas of significant risk.

Life Extension Programs

For most stockpile issues, the application of the Stockpile Stewardship Program tools has allowed the laboratories to resolve anomalous conditions with no impact to safety, reliability, or performance. For other issues that cannot be resolved in a timely manner through the Stockpile Stewardship Program, the following options are available:

—exceptions, limitations, or changes to the Military Characteristics or Stockpile to Target Sequence;

—component replacement or warhead refurbishment;

—introduction of more robust components that sustain the reliability of the stockpile;

—selective retirement of individual warheads or a warhead type;

—decertification; or

—nuclear testing.

In the past, all of these options have been employed. Today, we routinely use all options except decertification or nuclear testing to maintain the certification of warheads in the stockpile. In particular, we have completed the W87 Life Extension Program (LEP), achieved first production units on Alt 357 for the B61–7 and B61–11, as well as numerous smaller changes to gas transfer systems and non-nuclear components or subsystems to allow us to extend the life of these systems where possible. The first production unit for the W76–1 was not achieved on schedule as a result of a difficult materials production issue. Los Alamos National Laboratory is providing significant on-site technical assistance and coordination between the plant and Laboratory materials experts. The Laboratory also is working with the National Nuclear Security Administration to develop a recovery plan consistent with Department of Defense needs.

Reestablishing Pit Capacity

In 2007, Los Alamos National Laboratory produced the first war reserve pit manufactured in the United States since the Rocky Flats Plant was closed in 1989. By the end of fiscal year 2007, the Laboratory had manufactured 11 W88 pits (one more than required) and delivered 6 pits to the Pantex Plant for use in stockpile warheads. One of these has been assembled into a war reserve W88 warhead with the new 4T Terrazzo gas transfer system. The 4T was delivered for use and certified over 1 year ahead of schedule, a remarkable achievement that reflected excellent coordination among all sites in the nuclear weapons complex. As W88 warheads with Los Alamos National Laboratory manufactured pits enter the stockpile, warheads returned for surveillance will be available for disassembly and inspection, correcting a long-standing weakness in the W88 surveillance program.

Advanced Simulation and Computing (ACS)

Of all of the elements of the original Stockpile Stewardship Program this area has shown the most progress. Los Alamos, Lawrence Livermore, and Sandia National

Laboratories have led the way in developing the world's fastest supercomputers and then harnessing that power into tools needed to simulate our baseline weapons performance. This capability allows us to integrate our component level understanding into overall system performance. We have already enhanced our computing speed by more than a factor of one million with the ASC Purple machine at Livermore. The return on investment in this area has been high for the United States. For example, we are now able to confront the most challenging weapons physics questions that have plagued us for decades.

Los Alamos National Laboratory, in a partnership with IBM, has completed the installation of the first phase of the Roadrunner supercomputer for computations in support of national security science. Roadrunner is expected to become the world's first system to achieve a sustained performance level of a petaflop—a quadrillion calculations per second—early this summer. All three National Nuclear Security Administration laboratories will use Roadrunner for advanced physics simulations and predictive simulations of complex scientific processes.

Advanced Radiographic Experiments

Beginning in December 1999, warhead designers were able to see the clearest views ever made of the inside of an imploding, mock-weapon, test object with the successful operation of the first axis of the Dual Axis Radiographic Hydrotest Facility (DARHT). The images helped to validate new descriptions of high-explosive driven physics used in computer simulations of weapons performance.

With the advent of the Stockpile Stewardship Program, the decision was made to enhance the capability of the DARHT second axis to a 4-pulse machine. This enhancement required a completely new accelerator design that went far beyond what had ever been attempted before. Now in 2008, DARHT has met, and in many cases far exceeded, all of its technical requirements and expectations. We expect that this month it will officially become "dual" with the formal completion of the project for the second axis, adding both new capability and higher energy to this unique accelerator facility. The first use of this full capability in an implosion test of a mock weapon will take place later this year. The ability to produce multiple pulses with varied intensities in a preset time sequence allows warhead designers to specify what they want to see and DARHT will be able to deliver.

Ignition Experiments

The National Ignition Facility (NIF) is a critical piece of the Stockpile Stewardship Program and, arguably, is the most complicated and complex part. Developing a more detailed understanding of the fusion reactions that take place inside a weapon system remains one of the great challenges in the field of weapons science. Until the National Ignition Facility becomes operational, significant uncertainties will remain. I understand how difficult this project has been and am also acutely aware of the immense contributions that the full capacity of NIF will make to the overall Stockpile Stewardship Program. My conversations with Director Miller lead me to believe that this project is tantalizingly close to fruition.

Stockpile Surveillance

The weapons in the stockpile are not static. The chemical and radiation processes inside the nuclear physics package induce material changes that limit weapon lifetimes. We are seeing significant changes that are discussed in detail in my Annual Assessment letter.

The improvement in efficiency at Pantex helped us understand the present state of the stockpile and has greatly reduced our disassembly backlogs. This improvement allows us to get up-to-date technical information on the condition of weapon materials. We use the stewardship tools to evaluate the changes that continue within the stockpile. Using more detailed data from enhanced surveillance tools, we now have a better understanding of the major sources of stockpile issues:

—*Birth Defects.*—Flaws introduced into the warhead resulting from the manner in which it was produced, manufactured, or assembled;

—*Design Limitations.*—Warhead design decisions that were made that limit conditions under which a warhead can reliably operate because of incomplete scientific understanding of physics performance; and

—*Aging Effects.*—Changes in the stockpile that constantly take place and reduce the operating ranges or reliability of the warheads—effects that will continue to grow as the stockpile ages.

Los Alamos and the nuclear complex continue to make great strides in being able to both discover and correct these problems through advanced surveillance and nondestructive testing. As potential concerns are discovered, commonly referred to as SFIs or significant finding investigations, we are now able to use our new tools to rapidly assess, simulate, and model potential effects. At Los Alamos, we have dra-

matically reduced the number of open, unresolved SFIs over the last few years. Further, we are using our increased understanding to reduce the sampling rate for surveillance, while focusing on the important aspects for each warhead system.

Other National Security Applications of Stockpile Stewardship Tools

Additional important national benefits derive from these capabilities. Los Alamos applies this same science and engineering expertise to reduce threats from the proliferation of weapons of mass destruction and terrorism, and to provide for the Nation's energy security. The Laboratory works on the front lines and behind the scenes to prevent the use of nuclear or radiological materials as threats to national or international security. The Nuclear Nonproliferation Program and its predecessors originated nuclear safeguards and created most of the technology used to monitor and measure nuclear materials to assure their use in legitimate, peaceful purposes.

Recent Los Alamos Threat Reduction Accomplishments

—We delivered the fully integrated Cibola Flight Experiment space vehicle for launch with an orbiting computer capable of performing more than 1 trillion operations per second. This matches the performance of the best supercomputers from a decade ago, yet weighs only 40 pounds and requires only 80 watts of power.
—We rapidly and effectively supported the national response to the North Korean nuclear test. We provided the sole technical support from the Department of Energy at the Six-Party talks in Beijing on implementation of the North Korean denuclearization commitments.
—We recovered more than 1,750 U.S.-origin radiological sources in fiscal year 2007, including the first-ever disposal of Radium-226 sealed sources.

Recent Los Alamos Science and Energy Security Accomplishments

—We garnered over 102 major science awards from major external organizations.
—We developed the first high-resolution climate model for ocean circulation that allows us to better understand climate effects like El Niño and La Niña.
—We completed the 100th genetic sequence for the Joint Genome Institute.

These accomplishments represent a different application of the science underlying our core nuclear weapons mission. For example, many of the same people who would help us deal with potential nuclear terrorism incidents are our experts from the nuclear weapons program. Our global climate change expertise developed out of our need for knowledge on nuclear winter effects tied to the nuclear weapons program, and our supercomputer expertise was developed to simulate nuclear explosions. The dual-use aspects of our scientific capabilities allow for greater national return on investments, discovering other important applications for the stockpile stewardship tools. This broader use can often enhance their application for our core mission.

Even though all the elements of the Stockpile Stewardship Program are not yet in place and there are certain science processes that we do not understand yet, it is clear that there have been and continues to be significant accomplishments emanating from the scientists and tools of this program. This program has allowed us to sustain the necessary level of confidence in the stockpile. At the same time, we have much greater insight into the risks we face for the future.

INCREASING RISKS TO THE FUTURE SUCCESS OF THE STOCKPILE STEWARDSHIP PROGRAM

Today I have confidence in the United States nuclear deterrent and believe that within the next few years we will put in place the essential tools we envisioned at the outset of the Stockpile Stewardship Program. But I have increasing concerns as I look to the future. The stockpile continues to change because of aging and the necessity to remanufacture cold war weapons through the Life Extension Program approach. The accumulation of these changes, whose combined effects are difficult to quantify, will increase our uncertainties and pose increasing risk.

At the same time, there are ever-increasing standards imposed by environmental management, safety, and security requirements driving up the costs of the overall infrastructure. When coupled with a very constrained budget, the overall effect is exacerbated, restricting and, in some cases eliminating, our use of experimental tools across the complex. This puts at risk the fundamental premise of Stockpile Stewardship. At a time when our uncertainties are increasing, we should have a more vigorous program of non-nuclear, above-ground testing development and use, capabilities that allow us to validate and augment our developing predictive simulation tools. Regrettably, we are moving in the opposite direction.

TOUGH CHALLENGES AHEAD—LOS ALAMOS NATIONAL LABORATORY

I will first address specific challenges at Los Alamos National Laboratory. The risks at Los Alamos are similar to those that we face nationally.

Commitment to Science

Although available science-based tools and methods, both the large-scale facilities discussed above and the laboratory-scale capabilities that are the workhorse of our programs, have been adequate to address current issues in the stockpile, use of these tools is particularly at risk.

Los Alamos is one of the oldest sites in the nuclear complex whose facilities are difficult to maintain. Several of our aging facilities are nuclear facilities with extremely demanding standards for the environment, safety, and security. At the same time, the National Nuclear Security Administration's preferred alternative for complex transformation designates Los Alamos as the national center for plutonium R&D and production, further concentrating nuclear operations on our site. This increased responsibility for nuclear facilities and operations must be viewed in the context of a reduction in purchasing power of approximately half a billion dollars over the last 5 years Moreover, from our preliminary planning discussions with the National Nuclear Security Administration, we anticipate further erosion of our purchasing power by about $400 million over the next 5 years, assuming inflation and a flat level of appropriated dollars.

The growing costs of our infrastructure in this declining budget environment puts science at risk, especially our ability to execute and develop large-scale and laboratory-scale experiments. As the questions arise from a stockpile that inevitably continues to undergo change, we will be increasingly constrained in our ability to gather the data essential to assess those changes and to assure the efficacy of the recommended actions that must be made.

There are equally important consequences for the long term as well. All of the above near-term pressures constrain our ability to renew our aging infrastructure, which becomes more expensive to maintain the longer this renewal takes. Nationally, the program has become more focused on implementing near-term solutions at the expense of longer-term investments. The overall risks in the Stockpile Stewardship Program will be growing in the future. A balance of long-term investments in science and engineering with near-term actions will best serve the success of the program.

Commitment to the Scientists

Key to the ability of Los Alamos to respond to national needs over the long term is maintaining our technical skills—our people make us a premier national security science laboratory. We must be able to recruit and retain the best and brightest scientific talent. Los Alamos, like all the other national laboratories, draws and retains scientists because of the unique capabilities and opportunities we offer.

Part of what attracts people to a science laboratory such as Los Alamos, are the unique capabilities that are hard to find elsewhere. LANSCE, our neutron accelerator, has been a prime example of such a capability. Part of the future that we see for this facility is to transform it into the world's premier materials science and test capability, Matter-Radiation Interaction in Extremes (MaRIE). MaRIE will be designed to create and exploit extreme radiation fluxes and probe matter to achieve transformational materials performance through predictive multi-scale understanding. This facility would draw scientists to Los Alamos because it would represent a one-of-a-kind user facility whose scientific and practical applications could not be duplicated, and it would also be a key facet to the weapons program. When coupled with modern facilities and equipment and our role as a high-performance computing center (Roadrunner is the latest example), this facility would help ensure our access to the best scientific talent well into the future.

Because there is no advanced training program for nuclear weapons physics and engineering at our colleges and universities, the National Nuclear Security Administration laboratories need the right tools to attract scientists and engineers from the traditional disciplines and then teach them the true art of what we do. Without the continuing commitment to exceptional science, Los Alamos National Laboratory will not be able to provide the incredible diversity and depth of talent we require.

Commitment to Modern Facilities

Los Alamos is one of the oldest sites in the nuclear complex. With many old, high-consequence mission facilities, our Laboratory is very expensive to maintain. The Laboratory's main focus for infrastructure reinvestment priorities is replacing the Chemistry and Metallurgy Research building (CMR) and refurbishing our LANSCE accelerator facility. The CMR building was built in the late 1940s and early 1950s

to support scientific research of plutonium and other actinide elements. But after more than 50 years of service, it will be very difficult for the CMR to continue to meet modern safety, security, and operational requirements. Several sections have been closed to help manage risk, and the remaining laboratory space is harder and more expensive to use. As part of the National Nuclear Security Administration's preferred alternative for complex transformation, the CMR would be replaced by a new facility called the Chemistry and Metallurgy Research-Replacement (CMR–R) project.

The CMR–R project will include two buildings, one a light lab and administration building and the other a high-security R&D and storage building. Together these two structures will have a smaller footprint then the old CMR facility, and will be safer and more secure. The first phase of the CMR–R project, currently under construction, is the Radiological Laboratory Utility Office Building (RLUOB), a modern laboratory facility that will include 19,000 square feet of laboratory space, offices for 350 people, and a training facility. The second phase of the CMR–R project is the Nuclear Facility and construction will begin in the first quarter of 2010. The Nuclear Facility is being designed to provide 22,000 square feet of laboratory space, mostly dedicated to plutonium research, and will include a vault capable of storing 6 metric tons (6,000 kilograms) of plutonium. Neither the RLUOB nor the Nuclear Facility will manufacture pits. Regardless of whether the Nation elects to sustain the existing stockpile or transform it to a different configuration, congressional support of the CMR–R will be essential to conduct the fundamental research that supports the use of actinides in weapons and in other critical applications.

As I mentioned earlier in my statement, the Laboratory has developed a plan to sustain our long-term scientific capability in materials science through the experimental facility MaRIE. This plan could realistically take about a decade to reach full completion. A critical first step in evolving LANSCE, a fully functional but aging facility, into the MaRIE capability would be to start refurbishing the base accelerator within the next year with the help of Congress. LANSCE–R, as we refer to the refurbishment project, is an immediate critical step if Los Alamos is to continue using this facility for our classified weapons research activities. LANSCE is the only facility of its type in the country that can support both classified weapons research and unclassified scientific experiments. The weapons program relies heavily on capabilities derived from LANSCE, such as proton radiography, to interrogate fundamental physics cross-sections, the properties of various classified subsystems, and materials under extreme conditions.

Controlling Costs while Maintaining Mission Capability

I believe it is incumbent on my management team to focus on aligning overall costs with the mission requirements while at the same time finding efficiencies for more effective use of overall programmatic funding. At Los Alamos, we are actively working to reduce our physical footprint by roughly 2 million square feet (over one-quarter of the reduction has been completed in the last year and a half). We have internally absorbed the higher operating costs associated with the new contract structure. At the same time, we are providing significant leadership in the National Nuclear Security Administration's effort to achieve complex integration. Los Alamos is also working with the National Nuclear Security Administration and the Department of Energy in developing a third-party financing proposal to build a new science complex to help further consolidate our overall facilities footprint. This proposed new facility would eliminate over 450,000 square feet of existing substandard scientific space and house over a 1,500 scientific staff in the main Technical Area of the Laboratory.

The Laboratory has also had to make tough decisions and significant reductions in overall staffing levels. Since the beginning of fiscal year 2006, the Laboratory's total headcount has been reduced by over 2,100 individuals, about 46 percent of whom were part of the technical workforce. Matching the Laboratory's workforce to the size of our budget is my responsibility, but I am deeply concerned that with the loss of mission experienced scientists and engineers and the current budget outlook Los Alamos' ability to execute our mission is at risk for the future.

In summary, it is my view that it is in the national interest that we continue to develop and nurture the Laboratory's scientific talent and to invest in and rebuild our infrastructure in order to preserve Los Alamos National Laboratory as a premiere scientific institution. To achieve these critical outcomes, we need the help of Congress to ensure a stable, forward-looking, balanced budget profile to plan for the future.

CRITICAL CROSSROADS FOR THE NATIONAL STOCKPILE STEWARDSHIP PROGRAM

Since the moratorium on nuclear testing began in 1992, the Stockpile Stewardship Program has successfully maintained the nuclear weapons stockpile; however, it has become increasingly difficult and costly to sustain our legacy stockpile, manufactured in the 1960s, 1970s, and 1980s through refurbishment projects. The full cold war infrastructure required to support the older technologies and processes embodied in weapons developed during the cold war is expensive, not fully functional, and does not provide an agile response to evolving needs. The overall cost of the weapons complex is dominated by growing infrastructure costs, relatively independent of the number of weapons in the stockpile.

The continuing accumulation of small changes from stockpile fixes, life extension activities, and aging—with combined effects that are difficult to quantify—will result in larger performance uncertainties and pose increasing risk to the certification of low-margin legacy warheads.

With growing costs of the full cold war infrastructure and the prospects for a declining budget, it is becoming more difficult to maintain, use, or enhance the Stockpile Stewardship tools we have put in place. At the same time, there is a continued decline in the number of people in the complex who have direct experience with the design, manufacture, and testing of an actual weapon. Yet with the increasing risk to certification noted above, we should be moving in the opposite direction. To assess the impact of larger performance uncertainties with low-margin warheads we need a more detailed technical understanding of key, fundamental, technical issues to manage these uncertainties. This requires the more frequent use and further development of advanced laboratory-scale and large-scale capabilities and the simulation tools that can predict these results. The combinations of these factors cause me to conclude that the basic tenets of the Stockpile Stewardship Program are at risk.

With increasing risks to certification, I urge us to implement a more comprehensive inter-laboratory peer review process as part of Annual Assessment. Only one design laboratory would have certification responsibility for each nuclear package, but all the information for each would be readily available to both design laboratories. This would include, for example, the original nuclear test data, and all current data from surveillance and non-nuclear testing. Each would then execute a comprehensive assessment of the current nuclear package status and share that with the certification responsible design laboratory that would inform their final assessment. This approach is a near-term step that could mitigate the increasing certification risks and also provide more opportunities to build workforce expertise at both laboratories. In the past 2 years, Lawrence Livermore and Los Alamos have taken a step in this direction where the two directors are jointly briefed on the status of all the nuclear packages.

The Stockpile Stewardship Program has provided a much better understanding of both the stockpile status and the key technical issues that control performance and reliability. This insight has opened up the possibility of alternate paths forward beyond the current Life Extension Program approach. Such a path could include a transformed stockpile with increased performance margins, reducing risk. By also eliminating difficult materials it could permit a transformed complex, reducing infrastructure costs. It is clear to me that it is time to start making decisions about how to best accomplish this transformation.

Los Alamos fully supports the National Nuclear Security Administration in the development of a more cost-effective, lower-risk, and more responsive nuclear weapons complex infrastructure. A replacement warhead strategy, such as the Reliable Replacement Warhead concept, would have greater margin against performance uncertainties and would use design options with materials and components that would be less complex, safer, more secure, and easier to manufacture and maintain. Additionally, if the Department of Defense can have greater confidence in the National Nuclear Security Administration complex and its products, then that could lead to even further reductions in the stockpile.

CONCLUDING REMARKS

Los Alamos National Laboratory is committed to providing our technical expertise as part of the national effort to sustain confidence in a viable nuclear deterrent, while minimizing the risk for a return to nuclear testing, with the smallest number of weapons consistent with national policy goals.

The Stockpile Stewardship Program has been the right approach for the United States. We knew at the outset that it would be a very challenging program as the required scientific capabilities necessitated advances beyond the existing state of the art. There was no guarantee of ultimate success.

Over the last decade, there has been excellent overall progress with many examples of remarkable accomplishment. Among them is a much better understanding of the status of the current stockpile.

I am concerned about the risks to success for the future. First, the long-term vitality of science at Los Alamos to support our national security missions is at risk. Second, the continuing accumulation of changes to the stockpile will increase performance uncertainties and pose increasing risk in low-margin legacy cold war designs.

It is time for the Nation to set a path for the future that will address these risks.

Thank you for this opportunity to testify. I would be pleased to answer any questions you may have.

Senator DORGAN. Director Anastasio, thank you very much.

Next, Director Miller?

STATEMENT OF DR. GEORGE H. MILLER, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY, LIVERMORE, CALIFORNIA

Dr. MILLER. Thank you very much, Chairman Dorgan, for inviting me here and giving me the opportunity to give you my perspective of the health of the Nation's nuclear weapons program. I'd especially like to thank Senator Domenici, and personally thank him for his many years of leadership and service to this Nation, and importantly, for his extensive and exceptional stewardship of this country's science and technology and nuclear affairs, broadly.

I'm also very pleased that Senator Feinstein is here, and I thank her very much for her continuing support of the laboratories broad mission.

I'd like to summarize just a couple of points from my written testimony. Through Stockpile Stewardship, this Nation has been able to maintain an increasingly small nuclear deterrent, without nuclear testing. But the job's not done.

I'm concerned that the investments that have brought us to this point are at risk. As you and several members of the panel have pointed out, the country needs to make a series of decisions about the overall structure of the nuclear weapons program, and the policies associated with it. It is my view that—independent of the policy that we move forward—the science and technology embedded in the Science-based Stockpile Stewardship is necessary to succeed, because it is the intellectual underpinning for any decision.

I'm extremely proud of the contributions that Livermore has made to bringing the Stockpile Stewardship Program to this point. The W87 life extension program was the first life extension program certified without nuclear testing.

Through the Livermore, IBM, NNSA partnership, we have successively produced the world's largest computers, currently BlueGene/L at Livermore is 500 teraflops, half a petaflop.

Weapons simulations using these computers have shown us that there's much about the inner workings of a nuclear weapon that we do not yet understand, and they've pointed the way to the scientific capability that's necessary to continue to be able to certify the stockpile.

The national ignition facility is already the world's largest and most powerful laser, and it will be completed within a year. It will shortly bring fusion experiments, and the science of the cosmos to the laboratory. It's critical to enabling us to answer some of the most fundamental questions that we have about nuclear weapons performance.

Since the project was re-baselined about a decade ago, the NIF has been on-budget, on-schedule, and met all of its milestones. I thank the committee for its role in allowing NIF to move forward. I think you can take great pride in its accomplishments.

But the job of Stockpile Stewardship is not complete. The weapons are continuing to age, and the experienced weapons scientists are continuing to age. Some of the tools are just now coming online, they have yet to be applied to the full spectrum of problems that need to be resolved. As Mike said, DARHT has just recently been completed, it needs to be applied to the stockpile.

The simulations done on the BlueGene/L have pointed out that we need tens of petaflops sustained to be able to accurately understand what's going on in a nuclear weapon. NIF is not yet complete.

To ensure better confidence as we move forward, I believe it's important that we implement a more comprehensive peer review, whereby Livermore and Los Alamos more fully evaluate the entire stockpile each year, and it's essential that we complete this job.

I think we understand what the laboratories——

Senator DOMENICI. Would you repeat that again, please?

Dr. MILLER. Yes, sir.

I believe that we should implement a more comprehensive peer review, whereby Livermore and Los Alamos each year would more fully evaluate all of the stockpile, rather than just the systems for which they own have responsibility.

I think our job as laboratory directors is to provide technical options that can inform policy goals of the United States. To provide a weapons complex that's sustainable into the future, that has the smallest number of weapons consistent with policy goals, has the least costly weapons complex, and minimizes any need to return to testing.

As I look into the future, I'm concerned that the investments that have brought us to this point are not sustained. If they are not sustained, I believe a crisis in confidence will result.

Without a fully developed science and technology program, we will lose confidence in the stockpile, whether we have a life extension program, or some other. I believe we are seeing the signs of this concern borne out already, the critical investments in the accelerated super-computing initiative have already begun to decline. We are not able to fully utilize the experimental facilities that we have built.

The effects are already being felt at Livermore, with the reductions associated with last year's Federal budget, and the costs associated with the contract. By the end of this fiscal year, Livermore will have reduced its population by more than 2,000 people from the beginning of fiscal year 2007.

I believe that the Stockpile Stewardship Program is at a cusp of being able to ensure confidence in the stockpile without nuclear testing. I believe we can be successful if we push forward, I believe we can fail if we stop.

The weapons labs are centers of big science in this country. The resident expertise is being applied to the pressing problems of this country, of securing the Nation's defense and energy, and environmental and economic security.

Nuclear weapons expertise is critical to intelligence and understanding the problems of proliferation and terrorism. Nuclear weapons expertise is critical to the issue of understanding nuclear forensics. As a result of the scientific investments made by the Department of Energy and this subcommittee, these labs provide value to the country, well beyond nuclear weapons, in areas that I believe are the defining issues of this century.

PREPARED STATEMENT

We're doing a lot, but we can do more. All that we do is dependent upon the vital core of the nuclear weapons program. As you forward through the difficult decisions ahead of you, I ask that you think in terms of sustainment—sustaining and protecting what is most critical, and applying these critical resources to our country's, and the globe's, most defining and important problems.

[The statement follows:]

PREPARED STATEMENT OF DR. GEORGE H. MILLER

Mr. Chairman and members of the subcommittee, thank you for the opportunity to provide my perspectives on the fiscal year 2009 budget request as well as the health of the country's nuclear weapons stockpile and nonproliferation programs. I am the Director of the Lawrence Livermore National Laboratory (LLNL), a multidisciplinary national security laboratory with major responsibilities in nuclear weapons. My responsibility—and today's critical challenge—is to help enable a nuclear weapons program that is sustainable into the future with the smallest number of weapons and the least costly weapons complex consistent with policy goals and that minimizes the risk of needing to return to nuclear testing.

Because this is a time of significant change for the National Nuclear Security Administration's (NNSA's) nuclear weapons complex and our Laboratory, I open my statement with my perspective of the broad challenges we face. I then briefly highlight Livermore's accomplishments in NNSA programs and specific issues related to our activities. I conclude with summary remarks about my future vision for the Laboratory.

But first, I want to thank the Congress and especially this subcommittee for your continuing strong support of the Stockpile Stewardship Program and our important and technically demanding programs to reduce the dangers of proliferation of nuclear weapons. The Stockpile Stewardship Program continues to make excellent technical progress, but it is not yet complete and faces challenges in the years ahead. Critical decisions have to be made about the future of the U.S. nuclear stockpile and the weapons complex. Independent of specific choices made, it is clear that a strongly supported and sustained Stockpile Stewardship Program is necessary to ensure that this Nation can maintain the safety, security, and reliability of its nuclear deterrent over the long term. I support NNSA's goal of transforming the nuclear weapons complex to make it smaller, safer, more secure, and more cost effective. I recognize the realities that constrain the overall budget as we attempt to create a nuclear enterprise appropriate to the post-cold war era.

CHALLENGES FACING THE NNSA WEAPONS COMPLEX AND LLNL

Lawrence Livermore National Laboratory serves NNSA and the Nation by applying multidisciplinary science, engineering, and technology to meet urgent challenges to national security and global stability. Since the Laboratory's inception in 1952, a special national security responsibility has been ensuring that the Nation has a safe, secure, and reliable nuclear weapons stockpile. In addition, Livermore provides advanced technologies, integrated analyses, and operational capabilities to prevent the spread and use of weapons of mass destruction and strengthen homeland security.

Our special multidisciplinary capabilities are also applied to strengthen global security through research and development for advanced defense systems, abundant energy and environmental quality, biotechnology to improve human health, U.S. industrial competitiveness, and basic science. These activities—many directed toward finding innovative solutions to the great challenges of the 21st century—both derive from and depend on the core nuclear weapons science and technology and also con-

tribute to supporting the science and technology required for our nuclear weapons mission.

Livermore is an integral part of NNSA's Stockpile Stewardship Program and committed to helping the Nation transform the U.S. nuclear weapons complex and stockpile to meet 21st century deterrence needs. We need an affordable nuclear weapons complex; the smallest nuclear deterrent force consistent with policy goals; and a sustainable nuclear weapons program that provides confidence in the safety, security, and reliability of stockpile and minimizes the risk of the need for nuclear testing.

The Stockpile Stewardship Program was a very ambitious undertaking when launched a little over a decade ago. To date it has been highly successful in its two major goals. First, we had to develop and use vastly improved tools to much better understand nuclear weapons performance. I am proud of our tremendous accomplishments in this area. Great progress has been made and even more will come with quadrillion-operations-per-second (petascale) computers and high-fidelity simulations and the capability, beginning in 2009, to conduct thermonuclear weapons physics experiments at the National Ignition Facility (NIF). These tools are critically important to maintain confidence in our deterrent without nuclear testing. Second, we have to sustain the expertise—people—to ensure that the U.S. nuclear stockpile remains healthy by applying our improved understanding of weapons performance to deal with issues that arise in aging weapon systems without resorting to nuclear tests. So far, we have been able to do that. The first weapon system to successfully complete a life-extension program under the Stockpile Stewardship Program without nuclear testing was Lawrence Livermore's and Sandia's W87 ICBM warhead. Although the job is not over, I remain confident that science-based stockpile stewardship will continue to be a technical success provided that the Nation continues its investments in the science-based programmatic activities.

Budgets for NNSA nuclear weapons activities are tight and likely to remain so. As I look to the future, I am very concerned that the investments that have brought success to science-based stockpile stewardship might not be sustained. Over the longer term, failure to sustain investments in stockpile stewardship will result in loss of the expertise, capabilities, and activities that underpin the Annual Stockpile Assessment and certification of weapon modifications. That would lead to a loss in confidence in the stockpile. In some respects, the future is now at Livermore. The National Ignition Campaign, work needed to carry out the initial ignition experiments in 2010 and continuing research the following years, did not receive the full funding requested by NNSA in fiscal year 2007, fiscal year 2008, or fiscal year 2009, putting timely achievement of program goals at higher risk than would be the case otherwise. Reduced levels of funding for the Accelerated Simulation and Computing (ASC) program are eroding our capabilities to improve physics models in weapon simulation codes. Most tellingly, in fiscal year 2008 the Laboratory's spending power was reduced $280 million (compared to a $1.6 billion budget in fiscal year 2007)—about $200 million more than anticipated. While our focus is on reducing support costs and preserving programmatic capabilities, it is noteworthy that the staff will decline from about 8,900 in October of 2006 to under 7,000 FTEs by the end of fiscal year 2008. More than 500 of these are highly-trained scientists and engineers.

In a constrained budget environment, it is important to preserve critically needed capabilities and to stay focused on the long-term objectives: an affordable nuclear weapons complex supporting a smaller nuclear deterrent force sustained by a nuclear weapons program that provides confidence in the stockpile. Many details about the end state will have to be worked out—and depend on future nuclear weapon policy choices and world events—but it is clear that expertise, skills, and capabilities currently embodied in the NNSA national laboratories will be needed in the long term and can serve as useful technical resources to help define the path forward. In broad terms, a prudent path forward that would sustain science-based stockpile stewardship capabilities would be to:

—Consolidate selected capabilities and facilities such as those for special nuclear materials to reduce costs, while preserving intellectual independence of key capabilities that are necessary for technical peer review. Fully capable, independent peer review is critical when nuclear testing is not available.

—Sustain investments in capabilities at the NNSA laboratories that are both critical to the long-term success of stockpile stewardship and because of their technical leadership, provide a basis for expanding work for other Federal agencies and addressing important national priorities (e.g., at Livermore, NIF and ASC).

—Apply the capabilities at the NNSA laboratories to: continuing to improve their understanding of weapons physics issues to reduce uncertainties in weapon performance; managing issues that arise in stockpiled weapons; and working with the NNSA production plants and Department of Defense to devise an optimal

path forward for a certifiably safe, secure, and reliable stockpile at affordable costs.

—Work to reduce overhead costs at the NNSA laboratories and expand work for other Federal agencies in a way that supports and augments NNSA's investments in the laboratories.

This approach, which is fully consistent with NNSA's long-term objectives for complex transformation, provides an additional valuable service to the Nation. It secures a long-term role for the weapons laboratories as crown jewels of large-scale science supporting our Nation's defense, energy, environmental, and economic security. These laboratories are the largest multidisciplinary concentration of PhDs in the country—there are no other institutions like them. As a result of this investment in the scientific and technical infrastructure by DOE and this committee, the laboratories provide value to the country well beyond nuclear weapons work—in areas that are the defining problems of this century. And we can do even more.

NEW STOCKPILE STEWARDSHIP TOOLS AND THEIR APPLICATION

One of the greatest accomplishments of the Stockpile Stewardship Program to date is our tremendous progress in acquiring new tools and using them to better understand weapons performance. When nuclear testing was halted, there were significant gaps in our knowledge. Some nuclear test results remained unexplained and for some processes in the detonation of a nuclear device, our simulation codes were simply not adequate. Either the computers were not large and fast enough or we did not understand the physics—or both. For those processes, we depended on nuclear test data to adjust the codes.

A key focus of stockpile stewardship has been to fill the gaps in our knowledge to reduce our uncertainties about nuclear weapons safety, security, and performance as the stockpile ages. There are four major areas of investment in improved capabilities: more powerful computers, enhanced hydrodynamic testing capabilities to experimentally study the performance of (mock) primaries prior to nuclear explosion, an experimental facility to study the high-energy-density and thermonuclear processes in weapons (the National Ignition Facility), and tools to better understand the properties of plutonium. With these tools, we are striving to develop a better understanding of the physics, improve our simulation models, and use non-nuclear experiments and past nuclear test data to validate those model improvements. To date, some of the unknowns about nuclear weapons performance have been resolved, others we are close to resolving, and still others will require more time and effort. Greater knowledge increases the likelihood that we can resolve with confidence a problem that arises in stockpiled weapons without having to resort to a nuclear test.

Advanced Simulation and Computing (ASC)

The ASC program continues to be a remarkable success. The goal set when the Stockpile Stewardship Program began was a million-fold increase in computing power in a decade. It was estimated at the time that a computer capable of 100 trillion floating point operations per second (100 teraflops) would provide a minimum level capability to model the full performance of a nuclear weapon in three dimensions with sufficient resolution to illuminate the physics issues where we need to make significant improvement. The goal was attained with the delivery to Livermore from IBM of the 100-teraflop ASC Purple supercomputer, with over 12,000 processors and 2 million gigabytes of storage.

In April 2006, the NNSA laboratories began using ASC Purple for classified production runs. Soon after the machine began operating, a joint team of scientists from Livermore and Los Alamos performed a series of weapon simulations at unprecedented resolution using the most advanced ASC simulation software. The results gave dramatic new insights into weapons physics by pointing to phenomena not seen at lower resolution.

ASC Purple is now running a series of 6 month campaigns as a national user facility—managed in a manner similar to a unique, large experimental facility. Each of the NNSA laboratories propose computing work packages to be run as campaigns. These packages, which need ASC Purple's size and capability, aim at achieving major stockpile-stewardship milestones. The proposals are reviewed and prioritized for relevance, importance, and technical rationale; and machine time is allocated accordingly. ASC Purple is the first ASC system to be managed in this way.

A remarkable feature of the ASC program is its strong partnerships with the U.S. computer industry and major research universities to accelerate the development of supercomputer platforms, storage and operating systems, and software capable of running efficiently on machines with tens to hundreds of thousands of processors. An example of this is Livermore's partnership with IBM to develop and bring into operation BlueGene/L, the world's fastest computer. With its system-on-a-chip tech-

nology, BlueGene/L is a world apart from its predecessors. Compared with the previous record holder, it was 8 times faster and one-fourth the cost, and it required one-tenth the floor space and one-sixth the power consumption. In 2007, the machine was expanded from 131,000 to 208,000 processors and now benchmarks at 478 teraflops (with a peak speed of 596 teraflops).

BlueGene/L was acquired through the ASC program as a computational research machine for evaluating advanced architectures to help define an affordable path to petaflop computing (quadrillion operations per second). It has been remarkably successful, efficiently running simulation codes capable of addressing a broader range of weapons issues than originally envisioned. For 3 years running, simulations performed by researchers using BlueGene/L won the prestigious Gordon Bell Prize, which is awarded to innovators who advance high-performance computing.

It is vital that the laboratories build on the ASC program's outstanding successes and sustain the momentum toward petaflop computing and beyond by staying on schedule for the next planned ASC investments, the Roadrunner machine for Los Alamos and the Sequoia machine for Livermore, and continuing to maintain and develop the extraordinary simulations code systems. These next two machines take different approaches to the integrated problem of the computer architecture and simulations that must run on them. Sequoia is an extension of the successful BlueGene/L approach while Roadrunner takes a different approach. Both entail risks. The continuing advances in simulation required to resolve the remaining weapons performance issues are too important to pursue only one approach. One needs to succeed and hopefully both will. The generation of machines beyond them can combine the two different approaches.

Through the highly successful ASC program, we are turning simulation into a tool of predictive science—a full partner with theory and experiments. In particular, we are making key discoveries about physical processes in the functioning of a nuclear weapon that help us to improve models in codes and reduce sources of uncertainty in weapon performance. The more powerful Roadrunner and Sequoia computers are essential for implementing better physics models and as discussed below, the methodology we have been developing to quantify uncertainties in weapon assessments and certification. It is critically important to sustain the investments that have led to such remarkable successes in the ASC program.

Hydrodynamic Testing

Hydrodynamics testing is the most valuable experimental tool we have for diagnosing device performance issues for primaries in weapons before they enter the nuclear phase of operation. Hydrodynamics experiments are conducted at Livermore's Contained Firing Facility (CFF) at Site 300, our remote testing location, and the newly commissioned Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) at Los Alamos. Experiments are executed in accordance with a National Hydrotest Program, which NNSA coordinates with the laboratories. The plans include both Integrated Weapons Experiments—large-scale tests of mock weapon primaries—and smaller-scale focused experiments, performed to study specific physics or engineering issues. Over the last 3 years, Livermore researchers performed nearly 20 Integrated Weapons Experiments at CFF for both Livermore and Los Alamos. The Laboratory has also conducted a long series of Focused Experiments to study radiation case dynamics after high-explosive detonation. Important information was learned from these experiments that led to major improvements to weapons code physics and new insights into nuclear weapons performance.

In the NNSA's preferred alternative for complex transformation, long-term plans call for closure of CFF when its use for hydrodynamic testing is no longer programmatically necessary and reduced NNSA support for Site 300. As these changes occur, Livermore scientists and engineers will carry out aspects of their important hydrodynamic experiments at other sites. It is critically important that sufficient funding be made available to fully utilize the new capabilities available at DARHT.

The National Ignition Facility (NIF)

NIF is critical to the success of the Stockpile Stewardship Program. It is the only facility capable of creating in a laboratory the conditions necessary to experimentally access all of the nuclear phase operations important to modern nuclear weapons. A wide range of precisely diagnosed experiments can be fielded at NIF. These experiments offer the promise of uncovering important physics details about the functioning of a nuclear weapon that were inaccessible or not examined in underground nuclear tests. NNSA scientists will gather necessary data to improve and validate physics models in simulation codes. Ignition experiments at NIF are critical to understanding fusion burn, a key phenomena in the performance of weapons in the stockpile. The design and execution of complex NIF experiments will also test

the expertise of NNSA scientists and sustain their critical skills and knowledge about nuclear design.

Major progress continues to be made on NIF and preparations for fusion ignition experiments with the 192-beam laser. As has been the case since being rebaselined in 2000, the NIF project is meeting all of its technical performance, cost, and schedule milestones. Current plans are to complete the construction project and laser commissioning in March 2009, and begin the first ignition experiments in fiscal year 2010. In July 2007, Laboratory scientists, engineers, and technicians commissioned the first of two 96-beam laser bays, assuring that each beam met NIF's operational and performance qualification requirements. In early 2008, all 192 main laser beams were precisely aligned. As of the end of March 2008, testing has been completed on 144 of the 192 beams, and installation has begun of the final optical modules that convert the laser light from infrared to ultraviolet. More than 3.1 megajoules of infrared-light energy have been fired, making NIF by far the world's most energetic laser. The extraordinary laser energy (more than 1.8 megajoules of energy in ultraviolet light), the remarkable beam quality, and the ability to shape the pulse to meet the specific needs of experiments provide NIF unique and unprecedented experimental capabilities.

The National Ignition Campaign (NIC), which is being managed for NNSA by our Laboratory, involves multiple laboratories and encompasses all work needed to carry out the initial ignition experiments in 2010 and continuing research the following years. Currently, the main thrust of NIC is to prepare for experiments in 2009 to validate the ignition target's design. Using 96 beams, these experiments will help select the optimum radiation temperature conditions for the ignition experiments. Computer simulations, which have been validated by their close match with data gathered from the 4-beam NIF Early Light experiments conducted in 2003–2004, indicate that NIF's laser beams will propagate effectively through the hot plasma generated in fusion experiments to achieve ignition.

NIC is following a well-defined technical path toward ignition on NIF and the transition of NIF to routine operations in 2012 as a highly flexible high-energy-density user facility for research for stockpile stewardship as well as energy security and the basic science of matter at extreme conditions. However, NIC did not receive the funding requested by NNSA in fiscal year 2007 and fiscal year 2008, putting timely achievement of program goals at higher risk than would be the case otherwise. We remain confident that ignition will be achieved soon after the experimental program begins in 2010. We have larger concerns about a shortfall in the future funding needed to sustain the experimental effort and achieve the full benefits of NIF's unique capabilities. NIF is the only source of the data about the "nuclear phase" of operation that are necessary for the long-term success of stockpile stewardship.

A number of key uncertainties about nuclear weapons physics relate to weapons performance near the time the device "goes nuclear" and thereafter. The process of boosting the fission yield of primaries, in particular, is key to weapons performance and is not well understood. NNSA has launched a science campaign to investigate the physics of boost and improve the modeling of it in simulations with the goal of reducing uncertainties in weapon performance. Data and insights from NIF experiments are required to develop and validate the models. Ignition and thermonuclear burn is another area where NIF experiments will enable scientists to better understand the underlying physics and reduce weapon performance uncertainties.

In addition, NIF experiments will provide critically needed equation-of-state, opacity, and material dynamics data to improve and validate weapon simulation models. NIF is unique in its capabilities for these types of experiments because of its ability to produce very high temperatures in a sufficiently large volume for a sufficiently long period of time and because of its excellent diagnostics. These same attributes make possible scaled experiments of hydrodynamic and radiation transport phenomena, with results that can be directly compared to simulation model predictions of nuclear-phase weapon performance. As it nears completion, it is extremely important that the NIF project be fully funded so that it can be completed on time and that NIF be fully utilized to demonstrate ignition and resolve the weapons physics issues critical to continuing to certify the stockpile without nuclear testing. At this point in the project, there is little flexibility to accommodate funding shortfalls without impact on completion.

Plutonium Research Capabilities and Facilities

Plutonium is an extremely complex material and understanding its detailed properties is a major scientific challenge. Completed in 2006, a concerted long-term study by Livermore and Los Alamos researchers concluded that the performance of plutonium pits in U.S. nuclear weapons will not sharply decline due to aging effects

over decades. Because plutonium is highly radioactive, over time it damages materials in weapons including the pits themselves. However, the study concluded that the plutonium pits for most, but not all, nuclear weapons have minimum lifetimes of at least 85 years. These results have important implications in planning for the weapons production complex of the future.

Still, there is much we do not know about the material and its properties at extreme conditions, which is important for weapon performance. In 2007, Livermore researchers met an important stockpile stewardship milestone by completing the development of a new description of plutonium under a variety of physical conditions—an "equation of state." This equation of state is based on advanced theory and simulation, including simulations only now possible with the ASC Purple and BlueGene/L supercomputers, together with very accurate data from diamond-anvil-cell measurements at high static pressures and dynamic experiments using the Joint Actinide Shock Physics Experimental Research (JASPER) gas gun at the Nevada Test Site. Work with this equation of state tells us that the technical research into this complex material must continue if we are to meet all the needs of the stewardship program.

Large-scale work with plutonium at Livermore's plutonium facility (Superblock), which has provided vital support to the Stockpile Stewardship Program, will be phased out. NNSA's plans for complex transformation include the consolidation of weapons-useable special nuclear materials to fewer sites. All Category I/II quantities of special nuclear materials are to be removed from Livermore by the end of 2012—2 years earlier than planned when the first shipment of plutonium left the Laboratory for Los Alamos in late 2006. Since then, two more shipments of material have been made to the Savannah River Site in South Carolina, where surplus nuclear materials are being consolidated.

Livermore researchers will continue research and development activities to better understand plutonium, improve plutonium part manufacturing processes, and provide surveillance of stockpiled weapons. Our plutonium research breakthroughs have proved important over the years, and the two-laboratory approach is a vital part of effective peer review processes. Category III amounts of nuclear materials will remain on the Livermore site for small-scale experiments. For other activities, Laboratory scientists and engineers will begin using facilities elsewhere to conduct their work. To this end, modern plutonium-capable facilities are necessary for stockpile stewardship and sustaining the Nation's nuclear stockpile. It is essential that the Nation proceed with the Chemistry and Metallurgy Research (CMR) Building Replacement Project at Los Alamos.

MANAGING THE HEALTH OF THE STOCKPILE

Lawrence Livermore is responsible for the nuclear explosive packages in five nuclear weapons systems—four that were designed by Livermore: the W62 ICBM warhead, the W84 cruise missile warhead (inactive), the B83 strategic bomb, and the W87 ICBM warhead; and one designed by Los Alamos: the W80 cruise missile warhead. The Laboratory monitors the health of the weapons for which it is responsible, conducts stockpile stewardship activities to better understand aging effects on weapons materials and components, develops advanced technologies for weapon surveillance, evaluates issues as they arise in stockpiled weapons, and pursues programs to extend the stockpile life of weapons. In addition, Livermore scientists and engineers develop advanced technologies for weapons surveillance and manufacture of weapons parts, and the Laboratory participated in the Reliable Replacement Warhead Feasibility Study.

Livermore also assists others in the nuclear weapons complex on production issues. Laboratory engineers are working closely with the Pantex and Y–12 Throughput Improvement Project teams to improve plant efficiencies, expedite completion of joint projects, and introduce new capabilities. In addition, Livermore helped with the resumption of weapon pit manufacturing at Los Alamos, where a team succeeded in fabricating and certifying new pits for the W88 submarine-launched ballistic missile warheads. The Laboratory supplied radiographic inspection capabilities, produced small-scale plutonium samples for testing, and provided engineering evaluations and peer reviews based on a wide range of independently conducted experiments and simulations.

Comprehensive Peer Review and Advanced Certification

Livermore is a key participant in formal review processes and assessments of weapon safety, security, and reliability. As part of the Annual Stockpile Assessment Process, Lawrence Livermore and Sandia prepare Annual Assessment Reports for each of the nuclear weapons systems for which the two laboratories are jointly responsible. As input to the reports, Laboratory scientists and engineers collect, re-

view, and integrate all available information about each weapon system, including physics, engineering, chemistry, and materials science data. These Annual Assessments use the advanced tools developed by the stockpile stewardship program—such as ASC, DARHT, and soon NIF—as an integral part of the assessments. This work is subjected to rigorous, in-depth intralaboratory review and to expert external review, including formal use of red teams.

With the aging of U.S. nuclear weapons, risks are growing that reliability issues will arise, and modifications to extend the stockpile lifetime of weapons are likely to become more complex and challenging to certify. In recognition of these issues, the JASON Defense Advisory Group recommended to NNSA that the weapon certification process be improved through expanded peer review mechanisms and refinement of the computational tools and methods for certification. To address these recommendations, NNSA was directed by Congress to implement a new Science Campaign called Advanced Certification to significantly increase the scientific rigor of certifying the Nation's nuclear deterrent. The campaign is focused on expanding and applying the Stockpile Stewardship Program methodology called the quantification of margins and uncertainties (QMU). By enhancing the scientific rigor and transparency of QMU, the Advanced Certification Science Campaign will improve the quality of the assessments and enable better peer review by external panels of experts. These efforts will expand the applicability and validity of the process, initially developed for the existing stockpile, to complex Life Extension Programs and reuse of previously produced components such as pits, and they will answer questions raised by the JASONs in their consideration of the Reliable Replacement Warhead.

In conjunction with the Annual Assessment process, the laboratories have recommended that a more Comprehensive Peer Review process be implemented. In this process, responsibility for assessing a nuclear package in a weapon system will remain with the current responsible design laboratory. However, surveillance and underground test data for all stockpile systems will be accessible to both design laboratories, and each laboratory will annually carry out comprehensive independent analyses of all stockpile systems, thereby enabling in-depth, intensive laboratory technical peer review. This effort will provide the responsible laboratory and NNSA with more comprehensive evaluations of the stockpile and more efficiently apply complex-wide resources to address time urgent stockpile issues, such as significant finding investigation (SFI) resolution. I believe that adding the Comprehensive Peer Review process is the single most important action to take to improve confidence in the nuclear deterrent in the absence of nuclear testing.

Life-Extension Programs (LEPs)

The LEP that refurbished the W87 ICBM warhead was a successful example of stockpile stewardship. Congress authorized the W87 LEP in 1994, the first rebuilt W87 was delivered back to the Department of Defense (DOD) on schedule in 1999, and Lawrence Livermore and Sandia completed formal certification in 2001. NNSA and DOD established an extensive technical review process to certify the design changes and production procedures. The process entailed thorough internal reviews at Livermore, technical reviews by NNSA (including peer review by Los Alamos), and reviews by DOD. Throughout the program, the Laboratory collaborated with the production plants, working to ensure the quality of the W87 refurbishment work.

Subsequent LEPs are proving to be challenging, and future ones can be expected to be even more difficult because there are going to be more things that need to be fixed—that happens with age. Nuclear weapons include a variety of reactive and organic materials sealed in close proximity in a hostile radiation environment. In some weapon systems, we are beginning to see aging signs that concern us. Cold-War-era weapons were designed to meet stringent military characteristics (MCs). The limits of what was possible were often pushed in the design of currently-deployed weapons. Ease of manufacture or long shelf-life were lower design priorities. Exotic and/or environmentally unfriendly materials are used in a number of instances to improve performance, and manufacture of the weapons entailed numerous steps that are difficult to exactly reproduce. Furthermore, while there is a basis for high confidence in the performance of the stockpiled weapons as they were produced, some designs do not have large performance margins, which makes their performance less resilient to change. These factors increase the difficulty of certification of any modifications in refurbishments and the expense of rebuilding the weapons.

Reliable Replacement Warhead Feasibility

After authorization by Congress, the Nuclear Weapons Council launched the Reliable Replacement Warhead (RRW) Feasibility Study in 2005. The goal of the RRW is to replace existing aging warhead systems with designs that more closely meet the requirements of the post-cold war era. The RRW would include advanced safety

and security technologies, and it would be designed to have much larger performance margins than the system being replaced. Large performance margins make it easier to certify reliable performance without underground nuclear testing. These designs would be based on devices that were well tested previously, further obviating the need for nuclear testing. They would be manufactured from materials that are more readily available and more environmentally benign that those used in current designs. The objective is for these modified warheads to be much less costly to manufacture by a smaller, modernized production complex. The RRW is to maintain the current military capability—not to improve it.

In early 2007, NNSA announced its decision that Livermore and Sandia national laboratories would provide design leadership for the RRW for the U.S. Navy. After the decision, NNSA and the Navy began work to further define and develop detailed cost estimates for the RRW program. This work was intended to support a future decision to seek congressional authorization and funding in order to proceed into system development and potentially subsequent production. The effort has since been halted. Seeking clarification on a number of related policy and technical issues, Congress stopped funding for RRW work in fiscal year 2008. The Nation would benefit from a clearer view of the costs of RRWs versus programs to extend the life of existing warheads or a blending of the RRW and LEP approaches—together with the technical challenges and risks of the various options. Considerable technical work is needed to support an informed decision about the preferred options for the Nation's enduring nuclear deterrent and nuclear weapons complex. It is important that we expeditiously start to develop the needed information.

SUPPORT OF DEFENSE NUCLEAR NONPROLIFERATION PROGRAMS

Livermore engages in a wide range of activities for NNSA's Defense Nuclear Nonproliferation Program, whose important mission is to address the threat that hostile nations or terrorist groups may acquire weapons-useable material, equipment or technology, or weapons of mass destruction (WMD) capabilities. We contribute to almost all program areas because the Laboratory takes an integrated, end-to-end approach to its WMD nonproliferation work—from preventing proliferation at its sources, to detecting proliferant activities and identifying ways to counter those efforts, to responding to the threatened or actual use of WMD.

Another feature of the Laboratory's work is that we work closely with end-users of our technologies and systems so that our research and development efforts are informed by real-world operational needs. Livermore, in fact, supports several sponsors with unique operational capabilities. For Defense Nuclear Nonproliferation these include the National Atmospheric Release Advisory Center (NARAC), the Nuclear Incident Response Program, and the Forensic Science Center, which supports multiple sponsors. NARAC is the source of technical capabilities that also support the Department of Homeland Security's (DHS's) Interagency Modeling and Atmospheric Assessment Center. As a result of our special capabilities, the Laboratory is also responsible for DHS's Biodefense Knowledge Center and DOD's Counterproliferation Analysis and Planning System and the Homeland Defense Operational Planning System. The uniqueness of Livermore's capabilities is borne out by the fact that we are one of only 12 world-wide laboratories, and currently the only one in the United States, certified to analyze samples pertaining to the Chemical Weapons Convention and the only certified forensics laboratory able to receive all types of forensics evidence—nuclear, biological, explosive, and hazardous chemicals.

Selected examples of the Laboratory's activities in support of Defense Nuclear Nonproliferation include:

—In support of the Global Threat Reduction Initiative, Livermore is leading the effort to secure more than 1,000 radioisotopic thermonuclear generators deployed across Russia. Installed in the 1970s as remote power sources, these devices are highly radioactive and largely unsecured, thus posing proliferation and terrorism risks.

—In support of the Material Protection Control and Accounting (MPC&A) program, Livermore completed MPC&A upgrades for the last two Russian navy sites in the Kamchatka region in 2007. The Laboratory also leads the Federal Information System effort to establish a comprehensive national nuclear material accounting system for Russia.

—In a significant breakthrough to strengthen international nuclear safeguards, a team of researchers from Lawrence Livermore and Sandia recently demonstrated that the operational status and thermal power of reactors can be precisely monitored over hour- to month-timescales using a cubic-meter-size antineutrino detector. The detectors could be used to ensure that nuclear fuel in civilian power reactors is not diverted for weapons purposes.

—In support of efforts to monitor for underground nuclear explosions, Livermore develops tools and methodologies for detecting seismic events in regions of proliferation concern. In 2007, Laboratory scientists produced regional seismic calibrations for the Persian Gulf and surrounding regions, and they developed improved methods for distinguishing the waveform for earthquakes and nuclear explosions in North Korea.

—The Laboratory works on a variety of advanced detection capabilities. One example is major success in 2007 in developing a passive technique to detect shielded highly-enriched uranium, an important breakthrough for homeland protection.

All of these capabilities are built upon the science and technology infrastructure required to meet our nuclear weapons responsibilities.

SUMMARY REMARKS

On October 1, 2007, a newly formed public-private partnership, Lawrence Livermore National Security, LLC (LLNS), began its contract with the Department of Energy to manage and operate the Laboratory. LLNS is honored to take on the responsibility. We see a future with great opportunities to apply our exceptional science and technology to important national problems. To this end, we have identified four top-level goals.

First, we will work with NNSA to provide leadership in transforming the Nation's nuclear weapons complex and stockpile to meet 21st-century national security needs. As in NNSA's preferred alternative for complex transformation, we envision Livermore as a center of excellence for nuclear design with centers of excellence for supercomputing with petascale machines, high-energy-density physics with the National Ignition Facility (NIF), and energetic materials research and development with the High Explosives Applications Facility (HEAF). We are vigorously supporting the goal of consolidation and working toward eliminating Category I/II quantities of special nuclear material from the site by 2012.

Second, we will carry forward Livermore's tradition of exceptional science and technology that anticipates, innovates, and delivers. This is the science and technology that brought into operation currently the world's most powerful computer and used it the last 3 years in a row to win the Gordon Bell Prize with amazing scientific simulations; that is finishing commissioning of NIF and preparing for experiments to achieve the power of the sun in a laboratory setting for national security, long-term energy security, and scientific exploration; that is developing advanced radiation detection systems as well as analysis-on-a-chip technologies and DNA signatures for rapid detection of pathogens for health and security applications; and that has provided critical technical support since 1990 to the Intergovernmental Panel on Climate Change, which was a co-winner of the Nobel Peace Prize in 2007 for its work.

Third, we will aggressively make available the core scientific and technical capabilities of the Laboratory to meet pressing national needs in areas that build on and contribute to the core missions and strengths of the Laboratory. As I highlighted in this testimony, the Nation and the world face many complex challenges in the 21st century that require the exceptional science and technology and sustained multidisciplinary efforts that the Laboratory can offer.

Four, we will enhance business and operational performance, paying particular attention to safe and secure operations and improving our operational efficiency and cost effectiveness. Public trust in our Laboratory depends on meeting mission goals through safe, secure, disciplined, and cost-efficient operations.

LLNS' start as managing contractor at the beginning of fiscal year 2008 coincided with the reduction of $280 million in spending power at the Laboratory. We have been working to dramatically reduce support costs and the staff will decline from about 8,900 in October 2006 to under 7,000 FTEs by the end of fiscal year 2008. More than 500 of these are highly-trained scientists and engineers. The change is painful, but it is my responsibility to "right size" the Laboratory to budget realities.

It is the Nation's responsibility to "right size" the NNSA laboratories to their important, continuing missions and their broader responsibility to "think ahead" and pursue multidisciplinary science and technology in anticipation of emerging national needs. I urge your continuing support for a strong Stockpile Stewardship Program and for sustaining the NNSA laboratories' work on the science-based stockpile stewardship and NNSA nonproliferation programs as well as other activities to meet vital national needs.

Senator DORGAN. Dr. Miller, thank you very much.

Finally, Director Hunter, from Sandia.

STATEMENT OF DR. THOMAS O. HUNTER, PRESIDENT AND DIRECTOR, SANDIA NATIONAL LABORATORY, ALBUQUERQUE, NEW MEXICO

Dr. HUNTER. Thank you, Chairman Dorgan, and Senator Domenici, and Senator Feinstein. It's a pleasure to be before you today.

I'm Tom Hunter, President of Sandia National Laboratories. And our principal mission, as you know, is to provide and support the non-nuclear subsystems for all of the nuclear weapons in the stockpile. We also support a wide range of research and development, in other areas of national security.

I've presented written testimony, as you've noted, I'd like to summarize a few points, perhaps some of the same points the other directors mentioned, but I'll focus on them in a little different way, and then be glad to answer questions.

Let me first talk about Stockpile Stewardship. In my view, Science-based Stockpile Stewardship has made exceptional progress since its inception, over a decade ago. The Nation asked us to stop testing, to stop development of new weapons systems, and to invest in key scientific and engineering capabilities that would allow the continued certification of the stockpile. We've done that.

Along the way, we've been leaders in the development of many key areas of science, in particular, advanced modern super-computing, high-energy density physics, advanced microsystems, and many areas of material science.

One of the areas I'm most proud of, to have been associated with, at our laboratory is the Mesa facility, which was mentioned earlier by Director D'Agostino, when he said that we have completed on-schedule, and ahead of budget. In that facility, we build the small, little devices that can be put in nuclear weapons and I usually like to say, there we build little things you can't see, that do things you can't imagine.

Today I, Dr. Anastasio, and Dr. Miller—Mike and George—continue to support the annual assessment of the safety and reliability of the stockpile. We independently provide a personal statement of the condition of each of the systems in our stockpile. I don't think I can describe in words how significantly we take that responsibility—it means a lot to us professionally and personally, we do it each year, and are in the process of doing it this year, as well.

This annual assessment is a matter of both legislative requirement, and personal accountability. Behind it stands the investment of the Government, the work of many dedicated scientists and engineers, and our personal credibility and reputation, and that of our institutions. The stockpile needs, and will continue to need, attention. The stockpile will age. Issues will have to be resolved. As time progresses, we must maintain confidence that our deterrent is effective. As we move forward, it is essential to recognize the need for a vital, scientific foundation to support this confidence, and to make wise choices about the composition of the stockpile and the nuclear weapons complex that it supports.

I believe it is important to continue the investigation of a replacement strategy for legacy, cold war era warheads. A right-size stockpile that is safer, more secure, has more inherent performance margins, and can be maintained more effectively, should be our mutual goal.

The nuclear weapons complex must be transformed to be more effective. It must work better, operate more safely, be better integrated, and cost less. The NNSA's program for complex transformation is very important. We've already begun at our lab, we've already completed removal of all discrete category two and category three nuclear materials from our site. We've already achieved a reduction of 18 percent of our workforce since 2004, that supports nuclear weapons.

We're working to change our work mix at our California site. We're re-looking at our approach to super-computing. All of these transitions must be managed effectively so that our ability to effectively support the stockpile is maintained. We must use the insight from our Stockpile Stewardship Program to chose which infrastructure investments are made, and decide when they will be made.

The capabilities we have developed to support our nuclear tern have allowed us to make many, many contributions in other areas of national security—from combustion science for energy efficiency, to nuclear waste disposal, specialized radars for defense applications and many more. These applications provide great synergy and great vitality for our ability to support the stockpile. The nuclear weapons path forward is actually just one piece, though, of a much broader nuclear future for the country, and for the world.

It is important to enhance our efforts in non-proliferation, and help realize the full potential of nuclear power as a safe, and environmentally friendly source of energy. The budget legislation you see before you will allow that to be addressed.

Finally, I think I'd be remiss if I did not note that few threats to this country's future loom as large as our chronic lack of investment in science and engineering, and the education systems that support it. History will not judge our generation very favorably if we do not speak out, if we do not act, to significantly change our lack of attention and lack of investment in one of the clear elements that made this country great.

PREPARED STATEMENT

You have the full commitment of my—my personal commitment, and that of my organization—to support you in addressing these important problems in the future, and I'll be glad to address any questions.

[The statement follows:]

PREPARED STATEMENT OF DR. THOMAS O. HUNTER

Mr. Chairman and distinguished members of the subcommittee, thank you for the opportunity to testify. I am Tom Hunter, president and director of Sandia National Laboratories. Sandia is a multiprogram national security laboratory owned by the United States Government and operated by Sandia Corporation[1] for the National Nuclear Security Administration (NNSA).

Sandia's core role in the Nation's nuclear weapon program is the design, development, qualification, and certification of non-nuclear subsystems of nuclear warheads. As a multiprogram national security laboratory, Sandia also conducts research and development in nuclear nonproliferation, energy security, intelligence, defense, and homeland security.

My statement today addresses the appropriation request for the Department of Energy (DOE) programs that fund activities at DOE national laboratories and spe-

[1] Sandia Corporation is a subsidiary of the Lockheed Martin Corporation under Department of Energy prime contract no. DE–AC04–94AL85000.

cifically at Sandia National Laboratories. I will discuss the stockpile stewardship program and the laboratory capabilities at Sandia that are essential to sustain it. I will suggest how the NNSA laboratories can help respond to the challenges of the emerging global nuclear future, including nonproliferation issues. I will comment on programs in energy security and for the Office of Science. Finally, I will also bring to your attention my concern that a larger role for these laboratories in a broader national security context will be important, so that the best solutions for critical national needs may be achieved. My written statement includes an addendum of specific issues of concern that I offer for the attention of the subcommittee.

THE U.S. NUCLEAR DETERRENT

The U.S. nuclear deterrent remains an essential element of the Nation's security. Sandia serves NNSA's long-standing mission to maintain and enhance the safety, security, and reliability of the U.S. nuclear deterrent.

Development of Stockpile Stewardship in the Post-Cold War Era

The end of the cold war was a pivotal moment in the history of the U.S. nuclear weapon program. By 1992, all in-progress and planned nuclear weapon programs for new systems were either canceled or suspended, and arms reduction initiatives signaled a smaller nuclear weapon program in years to come. Also in that year, the United States committed itself to a moratorium on nuclear testing, which had been fundamental to the nuclear weapon development program since its inception.

It was clear that a different framework for maintaining the stockpile would be required. The Department of Energy implemented a new approach called "science-based stockpile stewardship" and invested in a comprehensive suite of capabilities and programs, which included experimental facilities and high-performance computers. By 2002, the NNSA Administrator and laboratory directors were able to report to Congress that science-based stockpile stewardship was meeting expectations.[2]

Today, "science-based" stockpile stewardship could be considered a redundant phrase. Stockpile stewardship assumes and requires the scientific competencies and resources that have been developed over the last decade.

Since 1996 the stockpile stewardship program has performed 12 successful annual assessments of the safety and reliability of each weapon type in the stockpile. The assessments include peer reviews and red team challenges, and they provide the basis for each of the laboratory directors' annual reports to the Secretaries of Energy and Defense as well as the Secretaries' subsequent annual report to the President on the condition of the stockpile. As I have reported in my recent assessments, numerous aging issues in nuclear weapon components have been discovered; to date, we have been able to provide sufficient confidence in the safety and reliability of our stockpile to support national policy requirements.

The advanced facilities and capabilities developed in the stockpile stewardship program enable our successful execution of the life extension program for the W76 warhead. In May 2007 Sandia completed the design—and NNSA's Kansas City Plant initiated production of—the new integrated arming, fuzing, and firing subsystem for this warhead. The radar fuze development costs were approximately 30 percent of the cost of the fuze we designed and produced for the W88 warhead in the late 1980s, while meeting similar requirements for survivability in the severe radiation environments of a nuclear detonation.

Sandia's Microsystems and Engineering Sciences Applications (MESA) facility was essential for the design, qualification, and fabrication of the radiation-hardened integrated circuits used in the W76 arming, fuzing, and firing subsystem. Advanced computational and physical simulation tools were used extensively in the design and qualification of key components, which will enable us to confidently place this life-extended warhead in the stockpile without underground nuclear testing.

In today's stockpile stewardship program, radiation tests using aboveground simulators provide adequate radiation effects testing for most spectra of concern to Sandia. We take the parameters derived from such tests and incorporate them into computational models that calculate system performance over a broader and more intense range of conditions. This achievement is possible using the capabilities and tools developed in the stockpile stewardship program.

In my view, the stockpile stewardship program today has advanced to the point where the preferred approach would be to rely on numerical simulation and test facilities for certification of non-nuclear subsystems in the stockpile. This approach

[2] House Armed Services Committee, Subcommittee on Military Procurement, Hearing on the Safety, Security, Reliability and Performance of the Nuclear Stockpile, 107th Cong., 2nd sess., June 12, 2002.

will, however, include some risk. We must maintain facilities, qualified people, and modeling and simulation capabilities that allow us to assess with confidence. We will continue to be concerned with certain issues in the stockpile for the indefinite future. However, I am confident that we will be able to perform our assessment and design responsibilities successfully if the national investment in a robust stockpile stewardship program is sustained in years ahead.

The Stockpile Today and Future

The Nation's nuclear weapon policy has changed significantly since the end of the cold war. The stockpile is smaller in total numbers and comprises fewer weapon types. It is natural that nuclear weapon policy in the post-cold war era should undergo revision to address the threats of the 21st century. I understand and support the need for stockpile transition.

But the fact is, the legacy stockpile is composed of weapons tailored for the threats and strategies of the cold war. Whether the designs of the legacy stockpile are appropriate for the 21st century, and can be maintained indefinitely, is problematic. It is important that Congress and the Executive agree on how the nuclear deterrent should be sized and shaped for the future and what role it should play in the larger context of national security. We need to establish the path forward for the deterrent, recognizing the reality of a changed global situation and fiscal constraints. We need a commitment to a robust stockpile stewardship program and an infrastructure appropriately configured to support it.

In looking at future options for the stockpile, I believe it is important to continue to investigate a replacement strategy for legacy cold war era warheads. Aging issues in the stockpile will require a measure of stockpile refurbishment as long as those systems remain in stockpile. In the long term, a revived Reliable Replacement Warhead (RRW) program would offer advantages for ease of manufacture, maintenance, and assessment, and especially enhanced safety and security. I support the NNSA's request to fund the RRW Program so that the laboratories can complete their feasibility studies, including cost estimates.

Simply put, the current stockpile will require continued maintenance and a laboratory/production complex configured around the past, with all its cost, complexity, and inherent risk. We must balance modernizing the stockpile with providing assurance to the world that we stand for an enhanced nonproliferation regime. The desired result would be a right-sized stockpile that maintains a balanced deterrent but is smaller, safer, more secure, and can be maintained more effectively.

Complex Transformation

In January NNSA released its draft Supplemental Programmatic Environmental Impact Statement (SPEIS) for transforming the nuclear weapon complex. Complex Transformation is a vision for a smaller, safer, more secure, and less expensive nuclear weapon complex. The SPEIS outlines a Preferred Alternative utilizing distributed centers of excellence, and it would consolidate missions and facilities within the existing NNSA sites.

Under the Preferred Alternative, Sandia would continue to be the center of excellence for science and engineering for warhead non-nuclear systems and components and for major non-nuclear environmental testing. Sandia would also cease operations at the Tonopah Test Range and would have a different role in NNSA's high-performance computing program. Sandia's California laboratory would continue to support the Lawrence Livermore National Laboratory with non-nuclear systems engineering, but would transition to a multi-agency resource. We are developing a plan to guide that transition.

We have long supported and see great benefit in the Preferred Alternative's proposal to consolidate Category I and II special nuclear materials (SNM). We are so committed to that concept, and to the improvements in security posture and the complex-wide cost savings associated with it, that we recently completed the removal of all discrete Category I and II SNM from Sandia sites. As of the end of February 2008, Sandia no longer possesses SNM in quantities that require a Category I or II security posture. This has made it possible for us to implement cost savings in our security protective force, which we have achieved through normal attrition and a thoughtful program of job transitioning and retraining.

A problem of worker displacement may arise in many job classifications as the Preferred Alternative is implemented. NNSA has set a goal of reducing the nuclear weapon complex workforce by 20 to 30 percent over 10 years. At Sandia we have sought to do our part by responsibly managing our workforce size. We have reduced our direct nuclear weapon workforce by 18 percent since 2004, largely through retirements and by redirecting engineers, scientists, and technicians to other national security programs. It is important to recognize and account for the fact that those

organizations that have already made progress toward achieving their goals should not be subject to even further reductions.

We at Sandia recognize the need for changes in the nuclear weapon complex. We support NNSA in its effort to transform the complex into an efficient enterprise for stewardship of the nuclear deterrent. Implementation of the Preferred Alternative must be carefully managed so that essential capabilities remain robust and workforce impacts are mitigated.

THE GLOBAL NUCLEAR FUTURE

As the demand for energy increases in the United States and worldwide, nuclear energy must be part of the solution. New nuclear power plants are now being proposed in the United States and worldwide. New reactor designs are likely to be part of the expansion of nuclear power. There will be technical issues, safety issues, and waste disposal issues associated with the expansion of nuclear energy, and the Department of Energy national laboratories can play a useful role in assisting with their solution.

The global nuclear landscape is changing significantly. The expansion of nuclear power generation internationally raises the potential for growing stockpiles of separated plutonium and spent nuclear fuel; and the spread of nuclear technology and material augments concern over smuggling and the threat of nuclear terrorism. Policy development and technology development have not kept pace with the accelerating changes in the global nuclear security landscape. The nonproliferation regime established by the Treaty on the Non-Proliferation of Nuclear Weapons has been challenged. Sandia and other laboratories have been very active in programs for nonproliferation, verification, and cooperative threat reduction for many years.

Reclaiming U.S. Leadership

It is in the security interests of the United States to assert leadership in the development of a safe and secure global nuclear future. We need an integrated policy framework that will provide for safe, secure expansion of nuclear energy while minimizing proliferation risks.

The United States must reclaim the technical leadership to support the development of proliferation-resistant nuclear energy expansion, control of nuclear materials, and verification regimes for future international agreements. The NNSA laboratories are unique in that they possess competence in both military and civilian uses of nuclear energy. I believe an opportunity exists to engage these laboratories in the development and implementation of solutions that deal with the larger nuclear context. To address gaps that have emerged as a result of both changing threat conditions and lagging investment, it will be important to strengthen the NNSA laboratories' capabilities to address the security challenges related to malicious or clandestine use of nuclear material or facilities.

Global Nuclear Energy Partnership (GNEP)

Part of the approach of the United States to support safe and proliferation-resistant nuclear power throughout the world is the Global Nuclear Energy Partnership (GNEP), which is contained in the budget for the Department of Energy's Office of Nuclear Energy. This program focuses on research and development to reduce the volume and toxicity of high-level waste, reduce the proliferation threat posed by civilian inventories of plutonium in spent fuel, and provide proliferation-resistant technologies to recover the energy content in spent nuclear fuel. Sandia leads the safety, security, and regulatory elements of the GNEP program. We are focusing our efforts on defining the regulatory framework and the data requirements to support licensing of fast reactors and recycling facilities. We at Sandia stand ready to support the Department of Energy and the Congress in deployment of this important program.

Nuclear Waste

An acceptable solution for radioactive waste management is critical to the expansion of safe nuclear power in the United States. Yucca Mountain was intended to be the Nation's long-term repository for spent nuclear fuel and high-level radioactive waste. These materials are currently stored at numerous sites around the country.

Sandia completed its portion of the Yucca Mountain license application early and provided it to the Department of Energy's Office of Civilian Radioactive Waste Management (OCRWM). As the lead laboratory for repository systems, Sandia managed the technical effort to develop much of the license application safety analysis. This work was accomplished despite a severely reduced budget in fiscal year 2008 and the consequent loss of some staff. We brought together the best talent available from among the Department of Energy national laboratories, research universities,

and technical contractors. We endeavored to produce a license application that will be credible among technical peers, defensible before the Nuclear Regulatory Commission, and respected for the integrity of its science.

We have already begun to prepare for the license application's defense, which will enable the Department of Energy to respond to technical questions from the Nuclear Regulatory Commission and requests for additional information throughout 2009. Public hearings and evidentiary hearings before the Atomic Safety Licensing Board are expected to last 2 to 3 more years.

Looking ahead, the Nation should establish a path forward that enables an environment where nuclear energy can realize its full potential as a safe, environmentally friendly source of energy. Confidence in a nuclear waste management solution remains a critical element of the nuclear fuel cycle and is critical to the expansion of nuclear power in the near term. Yucca Mountain could be made consistent with an approach that includes recycling and interim storage in a phased approach to nuclear waste disposal. In my view, we should seek ways to get the most from the investment in Yucca Mountain.

There are many options for managing the waste from current and future nuclear reactors, but all options ultimately rely on geologic disposal. The high-level waste from defense reprocessing will also need such a disposal method. The policy and resulting program for waste disposal need to be addressed now. My organization and I stand ready to support the administration and the Congress in the development of a revitalized approach to this important national issue.

LABORATORY CAPABILITIES

Sandia National Laboratories maintains an array of multidisciplinary capabilities at world-class levels to support its mission work for the Department of Energy and synergistic programs for other agencies. The research and development disciplines we require cover most of the physical sciences and engineering specialties recognized today, as well as the computational and supporting technologies needed for modern scientific investigation.

Essential Capabilities for the Stockpile

Sandia's essential capabilities for stockpile stewardship support our program's core products, which include engineered and integrated warhead systems; arming, fuzing, and firing systems; neutron generators; gas transfer systems; and surety systems.

The capabilities that we recognize as essential for this program include systems integration, major environmental testing, radiation effects science, computational simulation, microsystem technologies, materials science, and the engineering sciences. Many of these capabilities are synergistic with those in industry and at research universities but do not exist in those sectors in the specialized or unique forms required for stockpile stewardship, and rarely as an integrated enterprise. Our essential capabilities are integrated with the core products that we design and support for the nuclear weapon stockpile.

Microsystems and Engineering Sciences Applications (MESA) Complex

The MESA complex at Sandia's New Mexico site is the cornerstone of NNSA's initiative to address the need for microelectronics and integrated microsystems to support a certifiable stockpile for the future. Further, it is a unique, world-class capability for the integration of modeling and simulation into design and product realization of specialized components for national security applications. It is a major investment on the part of the agency to retain the mission capability for designing and fabricating radiation-hardened microsystems. MESA will meet that requirement for future decades.

We have established in MESA the ability to develop, design, and produce if necessary, unique integrated microsystems for weapon safety and security. This capability includes a national "trusted foundry" for radiation-hardened microelectronics. We have applied approximately 40,000 such products to the stockpile and nonproliferation missions of NNSA and for other national security customers. MESA is developing many new nano-enabled microsystem technologies for broad national security applications

The MESA facility is a landmark achievement for our laboratory. It is especially noteworthy as an example of project management excellence. MESA construction is effectively complete, 3 years ahead of schedule and $40 million below the original baseline. A dedication ceremony was held in August to celebrate the opening of MESA's Weapons Integration Facility, the final building of the MESA complex.

High-Performance Computing

Sandia's high-performance computing capabilities are vital tools for NNSA mission responsibilities in stockpile surveillance, certification, and qualification, and they have proved to be indispensable in our work for other agencies, especially elements of the Department of Defense. NNSA's decades-long investment in high-performance computing at Sandia revolutionized modern supercomputing and its application to science and engineering.

Since 1992, Sandia has been a pioneer in massively parallel processing (MPP), which employs special software to control thousands of low-cost processors configured as a single machine. Sandia was the first to shatter the world computational speed record by exceeding one trillion floating-point operations per second (one teraflop) with MPP. We achieved this milestone on the "Red" supercomputer that we developed with Intel under the Department of Energy's Accelerated Strategic Computing Initiative in 1996.

Sandia's current supercomputer, "Red Storm," also has been highly successful in terms of performance, effective cost for computing capability, and improvements achieved after initial operation. Sandia led the development of the architecture and associated applications of this machine. Our partner, Cray, Inc., developed its XT family of supercomputers based on the Red Storm design and now has 36 installations at 20 sites worldwide. Based on this significant heritage, Sandia claims the most cost-effective approach to supercomputing.

Application of these computing capabilities has allowed Sandia to address technical problems—previously thought to be impossible—in support of nuclear weapon qualification activities. Further, in several cases other Federal agencies have asked us to address computational problems that could not be addressed by any other institution. The impact of these calculations is hard to overstate; they have allowed resolution of formidable science and engineering challenges in support of national security.

Under the Preferred Alternative for complex transformation, NNSA plans to consolidate its high-performance computing platforms at the Lawrence Livermore and Los Alamos sites, principally due to the NNSA investments in computing facilities at those institutions. In order to remain a key participant in NNSA's high-performance computing program, Sandia has negotiated a memorandum of understanding with Los Alamos that will bring together the two laboratories' computer science and operational capabilities for high-performance computing. Under this agreement, Sandia will lead in providing the architecture and engineering expertise for capability platforms, and Los Alamos will lead in deployment and operations. Teams will be formed from both laboratories to provide an unparalleled computational resource for future NNSA capability platforms.

This partnership is not without risk to both institutions. It is essential for NNSA to execute a platform strategy that supports the Sandia/Los Alamos partnership with a platform procurement in fiscal year 2010 and meets the established requirements for maintaining and refurbishing the nuclear weapon stockpile. These requirements clearly identify the need for replacing the existing NNSA Purple and Red Storm platforms by fiscal year 2010.

Support for the Weapons Activities Engineering Campaign

I am concerned about erosion in the Weapons Activities Engineering Campaign. This campaign contains much of the science and technology foundations supporting Sandia's ability to assess and sustain the stockpile. This science-based campaign advances the engineering competencies that are the basis for assessing components and subsystems and improving weapon safety and reliability. This program suffered a 40 percent reduction between fiscal year 2004 and 2007; the fiscal year 2008 appropriation was still 35 percent below the 2004 mark, and the 2009 request is about the same. Chronic under-funding of this campaign may diminish the advanced engineering capabilities at the laboratories over the long term. These capabilities are essential for maintaining confidence in the assurance stewardship activities for the stockpile.

Attracting and Retaining Technical Talent

We are very deliberate about preserving critical skills in our workforce. Through strategic hiring and mentoring of top graduates, especially from key universities throughout the country, and through a formal knowledge preservation program, we believe we can ensure that the smaller workforce of tomorrow will have access to the technical knowledge and lessons learned that will be needed for the future.

We have been able to attract new talent largely because of the diversity of missions and professional challenges at the laboratories. System engineering programs, technology development, and advanced scientific and engineering research are es-

sential for sustaining career interest and commitment. The opportunity to support national security needs beyond the nuclear weapon program is motivating to prospective staff.

NNSA Capabilities Going Forward

My biggest concern with the long-term future of NNSA is that science and engineering capabilities may be relegated to a subordinate role as we strive to right-size the nuclear weapon complex and necessarily confront the fiscal realities of today. In my view, an essential characteristic of the cold war's resolution and a fundamental element of deterrence going forward is the strength and resiliency of the NNSA laboratories. Their scientific capabilities have deterred our adversaries, contributed mightily to the Nation's technological leadership, and seen many unparalleled applications in support of national security.

ENERGY SECURITY

By 2030, world energy demand and carbon emissions are expected to increase by 60 percent. The Nation needs a credible plan for transitioning from today's carbon-based energy and transportation infrastructure to a system that is less dependent on fossil fuels. Nuclear energy will be a major part of that solution, but other approaches to low-carbon energy generation and conversion will also be important.

The Department of Energy and its national laboratories are exploring bold new ways of translating research into deployable solutions to have more impact, sooner, particularly to achieve goals related to reducing oil and gas imports and lowering emissions. We are working on a plan to leverage several key Sandia capabilities with academia, a few other laboratories, and industry, to dramatically increase the effectiveness of transformative energy research in transportation systems.

Consistent with the Preferred Alternative for complex transformation, we are exploring a research thrust in energy security to be centered at Sandia's California site. The initiative would focus on low-net-carbon alternative fuels, accelerated electrification of transportation infrastructures, and combustion efficiency, which is a long-standing competency of the successful Combustion Research Facility in California. I believe a unique opportunity exists to apply existing facilities at Sandia's California laboratory to basic and applied research in support of our energy needs. This will serve to bring together the fundamental research efforts of the Department of Energy Office of Science with the applied energy programs of DOE. This will include university and industrial participation and draw on the entrepreneurial capabilities that are so strong in the San Francisco Bay area.

More intensive use of modeling and simulation through high-performance computing can accelerate the contributions of renewable energy technologies. Sandia is currently working toward an agreement with the National Renewable Energy Laboratory (NREL) to establish a partnership in which Sandia would provide capacity computing for NREL programs. NREL and Sandia bring extensive capabilities to the renewables mission and are focused on meeting this challenge—from understanding renewable resources for energy, to the conversion of these resources to electricity and fuels.

PROGRAMS FOR THE OFFICE OF SCIENCE

I am increasingly concerned that the Nation's investment in science and engineering is not receiving the attention the Nation requires. This is one of the most significant challenges that will define the Nation's future. While legislation like the America COMPETES Act[3] provides a statement of good intent, in my view it is essential for the Federal Government to make real investments in people, education, and programs across a broad spectrum of science and engineering.

The Office of Science is the steward for a significant fraction of the fundamental physical science research in the United States, both at the Department of Energy laboratories and in universities around the country. Its portfolio and those of a number of other agencies are central to American competitiveness, as argued in the "Gathering Storm" report of the National Academies.[4] In addition, many of the Office of Science research directions promise revolutionary advances in scientific areas vital to our national security. Despite the importance of a strong physical science foundation for future U.S. competitiveness, the history of investment in the Office

[3] American COMPETES Act, Public Law 110–69, U.S. Statutes at Large 121 (2007): 572.

[4] Committee on Prospering in the Global Economy of the 21st Century, Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future (National Academy of Sciences, National Academy of Engineering, Institute of Medicine, 2007, http://www.nap.edu/catalog.php?record_id=11463.

of Science is not consistent with the Department of Energy's prominent role and potential for the future.

Sandia has a presence in four of the Office of Science's programs: Basic Energy Sciences (BES), Fusion Energy Sciences, Advanced Scientific Computing Research, and Biological and Environmental Research. BES represents the lion's share of our work and includes research in materials, chemical sciences, combustion, geosciences, and nanotechnology.

The Office of Science's Center for Integrated Nanotechnologies (CINT) core facility was completed in 2006 and is jointly operated by Sandia and Los Alamos National Laboratories as a Department of Energy user facility available to university and industrial researchers. CINT is devoted to establishing the principles that govern the design, performance, and integration of nanoscale materials. Leadership in the science and engineering of nanotechnology will be important for U.S. competitiveness in the decades ahead.

Sandia is a major partner in the Joint BioEnergy Institute (JBEI), a research center funded by the Biological and Environmental Research Program. The research focus will be on understanding how to reengineer biological processes to develop efficient methods for converting plant materials into ethanol or other biofuels. This 5-year effort may help make biofuels production truly cost-effective on a national scale.

The synergy between programs in the Office of Science and other parts of the Department of Energy is very important. The investment across all of these programs must be balanced in order to assure a steady stream of scientific advances that can be translated into technologies of benefit to the American people. NNSA programs and all aspects of energy research and development gain from the fundamental science available in Office of Science programs. It would be beneficial for the Congress to support the funding levels contained in the fiscal year 2009 budget submission. This support would stimulate the kind of productive collaborations across programs that are so helpful. In addition, I am aware of efforts to strengthen the fiscal year 2008 budget by considering a supplemental appropriation for the Office of Science. I would encourage your consideration of that matter.

FUTURE OF THE NNSA LABORATORIES IN NATIONAL SECURITY

During the cold war, the nuclear weapon laboratories benefited from a designated core mission that for 50 years had furnished the rationale for their exceptional technical foundations. The unambiguous importance of that mission assured sufficient funding to sustain an effective technology base.

Today, the national security challenges are more complex than they were during the cold war. The NNSA laboratories are uniquely positioned to contribute to the solutions of these complex national security challenges. However, the NNSA Administrator and the laboratory directors face a formidable problem of how to maintain technical competencies—especially in nuclear weapons—in an era of limited resources, a smaller program, fierce competition for talent, and widespread public and political uncertainty toward the program. In this new and difficult operating environment, synergistic work supporting other national security missions is crucial. We depend on other national security activities to support and stabilize our critical capabilities and science base. It makes sense, therefore, to encourage more extensive use of the NNSA laboratories by multiple agencies and sponsors, thereby exercising and enhancing the competencies we require for stockpile stewardship.

We are working with DOE and NNSA to establish a strategy and approach that provides enhanced access to the unique facilities at these laboratories that will significantly benefit the Nation's responsiveness to broader national security problems.

An Example of Multiprogram Synergy: Radar

Sandia's capabilities for the nuclear weapon program benefit from synergy with other national security programs. An excellent example of this synergy is our work in radars.

Competency in specialized radar applications is a required capability for the nuclear weapon program. As a result of initial investments in radar fuze capability for nuclear weapons, we began working on miniature radars based on synthetic aperture concepts in 1983 for other national security applications. In 1985 we became involved in a special-access program for the Department of Defense to develop a 1-foot-resolution, real-time synthetic aperture radar (SAR) suitable for use in unmanned aircraft. Sandia flew the first real-time, 1-foot-resolution, SAR prototype in 1990. Follow-on work sponsored by the Department of Defense reduced the size and cost of SAR systems, improved resolution, and significantly expanded the applications and military benefits of radar. Partnerships with industry have transitioned each generation of the technology into field-deployable systems. Sandia-designed air-

borne SAR systems have now been used for real-time surveillance by every U.S. military command.

In this example, the original radar competency of the nuclear weapon program was improved by this work for the Department of Defense. The resulting advanced radar competency made it possible to apply new technology to the updated fuzing system for the W76–1 in the nuclear weapon program. This updated fuzing system would not have been possible without the competency that was maintained by work for the Department of Defense.

Broad National Security Engagement

Today, nuclear weapon activities constitute about 42 percent of Sandia's funding. Department of Energy programs in nonproliferation, energy security, and science provide another 20 percent, while agencies other than the Department of Energy furnish 38 percent of our total operating funds.

The work-for-others (WFO) process that has been in place for many years for accepting non-DOE work into the NNSA laboratories should be streamlined for the future. Many agencies could benefit from a reimbursable system that would give them direct access to the Department of Energy laboratories, and DOE would benefit from the additional programmatic activity and institutional support. In order to enhance our ability to serve the Nation, it may also be useful to explore innovative governance options to promote shared agency investment.

There are questions that naturally arise as the laboratories take on important national security assignments from agencies other than the Department of Energy. It is important to recognize that other agencies do contribute more than the direct program costs of their activities. In fact, they pay the overhead rates that all programs pay, and those payments help provide support for operational and infrastructure costs and for the Laboratory-Directed Research and Development Program. A portion of our overhead rates is utilized for capital improvements, and in some cases other agencies have paid directly for the construction of buildings and the purchase of capital equipment. It is important to recognize that while operational costs and some capital improvements are currently being addressed, there is still a need for more substantive investment in the science and engineering fabric of the laboratory.

The laboratories and NNSA should be encouraged to develop a realistic approach for maintaining the excellence of our scientific and engineering foundations well into the future. I believe we can succeed only as national security laboratories in a broad sense, serving the needs of multiple agencies for mutual benefit and shared excellence in national service.

Thank you, Mr. Chairman.

ADDENDUM—ISSUES OF CONCERN

The following specific issues of concern to Sandia National Laboratories—some of which were addressed in my statement—are summarized for the attention of the Committee.

Implementation of Complex Transformation

We support NNSA in its effort to transform the complex into an efficient enterprise for stewardship of the nuclear deterrent. Implementation of the Preferred Alternative must be carefully managed so that essential capabilities remain robust and workforce impacts are mitigated.

High-performance computing will remain an essential competency for Sandia. There is significant risk that the skills acquired by Sandia's system computing team will be lost over time without a high-performance computing platform on site. Sandia is committed to cooperating with the implementation of complex transformation and will monitor the implementation process to assure that capabilities are fairly integrated.

A problem of worker displacement may arise in many job classifications as the Preferred Alternative is implemented. NNSA has set a goal of reducing the nuclear weapon complex workforce by 20 to 30 percent over 10 years. At Sandia we have sought to do our part by responsibly managing our workforce size. We have reduced our direct nuclear weapon workforce by 18 percent since 2004, largely through retirements and by redirecting engineers, scientists, and technicians to other national security programs. It is important to recognize and account for the fact that those organizations that have already made progress toward achieving their goals should not be subject to even further reductions. Normal attrition should allow for appropriate workforce restructuring, but we may need a thoughtful program for job transitioning and retraining for those instances in which workforce dislocations are acute.

Support for the Weapons Activities Engineering Campaign

The Weapons Activities Engineering Campaign advances the competencies that are the basis for assessing engineered components and subsystems and improving weapon safety and reliability. This program suffered a 40 percent reduction between fiscal year 2004 and 2007; the fiscal year 2008 appropriation was still 35 percent below the 2004 mark, and the 2009 request is about the same. Chronic under-funding of this campaign may erode the advanced engineering capabilities at the laboratories over the long term. These capabilities are essential for maintaining confidence in the assurance stewardship activities for the stockpile.

Cyber Security

The United States relies extensively on information technology in the form of computers, chips embedded in all forms of products, communication systems, and military capabilities. There are growing indications that the security of our society is increasingly vulnerable to attacks on these systems. A national initiative in cyber security deserves increased attention, and that is beginning to happen. The Department of Energy and the NNSA laboratories have much to offer in assisting with solutions in this area.

During the past several years, the NNSA laboratories have experienced an increase in the level, intensity, and sophistication of network attacks directed against computer resources. Offensive capabilities for cyber warfare and cyber espionage have advanced by leaps and bounds worldwide. Other nations have been working assiduously to neutralize the cyber advantages that the United States has enjoyed for 2 decades and to exploit weaknesses in our cyber architecture as an asymmetric vulnerability for U.S. national security. These developments cause us to worry that the sophistication of the threats is growing at a faster rate than we are able to respond in hardening our systems against intrusions.

NNSA's request for cyber security in fiscal year 2009 is $122.5 million, an increase of 22 percent over 2008. This increase is essential to help us continue to harden our infrastructures against cyber attacks. But it should be recognized that this is a first step toward the kind of comprehensive effort needed to deal with this growing threat. Additionally, there is a need to bring in other parts of the Department of Energy in a more significant way, particularly the Office of Science.

Safeguards and Security Funding Offset for Reimbursable Programs

The fiscal year 2001 appropriation for Weapons Activities created a direct-funded budget for safeguards and security at NNSA sites. The conference report directed the Department of Energy to obtain funds from non-DOE customers in 2002 and beyond to offset a portion of the security appropriation. The laboratories have been collecting that offset via an overhead charge applied to work-for-others (WFO) projects. This practice has been called into question. Accordingly, the fiscal year 2009 budget execution guidance provides for direct funding only. Thus the funds formerly collected via the WFO offset will be lost, which at Sandia will cause a shortfall of several million dollars in funds available for safeguards and security.

Program Enhancements That Would Be Possible With Additional Funding

Full Utilization of the Refurbished Z Pulsed Power Accelerator

The Z pulsed-power facility provides data for nuclear weapon primaries, secondaries, and non-nuclear components essential for stockpile stewardship. Experiments on Z also explore advanced concepts and study alternative approaches to fusion energy. Full single-shift utilization is the most efficient way to maximize the return on the value of the recent refurbishment of Z. Operations are currently funded jointly by NNSA's Science and Inertial Confinement Fusion (ICF) Campaigns.

A new approach to creating high-current pulsed-power devices, known as a Linear Transformer Driver (LTD), has recently been demonstrated at Sandia. LTD is more than twice as efficient as traditional pulsed-power devices. This advance is likely to be the future of large-scale sub-microsecond pulsed-power devices. It is also the simplest technological approach to fusion energy. Additional funding would enable Sandia to accelerate the maturation of this game-changing technology.

B61 Life Extension

The B61 bomb has several versions and is one of the oldest weapon systems in the legacy stockpile. Many of the technologies used in the B61 are old, several components are reaching end-of-life, and the system would require upgrades to be compatible with new digital-interfaces for future delivery systems. Modern technologies and redesigned architectures would permit upgrades to this weapon without providing a new military capability. B61 refurbishment should be implemented as soon as possible to sustain the Nation's gravity-delivered nuclear weapon capability.

Discovery Science and Engineering Innovation Institutes

The America COMPETES Act passed last year authorized the establishment of Discovery Science and Engineering Innovation Institutes at Department of Energy national laboratories. Discovery Institutes would be catalysts for transformation by helping to develop the next generation of science and engineering leaders to address national challenges and meet industrial needs to compete globally. An appropriation for the Discovery Science and Engineering Innovation Institutes at national laboratories would enable this initiative to proceed.

Nuclear Waste

An acceptable solution for radioactive waste management is critical to the expansion of safe nuclear power in the United States. Sandia National Laboratories has developed significant waste-repository expertise through its work with both the Waste Isolation Pilot Plant and the Yucca Mountain Project. There are many options for managing the waste from current and future nuclear reactors, but all options ultimately rely on geologic disposal. The high-level waste from defense reprocessing will also need such a disposal method. The policy and resulting program for waste disposal need to be addressed now. My organization and I stand ready to support the administration and Congress in the development of a revitalized approach to this vital national issue.

Senator DORGAN. Dr. Hunter, thank you very much.

This is—as you might expect for those of us who don't work in this area—this is enormously complicated, complex, and difficult to understand.

Dr. Hunter, when I visited Sandia, you told me something about a teraflop, so let me ask you to share that again. I think what you said is a teraflop is one trillion computer functions in a second.

Dr. HUNTER. That's correct.

Senator DORGAN. Is that correct?

Dr. HUNTER. Yes.

Senator DORGAN. You told me that we achieved the first teraflop in 1997.

Dr. HUNTER. That's correct, in the mid-1990s, yes.

Senator DORGAN. And you told me the amount of space it required for the computers to achieve that teraflop—how large was that?

Dr. HUNTER. It basically required a full room, a complete room full of computers, and it required many thousands kilowatts of electricity to support it.

Senator DORGAN. And you said 10 years later we achieve a teraflop with what size application?

Dr. HUNTER. Actually, today there are chips being produced that were one single chip—about the size of a dime—does a teraflop on a chip.

Senator DORGAN. And it requires the energy of a 60-watt light bulb?

Dr. HUNTER. Sixty-five.

Senator DORGAN. Sixty-five. All right. So, that's a teraflop—1 trillion computer functions in a second.

Dr. HUNTER. That's correct, yes.

Senator DORGAN. You are saying that you have achieved, or are about to achieve next year a petaflop.

Dr. ANASTASIO. We're about to achieve this summer, a petaflop.

Senator DORGAN. Which is not a trillion functions per second, but a thousand trillion functions per second?

Dr. ANASTASIO. That's correct, sir.

Senator DORGAN. And Mr. Miller, you said that's not enough?

Dr. MILLER. Yes, sir.

Senator DORGAN. Yes, well, okay, so——

Senator DORGAN. I'm not sure I understand anything about this. I mean, I don't understand a trillion, I understand now what a teraflop and a petaflop is, I understand the dramatic advancements, I understand that weapons physics, perhaps, allow you to use these unbelievable, muscular, computer capabilities to understand things you didn't previously understand, but I think I speak for this subcommittee that, we don't understand how a scientist might use this capability. I think you tell us it's important, I believe that. I think that that is important.

Let me ask a couple of questions, and Dr. Hunter, thank you for allowing us all to understand what these are.

Director Miller, you said that you've lost 2,000 people—is that correct?

FUNDING AND PERSONNEL

Dr. MILLER. Yes, sir, it is.

Senator DORGAN. Let me try to understand how that happens, because the nuclear weapons program has not decreased—we increased it, not very much—we increased it by about $50 million last year, so it was relatively stable, just up, just a little bit.

Science, we increased last year, so we increase—in this subcommittee—the funding for nuclear weapons and science, and yet you end up losing 2,000 people. Tell us how that happened, does it have something, perhaps, at least in small part, to do with the contract that Senator Feinstein talked about?

Dr. MILLER. Yes, sir. There are three fundamental elements that are associated with that loss of 2,000 people. The first is that the Federal funding for the Laboratory mostly coming from NNSA, went down $100 million, so the money that you appropriated went elsewhere.

Senator DORGAN. That's an NNSA decision, not the decision of this subcommittee, is that correct?

Dr. MILLER. It is associated with the budget that was approved and where money was in the budget, so again, as an example, the money that goes into super-computing has steadily gone down. At its peak in 2004, it was $750 million a year, it is currently $545 million.

Senator DORGAN. Where did it go? If we're increasing the appropriation, does it go to facilities? The only point I'm making is——

Dr. MILLER. Right.

Senator DORGAN [continuing]. That doesn't—that responsibility doesn't necessarily rest at this table, if we're actually approving more money—slightly more money—for science and nuclear weapons. That's a decision made somewhere else in the bowels of NNSA. So, I'm just trying to understand it.

Dr. MILLER. So, yes, I mean, again, in a very, very simplistic fashion, you know, there are three elements to NNSA's budget. There is the science and technology, there is the physical infrastructure, and there is taking care of the stockpile that we currently have.

Senator DORGAN. That's correct.

Dr. MILLER. And so the increases in the budgets, in fact, more than the increase in the budgets, are going to maintain the cold

war stockpile that we have, and take care of the infrastructure that is aging and needs replacing. And where does that money come from? It comes out of science.

Senator DORGAN. All right, and——

Dr. MILLER. And the rest of your question—so we lost $180 million, I'm sorry—we lost $100 million in Federal funding. The cost of the contract, as a result of principally, the public to private sector changes, increased the costs at the laboratory $130 million. Of that $130 million, $40 million was the increase that Senator Feinstein asked about, in terms of the fees that go to the companies that are the management.

The reason for those fees was the NNSA and congressional decision to attract industrial partners, if you want to attract industrial partners, it will cost. That's what it cost in the case of Livermore, about $40 million extra.

Senator DORGAN. That's a pretty substantial cost. It cost you some, apparently, very attractive workers.

Dr. MILLER. Right. And then the other, then the third part is just inflation. The sum of all of that is about $280 million, that's what drove the decrease in people.

Senator DORGAN. Dr. Hunter, and Anastasio, tell me—since the implementation of the annual certification process that's gone back to 1997, tell me about your confidence in the reliability of the nuclear weapons that are currently deployed—you make certifications, you now come to us and say, "We're doing teraflops and petaflops and 80 this, and quadrillion that," and so we're obviously muscling up in technology and capability. Has your confidence decreased at all in your certification?

Dr. ANASTASIO. Well, I would say first, I am confident in the stockpile today. The concerns I have, the risks going forward to the future. It is true that as we do our annual assessment process, and we do our continuous work during the year that we find issues with the stockpile that need to get addressed.

Some of those turn out to be small issues that are not consequential—some are very significant. And, the way we deal with those, that are significant, have caused us to restrict the scope of certification for some of the weapons systems that we have in the stockpile. And I can't say too much more, in this forum.

And so, we're still confident in the systems, but there are some restrictions that are a consequence with that. And my biggest concern is the trend of maintaining balance across the three elements that George Miller talked about in the program, and keeping those in balance, in light of the constrained funding that we have, and all of the challenges the program has to face.

Senator DORGAN. Director Hunter.

Dr. HUNTER. Yes, I'd break the confidence into a couple of pieces. The first piece is our confidence—and my personal confidence in being able to find and detect issues—that is up. That is, I feel like we can do a better job today than we did 10 years ago, to assess and understand issues.

We then, of course, have the question of the confidence in the stockpile, and we still report the stockpile as safe and reliable, and our confidence in that statement is quite high.

The question, though, is are there ever cases, as Mike just said, where we have to put restrictions on what we say about the nuclear weapons, and the answer is, we see those, and they're well-supported by our observations and our ability to detect them.

Senator DORGAN. I want to just—I'm going to call on Senator Domenici, but I want to say that we asked you to come today to talk about the weapons issues, so these are very important issues and your three laboratories play an important role. You do more than that in each of your laboratories. My interest is, no matter what we are doing on some of these programs, we're always going to have a Stockpile Stewardship Program as long as there are nuclear weapons, and we'll need that work to be done.

My interest at the end of the day is to maintain a robust workforce in our national laboratories to pursue aggressive new science, because I think that's a significant investment in the future of this country—in dozens of areas, not just the issue of certification of nuclear weapons.

So, I think that you should know, there's a lot of support on this subcommittee for the advancement of science, and for the work that you do in your laboratories. I think the national laboratories are jewels, and produce significant opportunities for this country's future.

I see this—you know, we do a lot of spending. We spend money. Some of it we invest. And a portion of what you do is a significant investment into the future of this country. We have to continue to lead the world in science, and that's part of the decision of this committee, as well.

Senator Domenici.

Senator DOMENICI. Mr. Chairman, I'm so pleased to hear your comments so early in your chairmanship, that it makes me feel very happy and, about having to leave here. I'll get back to the worry about the future.

But first I would like to make a deal with you, Mr. George Miller.

And I want to ask Senator Feinstein—have you ever visited the laboratories in New Mexico, Senator?

Senator FEINSTEIN. No, not in New Mexico. I've visited Lawrence Livermore, not——

Senator DOMENICI. Well, I want to make a deal with you. I have never been to Livermore to see the great big machine that costs $4.5 billion, and that I wasn't for, and that gave him and his predecessor gray hair, because we're all—big shot Domenici was going to kill that machine, and frankly I didn't, in the end, I gave into my most natural tendency to be a sucker for big science. And I have been that, for my whole career. I am a sucker for big science. I've missed on a couple, but on a couple that are very important, I've not missed.

And the theory that permeates me, my bones, because of that, has caused me to continue to be worried about our country, in terms of its greatness having been built around science and technology and we were the best. And I'm very worried about the fact that we're losing out, because that seems to be too hard for a lot of our young people—math, science, physics and engineering.

But George, I haven't been there, and if you will promise to appropriately welcome me, and to be happy about my visit, and to be——

Dr. MILLER. We would be honored to have you visit, anytime, Senator. And we will make sure that it is a joyous occasion.

Senator FEINSTEIN. Yes, I'll bet.

Senator DOMENICI. We want him to be joyous, too.

I'll try to do it before I leave, okay? And I was just going to suggest that maybe the—in return, maybe I could take the distinguished California Senator to New Mexico, we could make a swap, she could come and see our labs, and I go to see your big lab.

Senator FEINSTEIN. I would be delighted, thank you.

NATIONAL IGNITION FACILITY

Senator DOMENICI. I think you should know—I do think you should know, Senator, that I was fully aware when we funded the NIF, the National Ignition Facility, as part of Stockpile Stewardship, and it hasn't been functioning yet, in that capacity, unless it is in the last few months, because it wasn't ready. So a big addition to our Stockpile Stewardship awaits implementation when we open NIF, if it works. And it'll work in some respects, for sure, but will it work in all respects, in all the ways or not? We don't know.

But, I knew fully that Lawrence Livermore, without that machine, might be a Lawrence Livermore with a short life. The people of California should know that—it might have died on the vine. That's given it a new breath of scientific prowess that will bring many thousands of people there to use that machine, and they won't be part of Science-based Stockpile Stewardship, they'll be part of a pushing America yet further to the cutting edges of science, as they use the machine.

Los Alamos got a machine out of it, and it's finished and it's finished and it's doing a great job, and they also got great computers out of it, and other things. And Sandia got a number of things, the last, clearly, is a fantastic Mesa facility which we've both seen, which specializes in small things—when you go there you will thoroughly amazed at—and not so worried about—whether our country's going to lose out in nano and technology, and the manufacture of small things.

Small machines—so small that you can put all kinds of machines on little—machines, literally—on a little piece of metal. And those machines worked, in there pumping their little brains out, and we can't even see them, and we're wondering what to do with them, and that's what they're doing there, so—we've got those done.

So, a lot of things have been accomplished. I worry about our country on science and technology training, physics, engineering, math and whether we have good teachers, and whether we're producing students. One way I could find out would be to ask the three of you who are—you are a demand source for the best scientists that we can produce, you want them, right? You're out there hiring them. So, let's ask you—are you noticing a substantial decrease in the number of talented Americans that seek complicated science jobs at your laboratory?

Dr. ANASTASIO. Senator, and by the way, Senator Feinstein, we'd be honored to have you come visit any time you were able.

Senator FEINSTEIN. Thank you.

Dr. ANASTASIO. And I'd love to see you again, in that context.

Senator FEINSTEIN. Thank you very much, thank you.

Dr. ANASTASIO. Senator Domenici—I do see a drop off in the number of U.S. citizens who are at the top of their field in a number of key areas that are important to the laboratory. But I am encouraged that we're still able, at these laboratories, to attract some of the best and brightest people that are still available—whether they be U.S. citizens, or not. And I think that's important, that we can still attract very high-quality staff, but the ability or the success of this country in generating all of those folks, we are seeing a drop-off.

Senator DOMENICI. George? Excuse me, Mr. Miller?

Dr. MILLER. Yes, sir. I would agree with what Mike said, we have a very prestigious post-doc called a Lawrence Fellow, that's basically at the top of the line in terms of post-docs. Generally, 60 percent of the people who win those post-docs are not U.S. citizens.

So, it is a concern. The good news is we still get the very best and the very brightest at the laboratories, because of the science investments that we've talked about, because the science is so exciting, because the mission is so compelling. And quite frankly, even though our core mission is nuclear weapons, about 80 percent of what we do is actually publishable in peer-reviewed scientific journals, and so all of that is essential.

Senator DOMENICI. Dr. Hunter.

Dr. HUNTER. Yes, Senator Domenici—I'd like to add my welcome to Senator Feinstein, please come.

Nationally, we have a problem. We are not seeing enough students going into the fields of science and engineering and we're not seeing enough people coming out, the way we'd like to see them.

One thing we find about these laboratories is, they not only have places of excitement because of the work, but they're also places of values and character, and they support the national interests, and that brings a lot of the right people to our laboratories. So I can report, basically, that we're able to get the people we generally need, but the national problem is one of—very significant—and one I think all of us can do more to try to help.

Senator DOMENICI. I'm going to submit some questions for you to answer in writing, but we were—we've kind of gone over our stay here, today. And we still, perhaps, will want to go another round, I don't know.

But, I want to suggest to—here, and for all of you to hear it and the subcommittee to hear it—we cannot continue to want so much of these laboratories, as we're here today describing, expect them to do so much, if we don't spend more money on the science part of the laboratories. No question in my mind that we are getting squeezed out, science is getting squeezed out, especially math, science—math, physics, engineering, and the like—in our national picture, too, in terms of what's going on in our schools. And I'm very worried about it, and hope you will keep your laboratories exciting, because that's what young people are looking for, and I think we're giving you enough equipment to do that.

One question—while we have praised NIF, we should talk a minute about the little brother, or little sister to NIF, the one you

have at your place that's got a funny name, called the Z Machine, ZA Machine or something.

Would you tell the chairman and Senator Feinstein what that is, and——

Dr. HUNTER. Sure.

The Z Machine is a very complementary facility to the NIF facility, it is working now, we have just refurbished it.

It is another approach to providing very high-density, high-energy density environments which uses what we call pulse power—lots of big transformers dumped into a very small space. And so we've just finished refurbishing that, we're doing experiments today looking at implosion of fusion capsules, and experiments today looking at materials under very high pressures, and very high temperatures. And it's operating—it can operate as often as once a day, and we use it routinely and we work day in and day out with the other two laboratories to support experiments that they do.

Senator DOMENICI. Okay. Now, will you please tell us about why you're worried about your laboratories—availability of appropriate computers?

Dr. HUNTER. Sure, I think it's the same general issue that Mike and George commented, because as we look at the balance of the investment, or the resources that go into the stockpile itself, or the other parts of the complex infrastructure, and ask them, what is the remaining amount that's spent on science? We find a normal and natural competition there, and that science piece, and the application on G, on Z, has been reduced over time to where we're barely able to operate at the one shift a day level.

Senator DOMENICI. Thank you.

Thank you, Mr. Chairman.

Senator DORGAN. Senator Domenici, thank you very much.

I'm going to call on Senator Feinstein, but I want to observe, relative to this question of funding, I just came down the hall—as I think did Senator Domenici—from another hearing today, Senator Feinstein was at the hearing—in which the administration's requesting $196 billion as an emergency piece this year for Iraq and Afghanistan.

So, the result is, because we have that war going on, it's very expensive—that's $16 billion a month, $4 billion a week, just for that emergency piece, in this year. And the result is, we get a domestic discretionary request in the budget in this subcommittee that says, "Okay, we need to fund the nuclear weapons programs, the laboratories, science, and by the way we want you to cut $1 billion our of water projects," the Corps of Engineers, lost $800 million, the Bureau of Reclamation cut $200 million, roughly. The fact is, it doesn't add up.

And so, this subcommittee, you know, unless we find some additional funding, is left with a Hobbesian choice. And so, last year we found some additional funding to try to fix some of these problems in the President's budget, but it is—it's a difficult problem, and no one here wants to short science. Nobody on this panel wants to do that. It's just that the President has given us a budget that, we've got to fix it, because it doesn't work.

Senator Feinstein.

NATIONAL LABORATORY FUNDING

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

First of all, it's very fine to see the three of you here, thank you very much—I have great respect for each of you. I have respect for what you do, I don't have respect for the product. I'm not a friend of nuclear weapons, and you have to know that up front.

I am a product of Nagasaki and Hiroshima, I grew up, I saw what 14 kilotons can do. I saw what 7 kilotons can do. I have not seen what 100 kilotons can do, and I've not seen what 400 kilotons can do, but I know they're out there, and I am very concerned.

I am not for a nuclear bunker-buster of 100 kilotons. To me, it was immoral. I am not for an Advanced Weapons Concept Program of building under 5 kiloton tactical battlefield nuclear weapons. I am not for 450 new plutonium pits.

So, I'm at a very different position. And I want to see the United States move away from nuclear weapons. I want to see us do it in a way that protects our national security. I want to see us take a real leadership role in non-proliferation. I want us to work with nations so they don't become nuclear weapons nations, and that's my heart, and that's my vision, and that's why I'm here today.

With respect to the budget in 2008, it was $1.091 billion, as passed. The President's budget is $1.036 billion—that's $55 million less than last year. So, it's the President's budget that we are essentially working from, in this subcommittee.

I am concerned about putting 500 highly trained scientists and engineers into the job market at this stage—I must tell you that right up. I'm concerned about it from a national security perspective.

And Dr. Miller, I don't know if there's anything we can do about that, I don't know if they can be employed at Sandia, or at Los Alamos, but I worry about it. Do you have any comments?

Dr. MILLER. Thank you, Senator Feinstein. I worry about it a lot. These are my colleagues, many of them I've known for 35 years, which is how long I've been at the laboratory, so this is an extraordinarily difficult time for the laboratory, and for the entire complex.

The fact of the matter is as Director of the laboratory, I have a fiscal responsibility to deal with the realities that the Federal Government gives me. And that's the reality of this particular situation. As you know very well, it's occurring at laboratories across the Nation. Mike has also lost 2,000 people over the last 18 months. There are layoffs anticipated at the Stanford Linear Accelerator, at Argon, at Oak Ridge. The fact of the matter is, as we have all said, in different ways, and from different origins, the investment in science and technology for the Nation's benefit is under siege.

So, I worry a lot about it, I do have responsibilities to maintain fiscal responsibility, and that's what has to happen.

Senator FEINSTEIN. Well, let me ask you something precisely, it's my understanding that the lab had expected about $80 million in increased costs, but the actual number spiraled to $280 million? What was the difference? What took up that difference?

Dr. MILLER. The $80 million went to $130 million, the extra $50 million is just inflation, which we knew about all along. The principal changes were—as I said before—the change from a public sector to a private sector.

Senator FEINSTEIN. How much is that?

Dr. MILLER. That's about $100 million.

Senator FEINSTEIN. In——

Dr. MILLER. Of the $130 million.

Senator FEINSTEIN. In what?

Dr. MILLER. Okay, so it is the fact that we are no longer tax-exempt, so we have certain taxes we have to pay. The healthcare, as a University of California employee, the healthcare benefits that the University offers are amortized over the entire State. Livermore has to deal with the healthcare in Northern California. The healthcare costs for the same benefits went up 47 percent.

Senator FEINSTEIN. How much in dollars?

Dr. MILLER. Sixty-five million.

Senator FEINSTEIN. So, in other words——

Dr. MILLER. We chose, we chose not use——

Senator FEINSTEIN [continuing]. Healthcare costs, equal to UC's increase cost $47 million, wow.

Dr. MILLER. Right. And the third was that, in the decisions that individual employees took about what kind of a retirement system to choose, they were given two options—one, a defined benefit plan like, identical to the University of California, one is a defined contribution plan. The defined contribution plan requires that the laboratory put money up front. We used an assumption that the same fraction of employees as took the defined benefit at Los Alamos, would take it at Livermore. That was not the case. More people picked the defined contribution plan, which again, increased the up-front costs for the laboratory.

Senator DORGAN. Senator Feinstein, might I interrupt for a moment?

Senator FEINSTEIN. Certainly.

Senator DORGAN. I'm—would you submit a report to this subcommittee on that $200 million—you said that it was a $200 million difference?

Dr. MILLER. Yes, it's about $280 million total, including Federal funding. But yes, I'll be happy to.

Senator DORGAN. Could you submit a report that outlines those costs, those added costs, so that we understand it?

Dr. MILLER. Yes, sir.

Senator DORGAN. And let me ask one other question, if I might. What—is any of this applied overhead that is——

Dr. MILLER. Let's see—those costs are collected through overhead so that it makes it look like the laboratory is more expensive in an overhead, even though we actually haven't added in the overhead people, and the fact of the 2,000 people, roughly two-thirds, are being reduced out of the overhead, or support side of the laboratory. So, we're actually reducing the number of people in the overhead, but the overhead costs are going up.

Senator DORGAN. The reason I ask the question is there's a lot of overhead expenditures applied—or overhead charges applied—to various Federal money that moves out, and so——

Senator FEINSTEIN. Well, but I think there were a lot of unintended consequences of this. And that's what concerns me. I don't think the people that made these decisions really understood that if they did this, there would be $47 million in additional costs for healthcare, that there would be fees that would go up, and the way these fees went up, and that the tax-exempt status of the University was going to change, so that it is a very hefty tax burden that's put in there now.

Dr. MILLER. And Mike could give you a similar story for Los Alamos.

Senator FEINSTEIN. See, this concerns me. And the problem was, as I understood it, from what I overhear, is the concerns over security at Los Alamos, in order to compete for the contract, you had to provide a different management structure from what had existed in the past—stop me if anybody thinks I'm wrong.

Senator DOMENICI. You're right.

Senator FEINSTEIN. Therefore, you took on all of these added costs by bringing in the private sector in a joint venture, which may or may not have been a good idea, I can't pass judgment on it. But one thing we know is there certainly are greater costs.

Senator DORGAN. Senator Feinstein, I'm going to ask Los Alamos to submit the same report that I've asked of Lawrence Livermore, with respect to——

Dr. ANASTASIO. Yes, sir, we'll be happy to do that, Mr. Chairman.

Senator FEINSTEIN. So, that when the President actually gave us a budget that was $55 million less—less than last year—just for, that's just for Lawrence Livermore, right?

Senator DOMENICI. Yes.

Senator FEINSTEIN. Just for Lawrence Livermore, that really put them behind the 8-ball with these other costs. Is that a correct interpretation?

Dr. MILLER. Yes, ma'am, that's exactly right.

Senator FEINSTEIN. And it seems to me that the administration has to take into consideration that when we go this way, it's going to cost more, and those costs have to be met. And that we also have to know that it's going to cost more.

So, the result is, I don't know whether these are senior scientists, whether they're junior people—but to quote you, they are highly trained scientists and engineers, that are now thrown into a job market—so let me ask you, between the three institutions, how many highly trained scientists and engineers are now being thrown into the job market? Being involuntarily—

Senator DOMENICI. Over what period of time? Three years?

Senator FEINSTEIN. Well, this—no, this last year.

Senator DOMENICI. Oh.

Dr. ANASTASIO. Yes, at Los Alamos, we've reduced the workforce by a little over 2,000 people over the last 18 months, and I would say, a little less than half of that number are technical people.

We were able to do that through an involuntary—a voluntary program. We did not have to do an involuntary, as George is doing, and in other, other turnover—managing the turnover, the normal turnover, without replacing people that leave, but year—I would say close to 1,000 people——

Senator FEINSTEIN. Okay.

Dr. ANASTASIO [continuing]. With a technical background, over the last 18 months.

Senator FEINSTEIN. And, Mr. Miller, could you comment—answer that same question?

Dr. MILLER. Yes, again, we have lost—by the end of this fiscal year, relative to the beginning of 2007, so again, roughly 2-year period, we will have lost 2,000, of whom about 500 are highly skilled engineers and scientists.

Senator FEINSTEIN. Mr. Hunter.

Dr. HUNTER. Thank you, Senator.

In the weapons program, we've actually reduced the workforce by about 500 or 600 people. The net number that exited the laboratory was more like 200 or 300, and of that, about half were scientists and engineers. The reason our numbers are smaller is because we added a lot of other work from other agencies to make up for some of the downfall in nuclear weapons.

Senator FEINSTEIN. All right, so now we have thousands of people floating around, when we know there's cyber warfare going on, there are all kinds of intrusions, there are all kinds of efforts to capture these scientific secrets. And I think it's really problematic.

Senator DORGAN. Dr. Hunter.

Dr. HUNTER. I may have been—I should clarify. In our case, we handled that reduction by normal attrition and limited hiring, as opposed to laying people off.

Senator FEINSTEIN. So, you didn't lay anybody off?

Dr. HUNTER. We did not lay anybody——

Senator FEINSTEIN. Okay.

Dr. HUNTER. This year we've laid off a few tens. I wanted to clarify that, thank you.

Senator FEINSTEIN. Thank you.

Senator DORGAN. Senator Domenici.

Senator DOMENICI. Yes.

Senator DORGAN. Thank you.

Senator DOMENICI. I wondered if Tom D'Agostino—I know you're not at the witness stand, but do you have any observations about this last 10 minutes of testimony?

Mr. D'AGOSTINO. Absolutely.

Senator DOMENICI. That might be helpful to us?

SCIENCE AND TECHNOLOGY FUNDING TRENDS

Mr. D'AGOSTINO. I think there's at least a sense after this discussion that the administration is not interested in science and technology—I want to clarify that right off the bat. Going back——

Senator FEINSTEIN. Who said that?

Mr. D'AGOSTINO. Well——

Senator FEINSTEIN. We didn't say that.

Mr. D'AGOSTINO. We do have a problem in science and technology, there's no question about it. I think it has to do with the levels of resources that ultimately end up at the institutions. And what we're seeing here, and I think maybe Tom Hunter alluded to it, it's the natural tension between maintaining a 50-year-old nuclear weapons infrastructure and dealing with flat budgets. This year is an exception—we requested about $9.1 billion or so for the

NNSA. In prior years, we were fairly consistent asking for money at about the $9.3 billion range.

And this subcommittee's been very supportive of, there's no question about it, the science and technology program. But when things get through, we've had a year-long continuing resolution in fiscal year 2007, we had an Omnibus last year, and the $9.3 billion typically gets reduced to the $9.1 billion range. That's been the trend over the last 2 years.

And so now we have a flat budget over the last few years. And as our facilities get more expensive to maintain, there is going to be reductions elsewhere.

What we're trying to do is aggressively reduce our fixed costs—those costs that are kind of below the radar, and George alluded to it when he talked about a two-thirds reduction in the workforce.

Since it's typically unpopular to ask for more money in nuclear areas—and we've seen 3 years worth of relatively flat budgets—we're trying to aggressively go after and reduce those fixed costs, so we can reinvest our resources into this infrastructure. And it's a hard management problem, there's no question about it.

I think we all agree that we want to reduce the costs of this program, without dropping the ball on the science and technology side. And what you're hearing, I believe, are those challenges we face.

Senator DORGAN. Yes, well, but let me just also say, as I said before, this subcommittee doesn't just deal with you, this subcommittee deals with a range of other things, and we have a budget that is sent to us without a lot of forethought, in my judgment, on another large area, and that is water. It's not nearly as large as nuclear. But the implication that this subcommittee should take a look at this country's water needs, and cut $1 billion out of water investment is preposterous.

Mr. D'AGOSTINO. Right.

Senator DORGAN. We're not going to do that. So, we also have a balancing problem, and it's because we've gotten a budget submitted to us that does not meet this country's needs.

And so, I think this subcommittee is very strongly in support of science.

Mr. D'AGOSTINO. Absolutely.

Senator DORGAN. And will be. But, we are also confronted with a budget that, in many ways, I think, is playing a game. We know what the water projects are, we know which ones have been started, we know which ones have to be invested in to be completed. And yet there's a bit of game being played, I think, in budget—Senator Domenici was chairman of the Budget Committee for many years, so he will recognize these issues.

This is not our only responsibility, but it's a very important one. And I just want to make a point, that we're put in a bad position by extraneous events, when the President sends us a budget and says, "Let's cut water projects by $1 billion," and that will not happen. This subcommittee's not going to do that.

So, we're going to try to do everything we can to make sure that we provide sound funding for science, and I've already made a statement on how I feel about the national laboratories. Senator Domenici, do you want to make final comment?

Senator DOMENICI. Yes, I just want to say, it does bother me that we end up testimony, seemingly, on a low note. But I don't think things are really on a low note. I think the laboratories have done quite well, considering that we really are going from a cold war to a non-cold war situation, you know, looking back at history, when America had giant projects that were good for war, and then the war ended, we just got rid of them, we didn't have anything left over. We've done that before with giant science projects that helped the government—the war ended, and we dismantled everything.

I think we've done quite well, building this down, and only in the last few years has it caught up with us.

But, I do want to say that I think you're telling us something, and just my interpretation—you know, if we're going to alter, change, or change the nuclear stockpile substantially—and I think you all are suggesting that we're probably going to—it's not going to look like it is today, in 15 years. It's going to look considerably different. It's going to be much smaller—smaller numbers, smaller weapons—we're hoping that that also will mean that we can—it'll cost less to maintain them and keep them, and make sure they're reliable.

But we're not moving head on that yet, we've solved the problem of not doing underground testing, and then we started Stockpile Stewardship out on a limb—nobody knew anything about it. When it was presented to me, I couldn't remember the three words, Science-based Stockpile Stewardship. I had to write them down, because they were so funny.

Now, they've just—it's pretty obvious, what we've done, we've accomplished a great deal. In the meantime, we need these laboratories living laboratories for the future, as I see it. And we spent a lot of money doing that.

But there are better laboratories for Science-based Stockpile Stewardship, wouldn't you think, Mr. Miller? They're better for it, than without it?

Dr. MILLER. Absolutely, sir. You said it very well.

Senator DOMENICI. I think that's right, and I think that's good for the country. And we'll try our best, and we hope the new management teams—which were the decision of the administration—and I don't blame them, that was their prerogative, that we were going to go with the new system—I hope it works.

Director Anastasio, I hope you all dedicated yourself to better management at Los Alamos, and I think it's gotten a little better. I don't have to say that about Director Hunter, you've always had the best management, you didn't even have to lay off any people—that comes with good management, incidentally.

And Director Miller, I'll find out more about you when I come to see you, okay?

Thank you all, very much.

Senator DORGAN. The interesting thing, Senator Domenici, is that we have a lot of nuclear weapons, we talk a lot about them, we can't possibly use one, ever, without catastrophic results for our planet.

Senator DOMENICI. Right.

Senator DORGAN. We've signed up, as a country, to go to zero nuclear weapons at some point in the future. We will not do that, of

course, until it is—if ever—it is determined to be safe and secure for our country to do that.

But, I think the other side of this subcommittee is nuclear nonproliferation, which is very important, and we will be talking more about that at a later time, as well.

ADDITIONAL COMMITTEE QUESTIONS

At this time I would ask the subcommittee members to please submit any questions they have for the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO HON. THOMAS P. D'AGOSTINO

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Question. Two months ago you named Dr. David Crandall as NNSA's Chief Scientist. In your announcement of his promotion, you stated that you "outlined your expectations for Dave in this new challenging assignment."

What are your expectations and can you please tell me how you intend to measure his success in implementing a comprehensive science strategy for the labs?

Answer. Dr. Crandall will advise me and represent the NNSA on science and technology issues for national security. He will work with NNSA program managers and with our national laboratories to define the nature of science and technology that NNSA can advance for national security and how to do that in collaboration with other parts of DOE and other agencies that have synergistic mission needs to those of NNSA. Measures of success will include defining strategic documents with more specifics on science and technology and agreements with other agencies on how to share resources to advance our respective mission needs.

ADVANCED COMPUTING

Question. When we faced the decision to proceed with the science-based Stockpile Stewardship program, it was decided that the labs would need to develop advanced computing capabilities that didn't exist at that time. I recall there was significant discussion regarding the potential to develop this capacity.

Fifteen years after we initiated this effort can you tell me if we have met or exceeded our computing goals at the time? What has this meant to Stockpile Stewardship?

Answer. NNSA has exceeded its computing goals in terms of both the platforms and the codes. In 1996, the Accelerated Strategic Computing Initiative, or ASCI, originally planned for a 100 Tera-Flop (TF) entry level system to support a high-resolution, end-to-end, 3D simulations. The original goal of 100TF was achieved in fiscal year 2005 with delivery of the ASC Purple machine. We also acquired the BlueGene/L machine clocked at 360TF for science applications.

Additionally, in 1996, the 100TF goal centered around performing a single calculation that was highly resolved enough to distinguish physical error from numerical error. The realization of Purple was accompanied by detailed simulations that revealed physics not previously seen in the 50-plus years of computational science. Today, we not only have the capability increase the physics basis in our simulations for annual assessments and other production work, but also have begun to adopt the codes for broader national security applications (i.e. threat reduction, secure transportation).

Question. What has this meant to U.S. leadership in computing?

Answer. To illustrate the program's impact on computing at the high-end: on the latest (Nov., 2007) Top 500 list of supercomputers around the world, the top 12 platforms shown have directly benefited from ASC-funded architectures. Of those 12, 9 are located in the United States. The United States has the top slot, with BlueGene/L at 478.2 teraflops (as measured on the Top500 benchmark), almost three times faster than the second-place machine. Of the entire top 500, fully 38 percent have major components that derived from ASC investments, and 25 percent employ internal networks developed through ASC collaborations and projects.

Your Advanced Computing and Simulation budget fails to provide any specifics regarding the proposed computer acquisition budget, including any mention of the Roadrunner platform and the status of the Sequoia platforms.

Question. Can you provide the specific details as to how much you have budgeted for each system and the status of each platform? What are the out year acquisition needs and how will this budget support the preferred alternative you have proposed?

Answer. The program has budgeted $25.9 million in fiscal year 2009 to cover the final payments for Roadrunner. Since the Sequoia procurement is about to release a Request for Proposals, a final payment schedule has not been negotiated. However, the funding profile for fiscal year 2009–fiscal year 2012 totals about $220.0 million. In addition, the program has a need to replace the Purple platform that supports the current National User Facility and has directed the LANL–SNL Alliance for Computing at Extreme Scales (ACES) team to begin the procurement process that will result in a platform, currently referred to as Zia, to be delivered in fiscal year 2010. While the program set an initial funding target of about $66.0 million for Zia, we are reevaluating the ability for that budget level to meet mission needs.

It is my understanding that the NNSA intends to acquire a third computer known as "Sequoia" for Livermore to support the Blue Gene/L and Purple platforms. Your budget is silent on this point as far as I can tell.

Question. Did the NNSA ever conduct a competitive solicitation for this new acquisition for Livermore?

Answer. The program documented a mission need in March 2008 for a petascale platform to address uncertainty quantification. That led to a decision to procure a system, code-named Sequoia, to be hosted at LLNL. While being housed at LLNL, it is not a follow-on to BlueGene/L or Purple. Sequoia is being acquired via a competitive process where the selection will be based on best value, determined by a combination of price and technical features related to NNSA workload. The release of the Request for Proposals is imminent and five major vendors have expressed interest in bidding.

Question. Did the laboratory or the NNSA consider any other vendors, other than IBM, regarding other technology or cost scenarios for this acquisition?

Answer. LLNL will evaluate all proposals received in response to the Request for Proposals and negotiate a contract with the winning bidder based on best value to the government.

Question. All of the most recent computing platform acquisitions are IBM products. What is your plan to consider alternative vendors or platforms to ensure we are considering the best alternatives in the business?

Answer. NNSA has directed LLNL to conduct a competitive solicitation for Sequoia, and to employ the traditional process of commissioning a tri-lab committee to advise the source selection authority on technical responsiveness of the bids.

Question. In the fiscal year 2008 Omnibus, language was included directing both the NNSA and the Office of Science to establish a joint advanced computing and algorithm R&D program. The objective of this language was to restore a world leading R&D capability in high performance computing architectures. The United States won't maintain its world leading role, if we don't continue to support research.

What is the Department doing to establish this capability and what goals have been set? Also, what is the strategy for achieving these goals?

Answer. The Department has established the Institute for Advanced Architectures and Algorithms (IAA). The goals of IAA have been set to:

—Undertake focused research and development in partnership with industry and academia on key impediments to high-performance computing;
—Promote the integrated co-design of architectures and algorithms;
—Develop and simulate prototypes to demonstrate advantages that allow application developers and algorithm researchers to explore advanced architectures; and
—Train future generations of computer engineers, computer scientists and computational scientists.

Both the DOE Advanced Scientific Computing Research (ASCR) and the NNSA Advanced Simulation and Computing (ASC) offices have approved the goals, structure and management of the IAA, including the requirement for every proposed IAA project to be submitted to ASCR and ASC for joint peer review and approval. Currently there are two technical workshops on memory and interconnect technologies being planned for the summer and the third on algorithms in the fall.

Question. As you know, I have had great concern about NNSA's high performance computing strategy. In your effort to reduce the computing investment at our national labs, you have directed that Sandia and Los Alamos form a partnership in

computing. The Labs have completed the negotiations and codified this deal in a Memorandum of Agreement.

Since your budget request for computing is extraordinarily vague can you explain what your plans are for this joint computing effort, how the NNSA will utilize it, what type of investments will be made and how this is an improvement over the existing three lab strategy?

Answer. The joint LANL–SNL MOU, formally establishing the Alliance for Computing at Extreme Scales (ACES), was undertaken to capitalize on each labs strengths as the preferred alternative was implemented and present an icon and entry point into the labs for academia and industry working with the ASC program at the New Mexico labs. The most immediate and visible impact will be that ACES will host the next National User Facility for ASC capability computing with the design team being directed by SNL and the operations team being led by LANL. The program expects a similar division of labor as future systems are acquired by ACES. As the program works to identify efficiencies we look to preserve and accentuate our strengths. ACES emphasizes the strengths resident in the New Mexico labs for current and future national security applications.

Question. As you are well aware I believe the NNSA has made a serious mistake in not pursuing a trilab advanced computing strategy to ensure that each lab works to develop cutting edge architectures as well as to support the world's best computer simulation capabilities.

Despite the fact that the NNSA has proposed to reduce computing investment as part of the preferred alternative, are you willing to keep an open mind to alternative approaches recognizing that computing has opened up significant modeling capabilities for the labs?

Answer. The NNSA labs are world leaders in designing, acquiring and operating supercomputers. Our approach for ensuring cost-effective, efficient, and sustainable operations that still met the needs of the Stockpile Stewardship program has led us to make some tough decisions. We have sought, and will continue to seek, technical advice from outside the headquarters as we develop strategic guidance and direct laboratory investments.

BUSH ADMINISTRATION—WEAPONS POLICY

Question. Mr. D'Agostino in your statement, you said that in 2004 the Bush administration ordered the nuclear weapons stockpile to be cut in half and then ordered an additional 15 percent cut just this past December. I believe critics of the President forget these facts. Many also have forgotten, or were never aware of the fact that this President recommended a shift in the role of the deterrent in the 2001 Nuclear Posture Review.

Can you explain to the subcommittee what this shift has been and the significance of this policy?

Answer. The 2001 Nuclear Posture Review addressed "strategic capabilities" not just nuclear forces. Its basic findings were:

—Russia is no longer an immediate threat—this fact itself has led to dramatically reduced U.S. reliance on nuclear weapons, and enabled very substantial reductions both in deployed forces and the overall nuclear stockpile.

—Precision conventional strike and missile defenses will further reduce reliance on nuclear forces.

—But nuclear weapons are still an important element of national security strategy.

—Substantial nuclear arsenals remain, and proliferation concerns grow—we can no longer predict when and where major new threats will emerge.

—Nuclear force planning is thus no longer threat-based (i.e., on cold war nuclear targeting model) but on broader concerns of defense policy.

—The defense R&D and manufacturing base, including the nuclear weapons infrastructure represented by NNSA's national laboratories and production facilities must be able to respond on needed timescale to emerging threats.

The ideas reflected in the 2001 NPR reflect a major reconceptualization of how strategic capabilities including nuclear and conventional strike forces, the supporting defense infrastructure and missile defenses interrelate in advancing the security interests of the United States and its allies.

Question. Consistent with the fiscal year 2008 Omnibus, the NNSA has adopted the congressionally directed level of 50–80 pits per year production capacity as the preferred alternative. Can you please explain the significance of this shift and the budgetary impact that will result?

Answer. The significance of the shift to 50 to 80 pits per year production capacity is acknowledgement by NNSA and the Department of Defense that any future re-

quirements, to include transformation of the nuclear weapons stockpile or life extensions of warheads, can be managed within the production levels that the capacity can support over a specific time period. The reduced capacity requirement also opens up the potential for upgrading/modifying the plutonium facility at the Los Alamos National Laboratory instead of building a completely new facility. The cost difference (savings) between building a new plutonium facility for pit production and upgrading/modifying the existing plutonium facility (PF–4) at LANL is estimated to be more than $1 billion. Either option requires a new capability for chemical and metallurgical activities to support pit manufacturing and other plutonium operations. The shift, however, comes with additional risk of both making the required improvements within an operating nuclear facility and meeting any future unknown stockpile requirements where time may be critical in sustaining the nuclear deterrent due to capacity constraints.

CHEMISTRY AND METALLURGY RESEARCH REPLACEMENT (CMR–R) PROJECT

Question. The NNSA's preferred alternative has proposed to build all three phases of the CMR–R facility at Los Alamos. There is a lot of misinformation being spread about this facility and its role as a production facility.

Can you tell me whether or not the CMR-Replacement facility will be used to manufacture pits? If not, where will pits be manufactured?

Answer. The CMR–R Nuclear facility will not be used to manufacture pits, but will support pit production through the availability of a vault to hold material and pits and through the required analytical chemistry and metallurgical analysis that ensures specification of material during production is being met. Pits will be manufactured within the Technical Area 55 (TA–55) plutonium facility (PF–4).

Question. What is the proposed role of the CMR–R and why can't the existing facility be used? Also, why is it important that CMR–R include a Category II nuclear facility behind the security fence?

Answer. The proposed role of the CMR–R is to provide analytical chemistry support currently conducted in CMR and add a vault for storage of material to support pit manufacturing and consolidation of plutonium missions. The existing CMR facility was built over 50 years ago and has significant facility infrastructure issues that impact personnel and safety. In addition, since its construction, further seismic analysis has revealed a seismic fault running under the building which has caused significant reduction in activities to maintain the safety basis. Upgrading the facility to meet modern seismic standards for nuclear facilities has been assessed as not being cost effective.

A Category II security facility is required due to the security requirements for a facility operating with the amount of special nuclear material required to accomplish the NNSA mission. The amount of activities using and handling special nuclear material and the required load of material within the vault necessitate this security. The Radiological Laboratory and Utility Office Building (RLUOB), the other facility within the CMR–R project, is only capable by design of handling very small gram quantities of special nuclear material.

Question. The budget request states that the CMR–R project total cost is estimated to be $2 billion, which is an increase from the initial estimates of $1 billion. The budget doesn't provide a specific justification for this increase.

Can you please explain why this estimate has increased?

Answer. The basis for the cost the CMR–R is being developed presently; NNSA does not envision having a validated cost baseline until fiscal year 2010. Specific quantification of the overall costs escalation cannot be performed now, but the factors that drive the increasing cost of CMR–R, especially for the Nuclear Facility, can be identified. These factors include: building commodity and construction support cost escalation in the marketplace (e.g., rapid increasing costs for steel, concrete, glass, formed shapes, like equipment and pipe, and fuel); facility structural design changes to accommodate higher seismic loads and enhanced security threats ("the design basis threat") recognized since Critical Decision-1 in May 2005; additional analysis of the detailed, specific quality assurance, safety, and security requirements for building nuclear facilities (e.g., the interactions associated with fire protection and ventilation systems, subject to severe seismic criteria); and continued schedule delays, which add carrying costs and future escalation.

ECONOMICS OF THE PROPOSED URANIUM PROCESS FACILITY

Question. Administrator D'Agostino, as you are well aware the CMR–R facility has come under intense scrutiny with Congress even prescribing the range of production in the fiscal year 2008 bill, which was included in your preferred alter-

native. I am quite confident that at the end of the day, the project will be better served by the intense scrutiny and review.

I am concerned, however, that the Uranium Process Facility and the new Kansas City Plant has not received the same level of review as the CMR–R Facility.

It is my understanding that the UPF Facility will cost between $1.4 billion and $3.5 billion and will support uranium mission of the complex. Also, I understand the Cost Analysis Improvement Group suggested that an alternative site other than Y–12 might improve the economics of this project.

Has the Department considered the precise throughput that will be required for the UPF to support the LEP or RRW mission and has this been vetted within other relevant Federal agencies.

Answer. The UPF is being designed with a throughput to support the most likely range of stockpile alternatives being considered jointly by the NNSA and DOD at this time. This throughput capacity supports future nuclear weapons stockpile requirements for either an LEP or an RRW strategy. The NNSA has worked closely with appropriate offices in the Department of Defense to properly define stockpile requirements affecting UPF throughput.

Question. What other sites are being considered and how will this impact the mission?

Answer. Uranium operations are currently accomplished at the Y–12 National Security Complex (Y–12) in Oak Ridge, TN. While Y–12 is designated as the preferred uranium center alternative in the Draft Complex Transformation Supplemental Programmatic Environmental Impact Statement, NNSA continues to evaluate two alternative sites as the potential locations for the uranium mission. These alternative sites are the Pantex Plant (PX) in Amarillo, Texas, and the Savannah River Site (SRS) in Aiken, South Carolina. If uranium operations were moved from Y–12 to either PX or SRS, the primary impacts on the NNSA mission are the potential risks and added costs of relying on aging Y–12 facilities during an extended transition period, and the loss of workforce expertise that occurs when experienced staff choose not to relocate. Current planning schedules show that moving the uranium mission from Y–12 to either SRS or PX requires an additional 5 to 7 years of transition operations of existing Y–12 facilities while replacement facilities are completed. After the transition, regardless of which site is chosen, the uranium processes required to support the NNSA mission would be qualified and fully functional.

ENHANCED SURETY

Question. For the past several years, Congress has provided additional funding in the Engineering Campaign to support advanced surety research in an effort to encourage the Department to pursue state of the art use control technology to prevent the unauthorized use of our weapons.

This is the first year that the administration has included funding to support advanced surety research in its request. How will this funding be spent and what is your goal and timetable for developing and deploying this state-of-the-art technology?

Answer. The administration has developed advanced surety technologies for several years through the Engineering Campaign. The W76–1 life extension program (LEP) incorporates improved safety features, modern weak-links and strong-links, that were developed in the Campaign. Currently funded advanced surety activities include a laser-based advanced initiation system that, when fielded, will eliminate a safety concern for certain weapons in the existing stockpile. Additionally supported work includes security-related technologies that will improve the Department's response to current terrorist threat scenarios. The surety technologies included in the reliable replacement design would have provided greater performance margin against these postulated threats. All of these advanced surety technologies are fielded based on their technological maturity, and while some require an LEP to implement, others can be fielded without the need of a major refurbishment of a weapon platform.

Question. Are you aware of any statutory prohibitions to prevent the NNSA from integrating use control technology into our existing LEP program?

Answer. The current statutory definition of a Life Extension Program implies use of, or modification of, an existing pit or secondary (50 U.S.C. sec. 2529). Therefore, if a potential use control technology would require the manufacture of a new pit or secondary, that technology would not be allowed in a Life Extension Program. Any other use control technologies that can be used in concert with an existing pit or secondary would be allowed under the Life Extension Programs.

Question. Knowing that our present warheads are going to be in the stockpile for many years, maybe decades more, and with the growing threat of terrorist extrem-

ists, are we doing enough to implement modern surety technologies to keep these warheads secure?

Answer. Weapon security will always be met through a combination of engineered features within the weapons and the appropriate physical security measures, and, therefore, future surety improvements must balance the tradeoffs between long-term and short-term costs, time to implement and overall effectiveness. In addition, before any surety improvements can be implemented, the nuclear weapons laboratories must ensure that the weapon can be certified without the need of future underground nuclear testing. External technologies can provide surety improvements in a relatively short time and at a low cost compared to either an LEP or replacement weapons but may have significant operational impacts and limited effectiveness. An LEP or replacement designs provide the opportunity for the greatest surety improvement but with a longer development time and additional work required to certify the nuclear package without underground nuclear testing. While we have made progress in fielding technologies to enhance the surety of the stockpile, some of the opportunities for greatest improvement have not made it into the stockpile to include the W80 LEP and the Reliable Replacement Warhead. The surety of the stockpile is only as good as the weakest link. Therefore, to ensure the security of the enduring stockpile, we maintain a program to evaluate the stockpile, system-by-system, and implement the appropriate level of surety for each system, accounting for all other aspects of weapon security for the system being evaluated.

LANL PERFORMANCE—ON THE RIGHT TRACK

Question. Administrator D'Agostino, we are approaching the 2 year anniversary of the new management team's take over of Los Alamos. It appears to me that things are on the right track with several deliverables met in pit manufacturing, supercomputing, and improved site security.

What is your impression of the operations at LANL?

Answer. I agree that there has been progress in meeting goals at Los Alamos in the areas that you cite. LANL has continued to meet mission deliverables and, in particular, is up-to-date in meeting their deliverables in pit manufacturing. The supercomputing deliverables for the Roadrunner computer system are being met, and LANL is working with us to understand the upgraded power and cooling needs of their computing facility. Their site security objectives have been largely met, including a balanced inventory of special nuclear material and the reduction of the amount of CREM (Classified Removable Electronic Media) as well as its improved management. LANL, by all measures, continues its tradition of outstanding science and technology. Recent positive progress has been made in the management of their LDRD (Laboratory Directed Research and Development) program to ensure that it is better aligned with strategic directions. There are some areas that still need improvement. Management costs have gone up since the new team has taken over and have added to the cost of doing business. Hiring is a crucial area to ensure future scientific success but has been slow because of budget difficulties. Overall, there has been steady improvement in most operational areas since the management transition.

LOS ALAMOS NEUTRON SCIENCE CENTER (LANSCE)

Question. Administrator D'Agostino, as you are aware, I have sent you a letter encouraging you to better define the long term science strategy and investment in the our national labs as part of the Complex Transformation effort. I believe strongly that the NNSA must identify a long term science strategy for the NNSA labs. More specifically, I also suggested you develop a refurbishment strategy for LANSCE.

Do you agree that the NNSA must have a long term science infrastructure investment plan?

Answer. Yes, we agree that a long term science infrastructure plan is required. The success of the stockpile stewardship program is a testament to the execution of the science investment strategies that were crafted in the 1990s. These strategies brought us the modern computational systems and experimental facilities that can be integrated to allow us to maintain the stockpile without underground testing. We are also seeing the closure of Significant Finding Investigations that had been open for many years because the tools were not available or capable. Now they are. In the immediate future we see the fruition of many more of the investments such as DARHT second axis, ZR, Omega EP, and NIF. Along with LANSCE and smaller facilities, these science tools will significantly advance our capability to certify and assess the stockpile. Presently, we are engaged in developing science, technology and engineering roadmaps. Many of these have pointed to the need for LANSCE during

the next 10 years or so to address key nuclear physics, hydrodynamic and material issues. Science facility needs beyond the next 10 years is being studied but will require more results from the planned work in the next 5 years that may identify gaps. Other national missions may also be weighed in defining new science facilities at laboratories.

Question. Do you believe LANL needs a new science facility to continue supporting the ongoing stockpile stewardship mission as well as support non-weapons scientific research?

Answer. The NNNA needs LANSCE for the future to support critical stockpile stewardship missions; however, we have not yet determined a driving need within NNSA for a new science facility at LANL. LANL has discussed ideas that could provide benefit to other science missions and also to NNSA. LANL plan some major technical workshops to refine their ideas, and they will continue to bring these forward to the Department of Energy and NNSA. NNSA believes that LANL will continue to have exciting science missions within NNSA either with or without a new facility.

Question. When will NNSA pursue a CD–0 for the LANSCE project?

Answer. NNSA granted CD–0 for the LANSCE refurbishment project in December 2006, and is working to complete CD–1 by the first quarter of 2009.

MATERIALS CONSOLIDATION—MOX

Question. Can you please summarize for the subcommittee where the NNSA is in terms of consolidating special nuclear material and what the Department will gain as a result?

I strongly believe that if the NNSA is going to consolidate the special nuclear material, it must also develop a final disposition strategy for the excess plutonium. Today, the current disposition pathway is the MOX plant at Savannah River.

Question. The MOX plant serves as our only plutonium disposition path forward. Is the Department considering any other alternatives? Alternative paths were considered, both by the Department of Energy and outside experts, and ultimately rejected as not the most cost effective approaches.

Answer. No, the Department is not considering any other alternative plutonium disposition paths for the approximately 43 metric tons (MT) of surplus weapon-grade plutonium planned to be processed at the MOX facility. While the Department is planning to use the Savannah River Site's H-Canyon Complex to dispose of up to 5 MT of impure, non-pit plutonium, the H-Canyon Complex is not suitable to dispose of large quantities of pure plutonium.

Question. If Congress were to cancel the MOX project, how much longer would it take to develop and implement another disposition pathway?

Answer. If the MOX project were cancelled, the Department would have to reevaluate viable alternatives for the disposition of surplus weapon-grade plutonium. The Department has previously considered immobilization to be a possible alternative and would likely reconsider it as a disposition path for the approximately 43 MT of weapon-grade plutonium currently planned for the MOX facility. Research and development of a ceramic immobilization process was halted 7 years ago and restarting such a program now would require at least 10–12 years to complete the necessary R&D, repository licensing, design and construction before such a facility were able to become operational in the 2018–2020 timeframe, assuming essentially unconstrained funding were available to support such an aggressive schedule. (Total project costs for MOX immobilization were estimated to be roughly equal, there is much more technical and financial risk associated with immobilization because the technology is less mature.) The amount of time necessary to immobilize this large quantity of weapon-grade plutonium would extend beyond the planned operating life of the Defense Waste Processing Facility (DWPF) at the Savannah River Site and an insufficient quantity of high-activity waste remains at DWPF to immobilize this quantity of plutonium. This would force consideration of shipping surplus plutonium to the State of Washington and performing some, if not all, of the can-in-canister immobilization operations at the Waste Treatment Plant (WTP) at Hanford.

Question. What is the earliest you believe it could be operational? How much more would it cost?

Answer. As I mentioned, it would take a minimum of 10–12 years to complete the necessary R&D, repository licensing, design and construction before an immobilization facility could become operational.

Cost estimates for immobilization are highly uncertain since the technology supporting the immobilization of plutonium is still in the R&D stage and the immobilized waste form has yet to be qualified for acceptance in the planned geologic repository. It is likewise impossible to estimate, with any reasonable accuracy, the

cost of shipping surplus plutonium to the State of Washington and performing some, if not all, of the immobilization operations at the Waste Treatment Plant at Hanford. Moreover, if the Department were to change its disposition program midstream and cancel the MOX project, the cost implications would be significant. With construction already significantly underway, there would be some physical stabilization of the construction site to bring an orderly close to the ongoing work at the site. An immobilization facility would still require some form of pit disassembly capability. Canceling the MOX program would also complicate the Department's proposed nuclear materials consolidation strategy, potentially forcing the Department to complete expensive security upgrades at the Hanford Site (about $200 million) and Pantex (about $27 million), and requiring the Department to continue to pay storage costs for plutonium estimated to be hundreds of millions of dollars per year, in addition to the possible payment of economic and impact assistance of up to $100 million per year to the State of South Carolina for failure to meet the MOX production objective as defined by section 4306 of the Atomic Energy Defense Act.

NNSA SCIENCE STRATEGY

Question. Administrator D'Agostino, your testimony makes a thorough case for the consolidation of materials, mission and manpower. However, in the 13 pages of written testimony, I only find the reference to science in a handful of examples, primarily focused on past scientific achievements. There is absolutely no mention of a scientific path forward or a strategy to sustain the scientific excellence at the labs.

Could you please explain to the subcommittee, what this budget provides in terms of long term planning to sustain the science capabilities at the laboratory?

Answer. With respect to Science and Technology at the NNSA Laboratories, my most important new initiative is Special Focus Area 4: Future Vision and Mission for the NNSA and its Laboratories. I believe that the NNSA laboratories can play a central role in national security R&D, and complimentary to the transformation of the weapons complex, I would like to transform the science and technology base from one primarily focused on nuclear weapons, to one which also meets the broader national security needs of the Nation. I expect a more detailed discussion of this vision in the budget formulation we are currently preparing. We expect that this exciting new direction will attract new talent to the laboratories, thus allowing us to execute our core mission at the same time bring scientific innovation to solving emerging national security issues.

RELIABLE REPLACEMENT WARHEAD

Question. Administrator D'Agostino, this budget provides $10 million to advance the feasibility work on the RRW study, but not enough to complete the research. It is my understanding that an additional $55 million is needed to complete this phase of study.

Can you tell me what will be gained if Congress provides the full $65 million needed to complete the feasibility study? What would then be the next steps?

Answer. The purpose of the joint Department of Defense and National Nuclear Security Administration Reliable Replacement Warhead Phase 2A study is to develop the detailed cost, scope and schedule baseline for a Navy Submarine Launched Ballistic Missile warhead application. This information is needed by the National Nuclear Security Administration, the Department of Defense, and the Congress in order to make informed decisions on whether and how to proceed with development and production.

Question. Please clarify for the subcommittee whether or not you have the authority to expend funds to support the engineering phase of the RRW. Under existing authorities can the NNSA build a RRW system if it desired at this point?

Answer. For refurbishments which use the Phase 6.X process, the Nuclear Weapons Council approves entry into the development engineering phase and the NNSA informs Congress. However for a new weapon development project, there are explicitly identified Congressional approval points. In the case of the Reliable Replacement Warhead, the National Nuclear Security Administration does not have authority to expend funds to support the engineering development phase, nor to build a Reliable Replacement Warhead.

Question. Mr. D'Agostino it is my understanding that the existing nuclear nations are all making modifications to their nuclear weapons programs and we know that both Iran and North Korea have pursued a clandestine nuclear program for years.

Do you believe that the completion of the RRW feasibility study would encourage any other nation to change their nuclear weapons policy?

Answer. No, there is not one shred of evidence that U.S. nuclear weapons activities including our contemplation of replacement warheads has had any impact on

either horizontal or vertical proliferation. With the end of the cold war came the cessation of the nuclear arms competition between the United States and Soviet Union in which one side's weapons modernization cycle generated a reaction in the other. Today, there is no coupling between Russian and U.S. nuclear weapons programs—indeed, the Russians are modernizing their nuclear arsenal and we are not.

U.S. nuclear programs will not increase incentives for terrorists to acquire WMD—those incentives are already high and are unrelated to U.S. nuclear (or conventional) defense capabilities. Nor are such programs likely to have any impact on rogue state proliferation, which marches forward independently of the U.S. nuclear program. Indeed, there is no indication at all that very significant reductions in the numbers of U.S. (and Russian) nuclear weapons, and in the alert levels of nuclear forces, over the past two decades, coupled with no U.S. nuclear testing and very little U.S. nuclear modernization, has caused North Korea or Iran to slow down covert programs to acquire capabilities to produce nuclear weapons. On the contrary, these programs have accelerated during this period. Nor did such U.S. restraint convince India and Pakistan not to test in 1998, or North Korea in 2005. Rather, North Korea and Iran appear to seek WMD in response to their own perceived security needs, in part, to deter the United States from taking steps to protect itself and allies in each of these regions.

But even more importantly, the credibility of the U.S. extended nuclear umbrella is a significant restraint on proliferation. Continued U.S. engagement in security cooperation with allies including a military presence, modern and flexible U.S. military forces, and the extension of a smaller but safe, reliable and capable nuclear deterrent to allies are key elements in assuring allies that they can count on the United States, and do not need their own nuclear forces.

Question. Last year, Congress directed the Department to answer several critical questions posed by the JASON report regarding the RRW program and the subcommittee provided $20 million to provide answers to their questions.

Does this work have application to warheads other than the RRW?

Answer. Many of the issues raised during the JASON review of RRW are directly applicable to Life Extension Programs of existing systems and annual assessments of existing systems. The advanced certification sub-program as outlined in the two reports to Congress is focusing on those issues that are relevant to all systems that may be changed from the tested designs by the use of new materials, enhanced surety features, and component modifications.

Question. Has the NNSA used these funds to secretly fund or subsidize the RRW feasibility study?

Answer. No. The advanced certification sub-program will look at the certification issues raised by the JASON regarding RRW but it will address a sub-set of those issues that are common to legacy systems as well. The RRW funding line that is in the fiscal year 2009 budget is intended to address specific JASON issues that pertain specifically to the WR1 design.

UNIVERSITY ROBOTICS PROGRAM

Question. What is your out year budget plan for the University Robotics Program.

Answer. The University Research Program in Robotics (URPR) was placed in the Enhanced Surveillance sub-program of the Engineering Campaign. Based on funding priorities within this sub-program, it is the intent of NNSA to fund the URPR at about $1.8 million for the out-years.

Question. Do you believe this research initiative adds value to this program or would it be better suited with another office?

Answer. Although the URPR has produced some worthwhile ideas and concepts for sensors and control systems, the weapon program does not consider this work to be priority.

Z MACHINE

Question. Administrator D'Agostino, you have recently completed the $90 million refurbishment of the Z machine making it more efficient and with a greater research potential. I have heard that the out year budget requests could reduce the budget for this facility by 50 percent.

Is this NNSA planning to shut this facility down in the near future and how can you justify spending all this funding, but not operating the facilities?

Answer. The Z machine at Sandia National Laboratories is an important part of the Stockpile Stewardship Program and has made important contributions to the program in materials properties, weapons effects, pulsed power fusion, and other areas. In the 2008 President's budget request, NNSA asked for $63.9 million for the Z machine, and in the 2009 President's budget request, NNSA asked for $64.0 mil-

lion. In both of these years, there were additional funds requested for targets. In future years, the NNSA intends to request adequate funding to make effective use of the Z machine and meet Stockpile Stewardship Program requirements. There are no plans to shut down this unique, world-leading facility.

Z MACHINE AND NATIONAL IGNITION FACILITY

Question. NNSA has made a major investment in the construction of laboratory facilities to support the Stockpile Stewardship Program including the NIF at LLNL, the OMEGA at the University of Rochester and the refurbishment of the Z facility at Sandia. However, NNSA budget requests are below what is needed to fully utilize these facilities.

Does this year's request and the out year budgets support the full utilization of these facilities? If not, what process has the Department used to prioritize the value and funding for these facilities?

Answer. The NNSA is requesting adequate funding to meet Stockpile Stewardship Program goals in accordance with a balanced, technically-based prioritization. Our responsibility is to adjust our budgets to meet the needs of the program according to our assessment of national priorities that Defense Programs must satisfy.

The level of facility funding is determined through a rigorous process involving the weapons laboratories, the Science Campaigns, and the Directed Stockpile Work program. Weapons science priorities are set by a process that considers where the advancement of scientific knowledge can make the most impact on weapons confidence synchronized with the development of experimental and computing capabilities. Funding for experimental facilities follows from the weapons science priorities and consideration of costs, benefits, and customer commitments.

Question. Given the progress and the opportunities provided by pulse power, the subcommittee also expressed their expectation that the Department will provide adequate funding for the full utilization of the Z machine in the out-year budgets.

What has the Department done to follow these directions?

Answer. NNSA recognizes the promise and progress of pulsed power and the important contributions to stockpile stewardship that the Z facility has been making and will make in the future. In fiscal year 2009, NNSA is requesting $64.0 million for operation and use of the Z facility. This amount will enable a strong program of over 180 shots which will meet all 2009 requirements for stockpile stewardship. Additional funding is requested for targets for the Z facility. In future years, the NNSA intends to request adequate funding to make effective use of the Z machine and meet Stockpile Stewardship Program requirements.

Question. The baseline ignition approach on the NIF is x-ray or indirect drive. This approach was chosen after detailed review of its maturity and value to the weapons program. Significant challenges remain for this approach as independent reviews have concluded and even now there appears to be uncertainty in the baseline target, requiring several different approaches to be funded. In the 2008 budget process this subcommittee expressed this concern and again asks the Department to justify why it does not defer the direct drive approach to ignition on NIF until after achievement of x-ray driven ignition or after experiments have shown that the baseline approach will not succeed.

Given the present and future budgetary pressures on the Stewardship Program, why does the Department continue using significant resources on other approaches to ignition such as direct drive?

Answer. In response to the present and future budgetary pressures on the National Ignition Campaign and the Stockpile Stewardship Program, resources have been shifted to maintain the indirect drive program. Those portions of the direct drive physics program that directly support the indirect drive effort are funded, along with a small polar direct drive program.

As confirmed by independent reviews, success in inertial fusion and an ignition demonstration depend on a detailed technical understanding of the implosion process. Many of the key scientific and technical challenges associated with ignition are independent of the drive method—direct or indirect drive. The OMEGA laser system is flexible and is used to study implosion physics with direct and indirect drive. The choice of direct or indirect drive is a technical decision based on experimental capabilities and requirements.

Studies at OMEGA examine physics and technology issues required for the success of indirect drive, including aspects of implosions using direct drive that are currently inaccessible with indirect drive. Implosion target physics is an integral part of the National Ignition Campaign. An important recent example is the achievement of record compressed densities in cryogenic deuterium-tritium capsules using direct drive on the OMEGA laser. This critically important result provided new knowledge

regarding capsule physics and the operation of cryogenic systems—information directly applicable to indirect drive.

Since its inception, the National Ignition Campaign has included direct drive as a risk mitigation strategy (contained in the approved NIC Execution Plan). Polar direct drive remains the only near-term back-up strategy for indirect drive ignition on the NIF. The mainline strategy remains indirect drive, and the bulk of NIF resources are devoted to it. Only if major unforeseen problems arise with indirect drive will a change to direct drive be considered.

Question. Has the Department conducted an external and independent review of the direct drive approach on NIF taking into account the non-ideal geometry on this facility? Has the Department considered any other approaches other than direct drive as the back-up to indirect drive on NIF? If so, what process was employed in this decision?

Answer. Yes. The polar direct drive approach for achieving ignition on the NIF was reviewed by an external and independent committee as part of the larger program review in 2005. It was recommended that direct drive research be continued as a risk mitigation strategy for achieving ignition. Polar direct drive is optimized for the initial NIF geometry. An NNSA Level-1 milestone in fiscal year 2009 provides a decision point for moving forward with development of polar direct drive for the NIF. The mainline strategy remains indirect drive and polar direct drive is the only current back-up. The committee also recommended that risk mitigation include planning for the use of green (2-ω) instead of blue (3-ω) light. Other approaches to ignition on the NIF, such as fast ignition and shock ignition, are primarily supported through multi-institutional grants by the Department of Energy's Office of Fusion Energy Sciences and by Laboratory Directed Research and Development (LDRD) at the national laboratories.

Please describe how the additional funding provided in the 2008 budget was used in accordance with the language of Congress. In particular was an additional $13 million provided to Sandia National Laboratory to fully fund single shift operation of Z, and how many "additional shots to support the goal of an ignition demonstration at the National Ignition Facility (NIF) in 2010" are being performed for the $9 million extra that University of Rochester received in fiscal year 2008?

Answer. For the Z facility for fiscal year 2008, the NNSA requested a total of $63.9 million for its operation and use. There were additional funds requested to fabricate targets for Z. In the Energy and Water Appropriations Act of 2008, the Congress added $13.0 million to fully fund single shift operations. Of the $13.0 million in additional funding, $7.9 million was provided directly to the Z facility and $2 million was provided to General Atomics Corporation to meet target needs for Z. The remaining $3.1 million was used for the Congressional rescission and the program's share of Defense Programs site infrastructure charges.

In addition, the Congress provided $62.0 million for the Laboratory for Laser Energetics operations, an increase of $9.0 million over the budget request, to provide additional shots to support the goal of an ignition demonstration at the National Ignition Facility in 2010. After the Congressionally mandated rescission and $1.0 million for the program's share of Defense Programs site infrastructure charges, the amount of funding provided to the University of Rochester over the fiscal year 2008 President's budget was $7.4 million. This funding has provided 262 additional shots on the OMEGA laser system and 115 shots on the OMEGA Extended Performance laser system in support of achieving ignition at the National Ignition Facility.

QUESTIONS SUBMITTED TO DR. TOM HUNTER

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

ADVANCED COMPUTING

Question. The fiscal year 2008 Omnibus language directed both the NNSA and the Office of Science to establish a joint advanced computing and algorithm R&D program at Sandia. The objective of this language was to restore a world leading R&D capability in high performance computing architecture. The United States won't maintain its world leading role if we don't continue to support research.

What has the Department been doing to establish this capability and what goals have been set and how will Sandia contribute to this research program?

Answer. The Institute for Advanced Architectures and Algorithms (IAA) has been established with centers of excellence at Sandia (SNL) and Oak Ridge (ORNL) National Laboratories. A joint SNL–ORNL management structure along with strategic

directions have been established. These strategic directions are aligned to the known technical gaps that must be closed for the United States to retain its leadership in high performance computing (HPC). However, the pacing elements in closing these gaps will be Federal funding and engagement by the both the U.S. semiconductor and HPC industry.

Working with Federal Program Managers in DOE Office of Science Advanced Scientific Computing Research (ASCR) and NNSA Advanced Simulation and Computing (ASC), a competitive proposal and external review process has been developed for deployment of the initial $7.5 million fiscal year 2008 funding. We expect the selection of winning proposals will be completed in Q4 fiscal year 2008 with most of the research activity occurring in fiscal year 2009. Although this has taken longer than we originally anticipated, we believe having concurrence from all parties on the funding process is placing IAA on solid footing for the future.

As you are aware, the appropriations language instructed both DOE OS and NNSA to establish the IAA. This language has been interpreted to require that ASCR fund ORNL while ASC funds SNL. It our belief that a very successful IAA briefing to ASCR and ASC management in January 2008 lead to Dr. Orbach inserting language at the last moment into the fiscal year 2009 President's budget requesting the continuation of IAA. However, no funding stream was identified. It is our understanding that ASCR plans to ask for additional appropriations in the fiscal year 2010 Presidents budget request. NNSA is supportive of the creation of IAA at SNL but has asked SNL to prioritize their future ASC computer science funding to support the NNSA contribution to IAA. Evidence of NNSA's support can be found in stability of SNL computer science FYNSP funding during a period of significant declines in the ASC budget. However as pressures increase in the overall NNSA budget, we are concerned that there is significant risk in SNL IAA FYNSP funding.

Question. The Complex Transformation Preferred Alternative proposes to eliminate future investment in a super computing platform at Sandia, despite a very strong track record in developing the first massively parallel computing architecture, which has become the standard for high speed computers.

How will this impact the laboratory in the future and what will you do with the experienced staff without this mission responsibility?

Answer. Our response to NNSA's decision to reduce capability platform sitting to LLNL and LANL has been to develop a strong partnership with LANL called the Alliance for Computing at Extreme Scales (ACES). On March 7, 2008, Tom Hunter and Mike Anastasio signed a Memorandum of Understanding (MOU) creating ACES. In this MOU, SNL has the leadership for architecting and engineering platforms to be sited at the Metropolis center at LANL while LANL has the leadership for deploying and operating the platforms. Although this might appear like a handoff, both labs have equal representation on creating and operating the next generation of capability computers. Other than NNSA reversing its decision, we believe this partnership provides the lowest risk path to retaining the SNL experience staff that developed and deployed the most successful HPC platform to-date, RedStorm.

For ACES to be successful, NNSA must assign a near-future tri-lab platform to the partnership. The NNSA ASC computing strategy calls for a replacement for the Purple platform in fiscal year 2010. SNL and LANL were lead to believe that once the MOU was signed, NNSA would announce that ACES would provide the "purple replacement". SNL remains concerned that after almost 3 months, NNSA has not made an announcement.

The MOU does not preclude SNL from developing, procuring and operating HPC capability platform for non-DP missions. For example with NNSA's support, SNL is developing a strategy for supplying HPC computing for the enormous challenges associated in turning information into knowledge through computational analysis (informatics). An example of informatics for national security would be the discovery of terrorist networks. We believe that moving in this direction provides new opportunities for SNL staff to make significant impacts in the U.S. national security through the development of new HPC architectures and state-of-the-art algorithms for informatics.

SANDIA FUNDING DIVERSITY

Question. Dr. Hunter, your lab has been the most successful of the three labs in diversifying your budget. However, it is my understanding that investment from other Federal agencies in limited and generally doesn't provide sufficient resources to make long term investments.

Can you explain to the subcommittee the challenges in seeking outside Federal customers?

As a result of your funding diversity, do you believe that NNSA uses this as an excuse for cutting corners and not making the same level of investment as the other?

Answer. Our Nation is facing a diverse set of emerging threats ranging from traditional strategic nuclear threats to threats from other nation states, terrorists, natural disasters, and threats from technological surprise. As the Nation interacts with a changed world in which monolithic threats no longer dominate, the means to disrupt an increasingly technology-based society are rapidly multiplying. In my role as President and Director of Sandia National Laboratories, I view the NNSA's national security laboratories, with their world-class scientists and engineers and many one-of-a-kind facilities, as national assets and as a unique resource for the Nation in anticipating and responding to hostile actors and actions.

I'd like to address three basic challenges, however, that currently limit the NNSA laboratories' ability to fully engage with other Federal agencies (OFAs), including: a long-term commitment to funding the foundational capabilities and resources of the NNSA Complex; enabling easier access to the NNSA's resources by OFAs; and a shared commitment through strategic partnerships between the NNSA complex and OFAs to ensure the Nation's security.

At Sandia, our Work for Other's (WFO) program has existed for more than 50 years and has expanded significantly over the past two decades. There are many examples where the nuclear weapons program has benefited from WFO program activities, including radar, safety and risk assessment, and improved modeling and simulation capabilities. Likewise, various WFO customers have benefited from the long history of DOE investment in capabilities at the national laboratories. It is becoming increasingly difficult, however, for any one funding source to maintain the needed foundational capabilities of the laboratories.

As we go forward, it will be essential to maintain the science, technology and engineering foundation of the Labs and define its vital role in responding to the Nation's security. This foundation, historically highly leveraged by other agencies with national security interests, faces dramatic reductions consistent with the downsizing of the nuclear weapons mission. We must find a way to sustain this foundation so that the statutory nuclear weapons mission and the broader national security commitments are effectively met.

In addition, it is imperative that OFAs should be provided easier access to the NNSA Complex's science, technology, and engineering capabilities. Commensurate with this, the NNSA and it laboratories are examining the existing NNSA Work for Others (WFO) program regulatory, policy, and procedural framework in order to identify improvements to current roles, responsibilities, policies, processes and requirements. Collectively, changes in these areas have the potential to provide easier access to the NNSA Complex's capabilities and allow NNSA sites more responsibility and accountability for meeting national security needs while still meeting statutory requirements.

Overall, the common missions and shared interests of a number of Federal agencies with a stake in the Nation's security provide a strong basis for collaborative activities, mutual prioritizing of resources, and enduring partnerships. Such mutual missions and interests have the potential to develop into true strategic partnerships and enhance the Nation's approach to meeting national security challenges. Building trust among such Federal agencies is difficult, and open and consistent communication will be essential. Relationship development among Federal organization is time consuming and requires resources. However, I believe that we can better leverage these shared missions and interests of Federal agencies with the NNSA laboratories.

Much of Sandia's work is sponsored by DOE's National Nuclear Security Administration (NNSA), but we also work for other Federal agencies, including the Department of Defense and Department of Homeland Security. And we work cooperatively with a number of government, U.S. industry, and academic partners to accomplish our missions and to help ensure the Nation's security. Many recognize that the threats the Nation faces are more diverse than ever. From my position at Sandia, I believe that the NNSA national security laboratories and my own lab are well positioned to offer the new science, technology, and engineering solutions to address these threats.

Z MACHINE

Question. Dr. Hunter, we have struggled to keep full funding of the Z machine, which has turned out to be a fantastic research facility at a fraction of the cost of many of the other facilities. I recall, with the recent refurbishment, this facility cost less that $200 million to construct.

Is the Z machine continuing to deliver important scientific data? How much more funding will you need above the fiscal year 2009 request to restore full operation?

Answer. First of all, your recollection on the facility cost is correct. Over the past 25 years, the capital investment in the facility, including the addition of major diagnostic systems such as the Z-Beamlet and Z-Petawatt lasers and the recently completed Z refurbishment project, is less than $200 million. (Major capital investments over the past 25 years have included: Particle Beam Fusion Accelerator II (1985) $45 million; Z Conversion (1996) $12 million; Beamlet Laser (2001) $13 million; Z Refurbishment (2007) $90 million; and Z Petawatt Laser (2007) $30 million; Total $190 million)

Today the Z machine is the most powerful and energetic laboratory x-ray source in the world. Z's strength is its ability to produce copious x-rays, large plasma environments, and controlled high pressures to evaluate weapons science phenomena. Z provides critical data for weapons primaries, secondaries, and non-nuclear components as part of NNSA's Stockpile Stewardship program. Achieving high energy density conditions is critical to develop and validate advanced theoretical models and codes and to characterize weapons component performance.

Z provides essential data on the effects of soft x-rays on weapon components that cannot be obtained with any other laboratory source. Z's material property capability is unique, produces the most accurate weapons material data available in high energy density pressure regimes, and is required to validate new physics models of the response of weapons materials, such as plutonium. Z is also essential for evaluating the feasibility of achieving thermonuclear fusion ignition with pulsed power. Pulsed-power-driven fusion has the potential to be a very efficient and low cost approach to producing high fusion yields in the laboratory for weapon science and over the long term energy.

At present, Z is funded to operate at 75 percent of full capacity to meet the essential requirements of NNSA's stockpile stewardship program. This partial capacity permits about 170–180 shots per year allocated as: 60 shots for material properties, 50 shots related to magnetically-driven Z-pinch implosions for fusion, 25 shots testing radiation effects, 25 shots supporting weapon secondary assessment, and about 10–20 pulsed power shots associated with facility operations and enhancements. An additional $12 million in funding is required to restore full single-shift operations, which would enable many other important opportunities to be pursued in the areas of weapon science, inertial confinement fusion, and fundamental science. Included in these additional tests are those in support of weapon primary and secondary assessment, nuclear survivability, and university science for the joint NNSA/OS High Energy Density Laboratory Plasma program. Allowing necessary ramp up time for training of new staff to support the full mission, the full single shift operations will support about 240 shots annually.

Question. For several years, I have pressed the Department to establish a joint High Energy Density Plasma research program utilizing NNSA facilities to support non weapons research. Finally, the fiscal year 2008 budget request provided $24 million to support this research.

Is this joint program utilizing the Z machine and do you believe more could be done to expand its use by the DOE Office of Science?

Answer. The joint High Energy Density Laboratory Plasma research program is still being formulated by the Defense Science Division within NNSA and the Office of Fusion Energy Science within the DOE Office of Science. We believe that the Z facility as well as the Z-Beamlet and Z-Petawatt laser capabilities should be a significant component of this program. These facilities can also provide experimental environments for the basic research needs for materials under extreme environments.

At the proposed funding level it is not likely that the new joint program will include a large effort in utilizing the Z facility and the other excellent high-energy-density science facilities at the NNSA laboratories. There are tremendous opportunities for university and national laboratory researchers to use NNSA's high-energy-density science facilities to access experimental conditions of interest for fundamental science in the areas of planetary physics, material properties at extreme temperatures and pressures, and laboratory astrophysics. A basic science program on high energy density laboratory plasmas would be a strong component of full utilization of the Z facility.

SUBCOMMITTEE RECESS

Senator DORGAN. We invited the three laboratory Directors, and I'm really pleased we did. I'm pleased you've come, and I hope we will be able to do this again next year.

And thank you for your work.

Director.

Dr. ANASTASIO. Thank you very much.

Senator DORGAN. This subcommittee's recessed.

[Whereupon, at 4:40 p.m., Wednesday, April 16, the subcommittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

WEDNESDAY, APRIL 30, 2008

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:32 a.m., in room SD–192, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Feinstein, Domenici, and Allard.

DEPARTMENT OF ENERGY

NATIONAL NUCLEAR SECURITY ADMINISTRATION

STATEMENT OF WILLIAM H. TOBEY, DEPUTY ADMINISTRATOR FOR DEFENSE NUCLEAR NONPROLIFERATION

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. The hearing will come to order. We thank all of you for being here today.

This is the Senate Appropriations Committee Subcommittee on Energy and Water Development. We are here to take testimony today of the National Nuclear Security Administration's fiscal year 2009 budget request for defense nuclear nonproliferation activities.

Today we have two panels. First we will hear from Deputy Administrator Will Tobey. He will be the first witness. The second panel will consist of two prominent nonproliferation experts. Dr. Siegfried Hecker is co-director at the Center for International Security and Cooperation at Stanford University and Dr. Matthew Bunn, senior research associate, Project on Managing the Atom at the John F. Kennedy School of Government at Harvard University. I thank all three for taking time out of their schedules to be with us.

The administration's budget request for the National Nuclear Security Administration's nonproliferation activities is $1.25 billion for fiscal year 2009. The request is $88 million less than the new budget authority provided in fiscal year 2008, but it is $410 million less than the directed programmatic funding provided in the 2008 bill. If that sounds complicated, it is. The difference is due to the fact that in fiscal year 2008, we redirected the use of $322 million in prior year balances. This fact in some ways distorts the year-to-year comparisons, but it is important to understand.

Further, in fiscal year 2008, we moved funding for the MOX facility over to the nuclear energy account and funding for the pit disassembly and conversion facility to the weapons activities. All of this makes getting adequate comparisons very, very difficult. Regardless, it is safe to say that we should have greater funding for these activities if we have the resources to do so.

In his written testimony today, Deputy Administrator Will Tobey says that the possibility that a rogue state or a terrorist will acquire nuclear or other weapons of mass destruction poses one of the most serious threats to the United States and to international security. President Bush has made the same point.

Today, Dr. Hecker and Dr. Bunn will also indicate that the threat is real and that greater financial resources are needed to be committed to the NNSA nonproliferation activities.

If there is a consensus about the threat of nuclear or other weapons of mass destruction, then the question is are we doing enough? Are we doing it well? What else should we be doing? Today we will review the budget request with the Deputy Administrator with those questions in mind.

Dr. Hecker and Dr. Bunn will discuss the adequacy of the budget request, but we will also ask their views on an array of nonproliferation policy and diplomatic challenges facing us here today. I have reviewed their testimony and they will cover some of that in their testimony.

North Korea, Iran, Syria are front-page reminders that proliferation concerns are real and immediate. And the questions arise as to whether the international community has the commitment and the appropriate means of dealing with countries which ignore international sentiment. Sanctions failed to stop India's development of a nuclear weapons program, and now we are considering nuclear cooperation agreements with that country. Agreements, I think, are unwise, by the way.

The 2005 Nuclear Nonproliferation Treaty review conference was a failure. Some argue that the administration contributed to that failure. I will ask about that today.

Renewed interest in civilian nuclear power use is on the rise around the world, and as we see in Iran, concern about enrichment capability has significant proliferation concerns regardless if it is claimed to be purely for civilian purposes.

These are just a few of the very significant nonproliferation policy and diplomatic challenges facing our country.

Obviously, the White House and the State Department drive the nonproliferation program policy, but NNSA provides the technical knowledge and capability to implement and verify.

We have a lot to cover in this hearing, and I want to make one point about this issue of nonproliferation. I think we have tried to do well as a country focusing on this, but in many ways it has become an orphan to so many other programs that have greater priority. And yet, some day we may well look in the rear view mirror and have seen a nuclear weapon exploded in a major city in this world and wonder what we could have done differently to stop the proliferation of nuclear weapons. There is not much more we do that exceeds in importance than the determination of this country to be a leader in nonproliferation. Some of our policies confound

me. Some of them worry me. Others I am pleased with. But I think the purpose of this hearing is to evaluate this issue of nonproliferation. Are we doing enough? What more should we be doing? Will we 5 and 10 years from now determine that we funded other things less important than this and short-funded this program? Let us hope not.

At any rate, we appreciate all three witnesses being here today, and let me call on the ranking member, Senator Domenici.

OPENING STATEMENT OF SENATOR PETE V. DOMENICI

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

I have always looked forward to this hearing because the issue of nuclear nonproliferation is near and dear to my heart and of such great importance to our national security.

I am also pleased to welcome a former constituent, former Los Alamos Director Sig Hecker. Sig is an old and dear friend who I have relied on for advice for decades. I know that sounds funny—"decades"—because he is so young looking and it hardly seems like it could be decades, but it has been.

Mr. Chairman, I strongly encourage you to seek Dr. Hecker's advice and wisdom on matters of nonproliferation just as I have, and I guarantee that you will not be sorry if you do that.

Dr. Hecker, you have returned from your fifth trip to North Korea, as well as a recent trip to India. We look forward to hearing about your impressions of both countries.

Mr. Tobey and Dr. Bunn, I also appreciate your attendance and look forward to discussions with you involving the challenge of nuclear proliferation and what our priorities should be in response.

Mr. Chairman, I noted earlier that I have a strong passion for these accounts, and I believe that the United States must maintain its determination to keep the world's most dangerous weapons out of the hands of terrorists and the world's most dangerous regimes. This means doing more of what has been successful in the past and fixing known shortcomings. We cannot rely on luck to keep us safe. Preventing nuclear terrorism must remain a high priority. I have seen firsthand the challenges of reducing the enormous and sometimes poorly protected stockpile of the Soviet Union at the end of the cold war. Sig Hecker showed us many of those shortly after the cold war as they existed on the ground in places in the former Soviet Union.

Since 1991 when the Soviet Union collapsed, our Nation has invested nearly $10 billion to lock up or destroy thousands of nuclear weapons and their delivery systems and hundreds of tons of nuclear material. The Department is now nearing completion of the security upgrades in Russia and the former Soviet republics. Just last week, one of the three remaining plutonium production reactors was shut down in Russia with U.S. assistance. In 2 years, we will complete the construction of coal plants in Russia necessary to enable the shutdown of two remaining production reactors.

The completion of these projects coincides with the new phase of our relationship with Russia. Russia is the leading exporter of natural gas, second leading oil producer in the world behind Saudi Arabia. With oil prices over $100 per barrel, the Russian Government is no longer strapped for cash. This is a quite different situa-

tion than we initiated in the MPC&A program. Our cooperation should reflect this reality. We must pursue projects on the basis of shared benefits and shared contributions.

Our major project of mutual benefit has been the blend-down of Russian highly enriched uranium. In 5 years, we will come to an end of the HEU purchase agreement. At that time, 500 metric tons of HEU from dismantled Russian weapons will have been eliminated, the equivalent of 20,000 warheads' worth of material. This weapons material is being turned into commercial nuclear fuel, and today supplies 50 percent of the U.S. reactor requirements. This program is considered by many to be the most successful nonproliferation program ever implemented.

I believe we can and must do even more. When the HEU agreement ends in 2013, it is estimated that there will be hundreds of tons of excess HEU remaining in Russia. With the right commercial incentives, this can be an economic win for Russia and a security win for the world, just as the current agreement has been.

I am somewhat frustrated with the Russian suspension agreement signed by the administration in February. It provides 20 percent, Mr. Chairman, of the U.S. enrichment market, without any requirement for additional HEU down-blending, meaning they can sell to us without delivering any HEU, highly enriched uranium. That is what we should be talking about.

I have legislation that I shared with you which will correct this problem. The legislation would provide Russia in excess of 25 percent of the U.S. market if it continues the down-blend of HEU. At its current rate of 30 tons per year, it does not blend down any additional HEU, and access will be limited to 15 percent of our market. This legislation provides a clear economic incentive for Russia to eliminate an additional 300 tons of HEU.

Looking forward, we must do more to prevent states from acquiring nuclear weapons, and you are fully aware of that and I think we are in accord. We must also not allow the proliferative states like North Korea to help other states develop weapons, but it seems like there is little we can do. They are doing it. We find out while they are doing it or after they are doing it, and so goes the world.

Addressing these issues will require sustained investment. I am not sure we are investing enough, but you and I have found that this budget is profoundly difficult and it is not getting any easier year by year.

Thank you very much, Mr. Chairman.

Senator DORGAN. Senator Domenici, thank you very much.

Administrator Tobey, thank you very much for being with us, you may proceed and the statements that you and the other two witnesses provide today will be inserted into the record in full, and you may summarize. Thank you very much.

STATEMENT OF WILLIAM H. TOBEY

Mr. TOBEY. Chairman Dorgan, Senator Domenici, thank you for the opportunity to discuss the President's fiscal year 2009 budget request for the National Nuclear Security Administration's Office of Defense Nuclear Nonproliferation.

At what may be my last opportunity to speak before this subcommittee, I would particularly like to thank Senator Domenici for his leadership on nonproliferation. You have been a great champion of the NNSA, and we are all deeply appreciative of that.

I would also like to recognize the men and women of the NNSA who work so hard to detect, secure, and dispose of dangerous nuclear material around the world. They have braved freezing conditions in Siberia, Hezbollah rocket attacks at Haifa, very difficult conditions at Yongbyon in North Korea, and through it all, they have never failed to accomplish their missions. And I feel honored to work with them.

The fiscal year 2009 budget request for the Office of Defense Nuclear Nonproliferation totals $1.247 billion. This amount will allow us to continue our mission to detect, secure, and dispose of dangerous nuclear and radiological materials, strengthen the international nonproliferation partnerships, and meet evolving proliferation and international security threats.

Specifically, this funding will advance our priorities to, one, enhance national capabilities to detect and interdict nuclear and radiological materials at key seaports and border crossings; two, reduce and eliminate stores of highly enriched uranium, weapon-grade plutonium, and vulnerable radiological materials across the globe; and three, work to ensure the sustainability of nuclear security upgrades in Russia and the international nonproliferation system.

As was recognized, last week we announced the shutdown of a plutonium production reactor at Seversk, something that we have been working with the Russians on for years now, and this is an important achievement and shows tangible results in our efforts.

We recognize that the best way to reduce the threat of proliferation or terrorist acquisition of nuclear weapons or devices is by denying them access to the necessary nuclear and radiological materials in the first place. To that end, our fiscal year 2009 request will allow us to accelerate our work, including installation of radiation detection systems at nine additional ports under our Megaports program for a total of 32 Megaport sites worldwide, helping to secure 49 border crossings and other high-risk points of entry under our Second Line of Defense Program and expanding export control and commodity identification training activities with more than 50 countries.

Additionally, in fiscal year 2009, we will undertake a new initiative to strengthen international safeguards to prevent the diversion of nuclear material from peaceful uses. This Next Generation Safeguards Initiative will develop the safeguards technologies and human resources needed to sustain our nonproliferation efforts while promoting international partnerships and meeting the challenges of growing nuclear energy demand.

Underpinning all these efforts is our nonproliferation research and development work through which we will continue our leadership as the principal Federal sponsor of long-term proliferation-related R&D on nuclear detection and characterization.

Our fiscal year 2009 request will allow us to accelerate our efforts under the Global Threat Reduction Initiative to convert HEU-fueled research reactors around the globe to the use of less proliferation-sensitive, low enriched uranium. We will also continue to

repatriate U.S.- and Russian-origin highly enriched uranium to secure sites, secure high priority nuclear and radiological sites globally, and secure and remove orphan radiological sources that could be used in dirty bombs. To date, we have removed enough nuclear material for nearly 70 nuclear weapons and secured more than enough radiological sources for over 8,000 dirty bombs. In fiscal year 2009, we will convert an additional 8 HEU reactors to LEU, remove an additional 700 kilograms of HEU, and secure an additional 125 radiological sites across the globe.

Last year I updated you on our progress under the 2005 Bratislava joint statement on nuclear security in which we have partnered with Russia to secure its nuclear weapons and sites of highest concern. I am pleased to report that we have completed 85 percent of these upgrades to date and are on track to complete our work under the Bratislava Agreement by the end of calendar year 2008. In fiscal year 2009, should Congress grant our request for resources, our focus will be on completing additional high priority security work beyond the Bratislava Agreement.

Additionally, our fiscal year 2009 budget request also includes funding to ensure the shutdown of the last remaining Russian plutonium production reactor by 2010, which will prevent the production of about one-half ton of weapons-grade plutonium annually. We will continue our efforts to facilitate Russia's commitment to dispose of 34 metric tons of surplus Russian weapons-grade plutonium and to disposition excess Russian and U.S. highly enriched uranium.

Just last week, we were pleased to announce that the United States and Russia have eliminated 10 metric tons of Russian weapons-usable nuclear material. This material, equivalent to 400 nuclear weapons, was successfully converted by down-blending highly enriched uranium to low enriched uranium under a joint U.S.-Russian program. These material security efforts enhance our work to strengthen the nonproliferation regime and the multilateral partnerships supporting it.

In this regard, we will continue to support the work plan of the Global Initiative to Combat Nuclear Terrorism and to advance the objectives of the United Nations Security Council resolution 1540, which mandate effective export controls, criminalize proliferation of WMD by non-state actors, and require states to secure proliferation-sensitive materials.

We will likewise continue our technical and diplomatic support of U.S. efforts on the Nuclear Nonproliferation Treaty within the Nuclear Suppliers Group and on multilateral initiatives such as international fuel assurances and disablement of North Korean nuclear facilities. We recognize that just as today's proliferation and terrorism threats are global in scope, so too must be the responses we undertake to address them.

I am mindful of the comments that were made at the outset of the hearing about the importance and urgency of our work. I would note that we have worked hard to accelerate our efforts across the board, including accelerating the conversion of reactors from highly enriched uranium to low enriched uranium, increasing nuclear material security under the Bratislava Initiative which advanced the completion of work in Russia by about 2 years, signing an agree-

ment with Russia on the Second Line of Defense Program which advanced the completion of securing Russia's borders by about 6 years, and in fact, even advancing our work under the elimination of weapons-grade plutonium production reactors such that we have shut down one of the reactors months early and we are still optimistic that we can shut down the last remaining reactor perhaps even a year early.

I am also quite mindful of the need, given the importance of our work, of listening to others about this work. I have appreciated the advice that we have gotten from this committee, both members and staff. We have worked hard to try and take it into account as we proceeded with our work.

PREPARED STATEMENT

I am also grateful to the advice that we have received from the members of the second panel. Even before I had been confirmed, I sought the advice of other experts on what our job should be and how we should execute it, and frankly, the advice that I found most comprehensive and useful was that of Dr. Hecker. We also speak frequently with Dr. Bunn, and his advice and his report that he completes on securing the bomb has been helpful in setting forth our priorities. We have tried to reflect that, as well as our own thinking, in how we execute these programs and I am grateful for all of that help.

Thank you.

[The statement follows:]

PREPARED STATEMENT OF WILLIAM H. TOBEY

Thank you for the opportunity to discuss the President's fiscal year 2009 budget request for the National Nuclear Security Administration (NNSA). I want to thank all of the members for their strong support for our vital national security missions.

In the 8th year of this administration, with the support of Congress, NNSA has achieved a level of stability that is required for accomplishing our long-term missions. Our fundamental national security responsibilities for the United States include:

—Assuring the safety, security and reliability of the U.S. nuclear weapons stockpile while at the same time considering options for transforming the stockpile and the complex infrastructure that supports it;
—Reducing the threat posed by proliferation of nuclear weapons, material and expertise; and
—Providing reliable and safe nuclear reactor propulsion systems for the U.S. Navy.

NNSA is examining how to proceed into the future to address evolving national security needs in a manner that anticipates significant changes in how we manage our national security programs, our assets and our people. To that end, the fiscal year 2009 budget request for $9.1 billion, a decrease of $35 million from the fiscal year 2008 Consolidated Appropriations Act, supports NNSA's crucial national security mission. My testimony today will focus on NNSA's Defense Nuclear Nonproliferation budget request for fiscal year 2009.

DEFENSE NUCLEAR NONPROLIFERATION

The possibility that rogue states or terrorists might acquire nuclear and other weapons of mass destruction (WMD) and their related technologies, equipment and expertise, poses one of the most serious threats to the United States and international security. The continued pursuit of nuclear weapons by terrorists and states of concern underscores the urgency of NNSA's efforts to secure vulnerable nuclear weapons and weapons-usable nuclear material, to detect and interdict nuclear and radiological materials and WMD-related equipment, to halt the production of fissile material for weapons, to dispose of surplus weapons-usable material, and to contain the proliferation of WMD technical expertise. The fiscal year 2009 budget request

will enable NNSA to continue these critical activities that support threat reduction initiatives vital to U.S. national security.

Preventing access to nuclear weapons and fissile material has many dimensions. Our highest priority is to keep these dangerous materials out of the hands of the world's most dangerous actors. Absent access to a sufficient quantity of essential fissile materials, there can be no nuclear weapon. The most direct way to prevent acquisition of nuclear weapons is by denying access to fissile material. Historically, much of our materials security emphasis focused on Russia because that is where most of the poorly secured material was located. We have made remarkable progress cooperating with Russia to strengthen protection, control, and accounting of its nuclear weapons and materials. We recently completed security upgrades at 25 Russian Strategic Rocket Force sites and will meet our commitment to conclude agreed-to security upgrade activities at Russian nuclear sites by the end of this year, as provided for under the Bratislava Joint Statement signed by Presidents Bush and Putin. Although these direct upgrade efforts are largely drawing to a close after over a decade of work, we will continue security upgrade work at some sites added to our work scope after the Bratislava summit, and will continue to work cooperatively with Russia to ensure the long-term sustainability of the systems and procedures already implemented. We recently reached agreement with Russia on a sustainability plan that identifies the requirements for long-term Russian maintenance and infrastructure of security upgrades under our cooperative program.

However, not all nuclear material of proliferation concern is located in Russia. We are also working with other partners to secure weapons-usable nuclear materials in other parts of the world, and to strengthen security at civil nuclear and radiological facilities. One area of particular concern is research reactors, which often use highly enriched uranium (HEU) fuel otherwise suitable for bombs. Our Global Threat Reduction Initiative (GTRI) converts research reactors around the world from HEU to low enriched uranium (LEU) fuel. The GTRI program, and its antecedents, have removed approximately 68 nuclear bombs' worth of highly enriched uranium and secured more than 600 radiological sites around the world, collectively containing over 9 million curies, enough radiation for approximately 8,500 dirty bombs. In the United States the GTRI program has removed over 16,000 at-risk radiological sources, totaling more than 175,000 curies—enough for more than 370 dirty bombs.

An additional nuclear security challenge concerns the effectiveness and credibility of international nuclear safeguards. Against the backdrop of growing nuclear energy demand, concerns over the diffusion of sensitive nuclear technologies, and the challenges posed by Iran and North Korea, international safeguards are coming under increasing strain. To address this challenge, NNSA has launched the Next Generation Safeguards Initiative (NGSI), which will ensure U.S. leadership and investment in our technologies and experts in the service of nuclear nonproliferation. Enhanced and revitalized international safeguards will also help ensure the sustainability of the gains made by our associated threat reduction efforts.

Additionally, in fiscal year 2009, we will continue to lead the U.S. Government efforts to oversee the disablement and dismantlement of North Korea's nuclear program. However, in order to continue our support for these critical disablement and dismantlement activities, we will require a waiver of the Glenn Amendment restrictions that were triggered by North Korea's 2006 nuclear test, as well as more substantial funding. The Glenn Amendment prohibits the Department of Energy, which would otherwise fund denuclearization activities, from providing any financial assistance to North Korea. Without this waiver, the Department will be unable to complete Phase Three denuclearization activities. NNSA and the administration have been working to insert language into the fiscal year 2008 Iraq War Supplemental, or any other appropriate legislative vehicle, to provide such a waiver.

We are also taking aggressive steps to interdict illicit transfers of weapons-usable nuclear materials and equipment, and to prevent dissemination of related sensitive nuclear technology via strengthened export controls and cooperation. We currently provide export control and commodity identification training to over 50 countries across the globe, in order to improve nations' capabilities to deter and interdict illicit WMD-related technology transfers. As an important complement to physical security improvements, the Second Line of Defense Program enhances our foreign partners' ability to interdict illicit trafficking in nuclear materials through the deployment of radiation detection systems at high-risk land-border crossings, airports and seaports. These efforts increase the likelihood of interdicting illicit nuclear materials entering or leaving the country. To date, 117 Russian border crossings have been equipped with radiation detection equipment under this program.

As part of the Second Line of Defense, the Megaports Initiative, established in 2003, responds to concerns that terrorists could use the global maritime shipping network to smuggle fissile materials or warheads. By installing radiation detection

systems at major seaports throughout the world, this initiative strengthens the detection and interdiction capabilities of our partner countries. At the end of 2007, the Megaports program was operational in 12 countries and being implemented at 17 additional ports. In addition, we continue to carry out nonproliferation research and development activities, developing, demonstrating and delivering novel nuclear material and nuclear detonation detection technologies for nonproliferation and homeland security applications.

Since the end of the cold war, the Nation's adversaries have been quick to adapt to technological improvements. Staying ahead of the R&D curve is critically important to keeping our Nation safe and secure. As the principal Federal sponsor of long-term nuclear nonproliferation-related research and development, NNSA focuses its R&D investments on leading-edge, early stage basic and applied R&D programs, including testing and evaluation, which lead to prototype development and improvements in nuclear detection and characterization systems. By concentrating on these key R&D components, NNSA helps strengthen the U.S. response to current and projected WMD threats.

These critical steps are only part of a comprehensive nonproliferation program. In addition to these efforts to secure, detect, and interdict weapons-usable materials, we also work to eliminate weapons-usable material. Indeed, there remains enough fissile material in the world today for tens of thousands of weapons. An integral part of our strategy, therefore, has been to encourage other states to stop producing materials for nuclear weapons, as the United States itself did many years ago. For example, Russia still produces weapons-grade plutonium, not because it needs it for weapons, but because the reactors that produce it also supply heat and electricity to local communities. We are helping to replace these non-commercial style reactors with fossil fuel plants, thereby eliminating their production of plutonium. We had the goal this year of shutting down two of the remaining three plutonium-producing reactors in Russia permanently. Last week we announced the elimination of the production of nuclear weapons-grade plutonium at the Seversk site. This is a historic nonproliferation milestone. The third at Zheleznogorsk will shut down in December 2010, if not, as we hope, sooner.

As previously indicated, there are a number of effective synergies between NNSA's defense activities and our nuclear nonproliferation objectives. For example, we are disposing of the substantial quantities of surplus weapons grade HEU that has resulted from the thousands of warheads we have dismantled, by downblending it to lower enrichment levels suitable for use in commercial reactors. This past February marked the 15th anniversary of the U.S.-Russia HEU Purchase Agreement—one of the most successful nonproliferation programs ever conceived. Under the HEU Purchase Agreement, over 322 metric tons of uranium from Russia's dismantled nuclear weapons—enough material for more than 12,000 nuclear weapons—has been downblended for use in commercial power reactors in the United States. Nuclear power generates 20 percent of all American electricity, and half of that is generated by fuel derived from Russian HEU. As a result, one-tenth of U.S. electricity is made possible by material removed from former Soviet nuclear weapons.

Similarly, disposition of surplus U.S. HEU through downblending to low-enriched uranium has been proceeding for nearly a decade and progress is continuing. As of the end of December 2007, approximately 92 metric tons of HEU, equivalent to over 3,500 nuclear weapons, have been downblended and converted to power or research reactor fuel, and an additional 13 metric tons have been delivered to disposition facilities for near-term downblending. This HEU disposition progress has already contributed substantially to nuclear material consolidation efforts in the Department of Energy complex, eliminating the necessity for high security storage at two sites, and greatly reducing it at several others.

In addition to the efforts on HEU, the United States and Russia have each committed to dispose of 34 metric tons of surplus weapon-grade plutonium. In November 2007, we signed a joint statement with Russia that represents a technically and financially credible plan to dispose of 34 metric tons of Russia's surplus plutonium in fast reactors. Under this approach, Russia will pay for the majority of costs and begin disposing of its surplus plutonium in the 2012 timeframe. Last year, the Department of Energy began construction of a Mixed Oxide Fuel Fabrication Facility at the Savannah River Site. The facility originally planned to dispose of 34 metric tons of surplus weapon-grade plutonium by converting it into mixed oxide (MOX) fuel to be irradiated in commercial nuclear reactors, producing electricity and rendering the plutonium undesirable for weapons use. Last September, at the IAEA General Conference in Vienna, Secretary Bodman announced that an additional 9 metric tons of plutonium, enough to make approximately 1,100 nuclear weapons would be removed from such use and eliminated by conversion to mixed oxide fuel.

The MOX facility is a critical component of the Department's surplus plutonium consolidation efforts and is essential to the goal of transforming the complex.

Our efforts at home are not enough, in and of themselves. We need cooperation from our international partners as well, and if we are to encourage responsible international actions, the United States must set the example. We have dramatically improved physical security of U.S. nuclear weapons and weapons-usable materials in the years since the September 11, attacks. We have made substantial reductions in our stockpile and made additional plutonium available for conversion into civilian reactor fuel. Additionally our Complex Transformation will further reduce the number of sites and locations where we store special nuclear materials, providing for improved security of these materials.

The risk of nuclear terrorism is not limited to the United States. The success of our efforts to deny access to nuclear weapons and material is very much dependent on whether our foreign partners similarly recognize the threat and help us to combat it. To this end, we undertake efforts to strengthen the nonproliferation regime and expand international nonproliferation efforts. We continue to provide technical and policy support to U.S. efforts within the nonproliferation regime, including support to the Nuclear Nonproliferation Treaty, the Nuclear Suppliers Group, the International Atomic Energy Agency and a wide range of U.S. diplomatic initiatives, including the efforts in North Korea. We also have strengthened international collaboration and dialogue on nonproliferation efforts, including developing an international mechanism through which seven countries have pledged some $45 million in contributions to our nonproliferation programs.

In July 2006, Presidents Bush and Putin announced the Global Initiative to Combat Nuclear Terrorism to strengthen cooperation worldwide on nuclear materials security and to prevent terrorist acts involving nuclear or radioactive substances. By the end of 2007, 64 nations had joined this Global Initiative, and a number of subject matter expert conferences and training activities have been conducted. Most recently in December 2007, representatives from 15 nations participated in Global Initiative to Combat Nuclear Terrorism Radiation Emergency Response workshop held in China by the NNSA. Paired with U.N. Security Council Resolution 1540 and working closely with our overseas partners, we now have both the legal mandate and the practical means necessary for concrete actions to secure nuclear material against the threat of diversion.

FISCAL YEAR 2009 BUDGET REQUEST PROGRAMMATIC DETAIL

The President's fiscal year 2009 budget request for NNSA totals $9.1 billion, a decrease of $35.0 million or 0.4 percent less than the fiscal year 2008 Consolidated Appropriations level. We are managing our program activities within a disciplined 5-year budget and planning envelope, and are successfully balancing the administration's high priority initiatives to reduce global nuclear danger as well as future planning for the Nation's nuclear weapons complex within an overall modest growth rate.

The NNSA budget justification contains information for 5 years as required by sec. 3253 of Public Law 106–065, the National Defense Authorization Act for Fiscal Year 2000. This section, entitled Future-Years Nuclear Security Program, requires the Administrator to submit to Congress each year the estimated expenditures necessary to support the programs, projects and activities of the NNSA for a 5-year fiscal period, in a level of detail comparable to that contained in the budget.

The fiscal year 2009–2020 13 Future Years Nuclear Security Program—FYNSP—projects $47.7 billion for NNSA programs though 2013. This is a decrease of about $2.3 billion over last year's projections. The fiscal year 2009 request is slightly smaller than last year's projection; however, the outyears increase starting in fiscal year 2010.

Defense Nuclear Nonproliferation Budget Summary

The Defense Nuclear Nonproliferation Program mission is to detect, prevent, and reverse the proliferation of weapons of mass destruction (WMD). Our nonproliferation programs address the threat that hostile nations or terrorist groups may acquire weapons-usable material, equipment or technology, or WMD capabilities. The administration's fiscal year 2009 request totals $1.247 billion for this program, reflecting a return to measured growth from the fiscal year 2007 appropriation level, but a decrease from the final fiscal year 2008 appropriation, which included a large Congressional plus-up over the President's request. The decrease also reflects Congressional action to transfer funding for some construction projects to other budget accounts, and the anticipated decrease of other major construction activities under the Elimination of Weapons Grade Plutonium Production Program in 2008, following completion of major elements of that program's work scope.

GLOBAL THREAT REDUCTION INITIATIVE

The fiscal year 2009 request of $220 million for the Global Threat Reduction Initiative (GTRI) is an increase of $27 million over the fiscal year 2008 operating plan. This funding will support GTRI's mission to reduce and protect vulnerable nuclear and radiological materials at civilian sites worldwide by converting reactors from HEU to LEU, removing excess nuclear/radiological materials, and protecting high priority nuclear/radiological material from theft and sabotage. Specific increases in the GTRI budget reflect an acceleration of (1) Bratislava efforts to repatriate Russian-origin HEU and convert HEU reactors to LEU; (2) efforts to develop a new ultra-high density LEU fuel needed to convert 28 high performance reactors around the world; (3) the removal of nuclear materials not covered under other existing programs; and (4) security upgrades on high priority HEU and radioactive materials located in the United States.

INTERNATIONAL MATERIAL PROTECTION AND COOPERATION

NNSA's International Material Protection and Cooperation fiscal year 2009 budget request of $429.7 million represents a decrease of $194.8 million from the fiscal year 2008 appropriated level. This large decrease reflects: (1) the anticipated completion of major elements of nuclear security upgrade work performed under the Bratislava Agreement; (2) completion of the majority of nuclear security upgrades in countries outside of Russia; and (3) large Congressional increases for this work over the President's fiscal year 2008 budget request. During the past 15 years, the Material Protection Control and Accounting (MPC&A) program has secured 85 percent of Russian nuclear weapons sites of concern, and work is underway to complete this work by the end of fiscal year 2008. To maintain this progress, MPC&A and Rosatom have developed a new joint plan identifying elements required for Rosatom's long-term sustainability of U.S.-installed security enhancements. In fiscal year 2009, international material protection activities will focus on the continued enhancement of Russia's capability to operate and maintain U.S.-funded security improvements in the long-term. The MPC&A Program is also focused on reducing proliferation risks by converting Russian HEU to LEU and by consolidating weapons-usable nuclear material into fewer, more secure locations. In fiscal year 2009, we will eliminate an additional 1.4 metric tons of Russian HEU for a cumulative total of 12.4 metric tons.

Our Second Line of Defense (SLD) Program installs radiation detection equipment at key transit and border crossings, airports and major seaports to deter, detect and interdict illicit trafficking in nuclear and radioactive materials. The SLD Core Program, which installs radiation detection equipment at borders, airports, and strategic feeder ports, has equipped 117 sites in Russia. The United States and Russia have agreed to jointly fund work to equip all of Russia's border crossings with radiation detection equipment by the end of 2011, 6 years ahead of schedule. The Core Program has also equipped 33 sites outside of Russia with radiation detection systems. The SLD Megaports Initiative has deployed radiation detection and cargo scanning equipment at 12 ports to date in the Netherlands, Greece, Bahamas, Sri Lanka, Singapore, Spain, the Philippines, Belgium, Honduras, Pakistan, the United Kingdom, and Israel. Various stages of implementation are underway at ports in 16 other locations.

During fiscal year 2009, the SLD Core Program is planning to complete an additional 49 sites. The SLD Megaports Initiative plans to complete work at nine key ports in fiscal year 2009 in Israel, Jordan, Spain, Mexico, China, the United Arab Emirates, Saudi Arabia, Oman, and Taiwan. We will continue progress on separate ports in Spain and Mexico, and will initiate new work in fiscal year 2009 at ports in Argentina, Brazil, and Malaysia. The Megaports program is also pursuing outreach activities in northeastern Africa and other key regions of concern. Fiscal year 2009 funding will also support the procurement of Advanced Spectroscopic Portals (ASP) and mobile detection systems, including Mobile Radiation Detection & Identification Systems (MRDIS) and Radiation Detection Straddle Carriers (RDSC). The Megaports Initiative also works closely with the U.S. Department of Homeland Security's Bureau of U.S. Customs and Border Protection (CBP) by making technical resources available to complement the Container

Security Initiative (CSI) and the Secure Freight Initiative (SFI) at international ports. Under SFI, all U.S.-bound containers are being scanned at three ports in Pakistan, Honduras, and the United Kingdom, fulfilling the 2006 SAFE Ports Act to couple non-intrusive imaging equipment and radiation detection equipment in order to demonstrate the effectiveness of 100 percent scanning of U.S.-bound containers. SLD Megaports has also partnered with CBP at four, limited capacity SFI locations in Hong Kong, Oman, Korea, and Singapore. The Megaports Initiative is

installing radiation detection equipment at all CSI ports and has worked with CBP to pursue, where feasible, joint agreements with host nations to implement both the Megaports and SFI programs.

NONPROLIFERATION AND INTERNATIONAL SECURITY

The Nonproliferation and International Security (NIS) mission is to prevent, mitigate, and reverse WMD proliferation by providing policy and technical support to strengthen international nonproliferation regimes, institutions, and arrangements; promote foreign compliance with nonproliferation norms and commitments; and eliminate or reduce proliferation programs and stockpiles. Major NIS strategic priorities in fiscal year 2009 include supporting the safe and secure expansion of nuclear energy use and disablement, dismantlement, and verification of nuclear programs in North Korea. NIS will also support the Next Generation Safeguards Initiative (NGSI) to strengthen international safeguards, revitalize the U.S. technical and human resource base that supports them, and develop the tools, approaches, and authorities needed by the International Atomic Energy Agency to fulfill its mandate far into the future.

In fiscal year 2009, NIS also will confirm the permanent elimination from the Russian weapons stockpile of 30 metric tons of HEU; control the export of items and technology useful for WMD programs; continue an augmented export control cooperation program involving emerging suppliers and high-traffic transit states; break up proliferation networks and improve multilateral export control guidelines; develop and implement policy in support of global nonproliferation regimes; train 2,500 international and domestic experts in nonproliferation; provide technical expertise to the USG to support various WMD interdiction activities; develop and implement transparency measures to ensure that nuclear materials are secure; transition 300 Russian and FSU WMD experts to long-term private sector jobs; and make the preparations necessary for the USG's $50 million contribution to the International Atomic Energy Agency for the establishment of the International Nuclear Fuel Bank—an international effort to establish a back-up nuclear fuel supply for peaceful uses.

ELIMINATION OF WEAPONS GRADE PLUTONIUM PRODUCTION

Turning to programs that focus on halting the production of nuclear materials, the Elimination of Weapons Grade Plutonium Production (EWGPP) Program is working towards completing the permanent shutdown of the three remaining weapons-grade plutonium production reactors in Seversk and Zheleznogorsk, Russia. The fiscal year 2009 budget request of $141 million reflects a decrease of $38 million from the fiscal year 2008 level due to the successful shutdown at Seversk last week. The budget profile provides the funding required to replace the heat and electricity these reactors would otherwise supply to local communities with energy generated by fossil fuel, permitting the Russians to permanently shut down these reactors. The reactor at Zheleznogorsk will be shut down by December 2010, if not sooner. This construction activity thus leads to the elimination of more than 1 metric ton of weapons-grade plutonium production per year.

FISSILE MATERIALS DISPOSITION

The Fissile Materials Disposition program request for fiscal year 2009 is $41.8 million. The program retains three principal elements: efforts to dispose of U.S. highly enriched uranium (HEU) declared surplus to defense needs primarily by down-blending it into low enriched uranium; technical analyses and support to negotiations involving the United States, Russia, and the International Atomic Energy Agency (IAEA) on monitoring and inspection procedures under the 2000 U.S.-Russia plutonium disposition agreement; and limited support for the early disposition of Russia's plutonium in that country's BN–600 fast reactor including U.S. technical support for work in Russia for disposition of Russian weapon-grade plutonium in fast reactors generally.

The fiscal year 2008 Consolidated Appropriations Act (Public Law 110–161) appropriated funding for the Mixed Oxide Fuel (MOX) Fabrication Facility Project in South Carolina in the Department of Energy's Office of Nuclear Energy account and funding for the related Pit Disassembly and Conversion Facility/Waste Solidification Building projects in the NNSA Weapons Activities account. These projects remain important components of the Nation's nuclear nonproliferation efforts. In total, the funding commitment to the Department of Energy's nonproliferation activities is $1.853 billion in 2009. The MOX project is a key component of the U.S. strategy for plutonium disposition. It is the centerpiece of a comprehensive approach for disposing of surplus weapons-usable plutonium by fabricating it into mixed-oxide fuel

for irradiation in existing nuclear reactors. This meets key national security and nonproliferation objectives by converting the plutonium into forms not readily usable for weapons and supports efforts to consolidate nuclear materials throughout the weapons complex.

In addition to its role in the disposition of excess nuclear materials at home, the U.S. views the MOX project as a key component of U.S. global nuclear nonproliferation efforts in which fissile material disposition is the final step in a balanced nuclear nonproliferation strategy aimed at employing measures necessary to detect, secure, and dispose of dangerous nuclear material. In 2007, the U.S. and Russian governments agreed on a framework for a technically and financially credible Russian plutonium disposition program based on the irradiation of plutonium as MOX fuel in fast reactors. When all required steps have taken for implementation, it will enable the United States and Russia to meet their commitments under a 2000 agreement to dispose of a combined total of 68 metric tons of surplus weapon-grade plutonium—enough material for approximately over 8,000 nuclear weapons.

This budget request also seeks funding to dispose of surplus U.S. HEU, including downblending 17.4 metric tons of HEU to establish the Reliable Fuel Supply, which would be available to countries with good nonproliferation credentials that face a disruption in supply that cannot be corrected through normal commercial means. This initiative marks an important first step creating a reliable nuclear fuel mechanism that could provide countries a strong incentive to refrain from acquiring their own enrichment and reprocessing capabilities.

NONPROLIFERATION AND VERIFICATION RESEARCH AND DEVELOPMENT

The fiscal year 2009 budget requests $275 million for Nonproliferation and Verification Research and Development. This effort encompasses two primary programs that make unique contributions to national security by conducting research and development into new technical capabilities to detect illicit foreign production, diversion or detonation of nuclear materials. The Proliferation Detection Program conducts research across a spectrum of technical disciplines that supports the NNSA mission, national and homeland security agencies and the counterterrorism community. Specifically, this program develops the tools, technologies, techniques, and expertise required for the identification, location, and analysis of facilities, materials, and processes of undeclared and proliferant nuclear programs. The Nuclear Detonation Detection Program produces the Nation's space-based operational sensors that monitor the entire planet to detect and report surface, atmospheric, or space nuclear detonations. This program also produces and updates regional geophysical datasets that enable and enhance operation of the Nation's seismic nuclear detonation detection network.

APPROPRIATION AND PROGRAM SUMMARY TABLES—OUT-YEAR APPROPRIATION SUMMARY TABLES—FISCAL YEAR 2009 BUDGET TABLES

NATIONAL NUCLEAR SECURITY ADMINISTRATION—OVERVIEW

[In thousands of dollars]

	Fiscal Year 2007 Current Appropriations	Fiscal Year 2008 Original Appropriation	Fiscal Year 2008 Adjustments	Fiscal Year 2008 Current Appropriation	Fiscal Year 2009 Request
National Nuclear Security Administration:					
Office of the Administrator	358,291	405,987	−3,850	402,137	404,081
Weapons Activities	6,258,583	6,355,633	−58,167	6,297,466	6,618,079
Defense Nuclear Nonproliferation	1,824,202	1,673,275	−15,279	1,657,996	1,247,048
Naval Reactors	781,800	781,800	−7,114	774,686	828,054
Total, NNSA	9,222,876	9,216,695	−84,410	9,132,285	9,097,262
Rescission of Prior Year Balances		−322,000		−322,000	
Total, NNSA (OMB Scoring)	9,222,876	8,894,695	−84,410	8,810,285	9,097,262

OUT-YEAR APPROPRIATION SUMMARY—NNSA FUTURE-YEARS NUCLEAR SECURITY PROGRAM (FYNSP)

[In thousands of dollars]

	Fiscal Year 2009	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013
NNSA:					
Office of the Administrator	404,081	419,848	436,266	451,771	469,173
Weapons Activities	6,618,079	6,985,695	7,197,844	7,286,912	7,460,318
Defense Nuclear Nonproliferation	1,247,048	1,082,680	1,076,578	1,111,337	1,133,982
Naval Reactors	828,054	848,641	869,755	880,418	899,838
Total, NNSA	9,097,262	9,336,864	9,580,443	9,730,438	9,963,311

DEFENSE NUCLEAR NONPROLIFERATION

[In thousands of dollars]

Funding Profile by Subprogram	Fiscal Year 2007 Current Appropriation	Fiscal Year 2008 Original Appropriation	Fiscal Year 2008 Adjustments	Fiscal Year 2008 Current Appropriation	Fiscal Year 2009 Request
Defense Nuclear Nonproliferation:					
Nonproliferation and Verification Research and Development	265,197	390,752	−3,556	387,196	275,091
Nonproliferation and International Security	128,911	151,370	−1,377	149,993	140,467
International Nuclear Materials Protection and Cooperation	597,646	630,217	−5,735	624,482	429,694
Elimination of Weapons-Grade Plutonium Production	231,152	181,593	−1,653	179,940	141,299
Fissile Materials Disposition	470,062	66,843	−608	66,235	41,774
Global Threat Reduction Initiative	131,234	195,000	−1,775	193,225	219,641
International Nuclear Fuel Bank	.....	50,000	−455	49,545	.....
Congressional Directed Projects	.....	7,500	−120	7,380	.....
Subtotal, Defense Nuclear Nonproliferation	1,824,202	1,673,275	−15,279	1,657,996	1,247,966
Use of Prior Year Balances	.....	.....	.....	.....	−918
Total, Defense Nuclear Nonproliferation	1,824,202	1,673,275	−15,279	1,657,996	1,247,048
Rescission of Prior Year Balances	.....	−322,000	.....	−322,000	.....
Total, Defense Nuclear Nonproliferation (OMB Scoring)	1,824,202	1,351,275	−15,279	1,335,996	1,247,048

NOTES: The fiscal year 2007 Current Appropriation column includes additions for international contributions to the Elimination of Weapons-Grade Plutonium Production Program in the amount of $5,397,964; to the International Nuclear Materials Protection and Cooperation Program in the amount of $4,916,044 and to the Global Threat Reduction Initiative Program in the amount of $1,738,800. Fiscal year 2008 adjustments reflect a rescission of $15,279,000 as cited in the fiscal year 2008 Consolidated Appropriations Act (Public Law 110–161).

PUBLIC LAW AUTHORIZATION

Fiscal Year 2008 Consolidated Appropriations Act (Public Law 110–161)
National Nuclear Security Administration Act, (Public Law 106–65), as Amended

OUT-YEAR FUNDING PROFILE BY SUBPROGRAM

[In thousands of dollars]

	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013
Defense Nuclear Nonproliferation:				
Nonproliferation and Verification Research and Development	318,620	334,182	343,397	351,098
Nonproliferation and International Security	151,052	158,711	171,108	175,368
International Nuclear Materials Protection and Cooperation	400,511	394,626	395,225	404,064
Elimination of Weapons Grade Plutonium Production	24,507	.....	.....	.....
Fissile Materials Disposition	37,691	27,985	28,435	26,000
Global Threat Reduction Initiative	150,299	161,074	173,172	177,452
Total, Defense Nuclear Nonproliferation	1,082,680	1,076,578	1,111,337	1,133,982

Senator DORGAN. Mr. Tobey, thank you very much. I did not indicate, and I should have at the outset, that we appreciate the aggressive initiatives you have undertaken. You have been able, when initiatives are presented, to move very quickly and be aggressive in those, and we appreciate that.

I want to ask a few questions and then call on my colleagues to inquire.

In your statement, Administrator Tobey, you say the possibility that rogue states or terrorists might acquire nuclear and other weapons of mass destruction and their related technologies, equipment, and expertise poses one of the most serious threats to the United States and international security. You say the continued pursuit of nuclear weapons by terrorists and states of concern underscores the urgency of NNSA's efforts to secure vulnerable weapons, et cetera.

First of all, I agree with that. I think there is an unbelievable danger out there in this world where a lot of rogue states and others wish to acquire nuclear weapons, and there is a lot of danger of someone acquiring one. You make the point that in order to do so you have got to have access to fissile material.

The urgency expressed in this paragraph I think is at odds with the budget request by the administration. And let me ask the question specifically. You will be spending less money this coming year than you did this current year if we agree with the President's budget request, substantially less money, frankly, hundreds of millions of dollars. And yet, you describe to us the urgency of this mission.

Now, I understand you come here as a requirement to support the President's request, but is there not a disconnect here with respect to the urgency and the request for less funding?

Mr. TOBEY. Mr. Chairman, I guess I would note, to some extent, some context which you actually noted at the start of your statement.

First of all, since September 11, our budget has roughly doubled for nonproliferation work. Given that initial ramp-up, which was quite steep and allowed us to accelerate our efforts, we have continued to try and put the budget on a generally upward slope, despite the fact that some of our efforts are actually shutting down. They are coming to completion because our work is done.

As you noted, if in fact you take into account what, as you also said was a complicated situation, whereby last year's congressional action actually took money that had been previously appropriated to our funds and took it away from a nonproliferation program, the Fissile Material Disposition program, it appeared to plus-up our budget when actually what it did was take money that had already been given to us and reprogram it for a different purpose.

If you take that into account, and the fact that money requested for the elimination of weapons-grade plutonium production is going down because our work is being completed as we shut down these reactors, and then also take out the one-time appropriation for the $50 million for the IAEA nuclear fuel bank, our request is actually about flat with last year. That flat request I think does not reflect an indifference to the urgency of our work. I think it actually allows us to accelerate our work in our priority areas even as our work is coming to completion in areas like the elimination of weapons-grade plutonium production and the Bratislava Initiative.

Senator DORGAN. Mr. Tobey, that is a very deft answer. But I look at the proposal for future year appropriations—and it is true we had a jump after 9/11, but as I look at 2010, 2011, 2012, and 2013, the proposal here is essentially flat-funding. In fact, from 2009 to 2010, there would be a reduction; 2010 to 2011, a reduction. And my only point is that if there is urgency here, I do not think that funding request by the President squares with the urgency.

I note that Dr. Hecker and Dr. Bunn both point out in their written testimony that since the early to mid-1990s, the investment by DOE in nonproliferation safeguards, security technology experts, facilities, and so on has declined.

So this is not your budget. You are here to support the budget that you have been sent up here to support. But as one member of this subcommittee, I observe that I think there is not much that we do at this moment in the history of this country and what we face in the world than to attempt to stop the proliferation of nuclear weapons, keep them out of the hands of rogue nations and terrorists—there is not much more important than that because the detonation of one nuclear weapon in a major city anywhere in this world will have cataclysmic effects on life on this planet. So I just make that point that I think there is a disconnect here between the urgency and the funding.

A quick question, in your testimony, you referenced your office's work in overseeing the disablement and dismantlement of North Korea's nuclear weapons program. You mentioned the need for a legislative waiver of the Glenn Amendment restrictions that exist, as well as more substantial funding for that. Can you explain the Glenn Amendment restriction to us and your need for a waiver? And when must you have the waiver in place?

Mr. TOBEY. Sure. The Glenn Amendment prevents us from spending money in states that have conducted a nuclear test after a certain date. So, therefore, we are restricted from spending our funds to oversee the dismantlement or disablement of North Korean nuclear facilities.

We have been able to undertake that work through funding from the State Department, which does not have such restrictions. Be-

cause our DOE personnel have the expertise to oversee that, the State Department has essentially contracted with us to do that. But those funds are quite limited relative to the actual costs that would be necessary with the disablement and dismantlement of the North Korean nuclear facilities.

I must admit that it is somewhat uncertain what the exact time lines would be for that work. As you probably know, we have been waiting now for a period of months for North Korea's declaration, which I think would be a signal that we were actually going to move ahead. And as a consequence, we have not submitted, within our budget, those numbers because I could not guarantee that we would spend them.

What I can tell you is that our estimate, if we were to move ahead as fast as we could with disablement, in fiscal year 2008, our requirements would be roughly $50 million, and in fiscal year 2009, it would be about $360 million.

Now, I think it is also an open question as to exactly how those costs might be borne, and I would expect that we would be interested in seeing that perhaps some of the other of the six parties would be willing to pay for some of those costs. But I wanted to lay out, at least as we see it, what the objective facts are.

Senator DORGAN. I would be interested if you could give us some analysis. When you say $360 million, how does that break down? I do not need it at the moment, but if you would just submit it to us, I would appreciate that.

Mr. TOBEY. Okay.

[The information follows:]

DPRK FUNDING BREAKDOWN

[In millions of dollars]

	Fiscal Year 2008	Fiscal Year 2009
By Office:		
NA–21	30	260
NA–24	20	100
Total	50	360
By Function:		
Material Packaging Preparation	30	95
Material Packaging and Transport		165
Disablement and Dismantlement	12	43
Verification	4.5	44.5
Health, Safety, and the IAEA	3.5	12.5

Senator DORGAN. Senator Domenici?

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

Mr. Tobey, my memory slips me. What are the countries that are involved in the North Korean action?

Mr. TOBEY. The Six Parties are North Korea, China, Russia, Japan, the Republic of Korea, and the United States.

Senator DOMENICI. Well, there is not any question with this Senator that we should not be bearing the entire monetary costs. It looks to me like Japan and even South Korea—they are not party to it. Are they? Is South Korea a party to it? Is South Korea one of the six countries?

Mr. TOBEY. Yes.

Senator DOMENICI. They can well afford and it is very important to them. So I hope we hear from those in the position of working on this that the United States is at least trying in these difficult budget days to ask others to pay some of it.

Despite occasional problems, the dismantling of the North Korean plutonium production infrastructure continues under these six party talks. If a breakthrough occurred and all the expected facilities decommissioned and materials were removed and verification activities were implemented, is that a definition of the project that would cost that $300 million-plus?

Mr. TOBEY. No. That would apply simply to the disablement of the facilities at Yongbyon. There may well be other facilities that would require dismantlement.

Senator DOMENICI. And that would just be more money.

Mr. TOBEY. Correct.

Senator DOMENICI. You would assume the same kind of imposition on others of partial costs would be the order of the day.

Mr. TOBEY. We have undertaken this diplomatic effort as a partnership with other countries. It would make sense to me that other countries would bear a part of those costs. And certainly that has been the case with respect to, for example, shipments of heavy fuel oil that have gone to North Korea.

Senator DOMENICI. Last week the Intelligence Committee received briefings, and some of us received them also as members of Armed Services or otherwise on North Korea's nuclear assistance to Syria. Apparently North Korea was helping Syria build a clandestine nuclear reactor until Israel destroyed the facility in the arid desert. Have we obtained any assurance from North Korea that it will stop exporting nuclear technology?

Mr. TOBEY. I am unaware of an assurance at this point. Obviously, that would be a priority of ours within the talks.

Senator DOMENICI. Well, it seems to me kind of strange that we would be thinking that their talks with us were reliable, while at the same time they were reaching the spirit of everything by helping Syria directly. Does this create any kind of concern on your part as an American representative that that is going on?

Mr. TOBEY. Absolutely, sir.

Senator DOMENICI. And nothing can be done about it I assume.

Mr. TOBEY. I think it is a matter of very serious concern, and I think it is an issue that will need to be resolved before we can be confident that the North Korean nuclear matter has been resolved.

Senator DOMENICI. Did North Korea violate any agreements in providing this assistance that you know of?

Mr. TOBEY. I should caveat this with the notion that I am not a lawyer, and we are only beginning to look at some of these issues. But my understanding is that North Korea has withdrawn from the NPT. What may have gone on in Syria could well be a legal issue with respect to the NPT and Syria, and there are, of course, United Nations Security Council resolutions that were enacted with respect to North Korea in the wake of their nuclear test, essentially prohibiting certain forms of trade to include nuclear trade.

Senator DOMENICI. I am going to leave that area and ask the chairman—I have some questions regarding Russia's participation and how much they should pay these days.

Would you like to hear from some other Senators first? That would be all right with me.

Senator DORGAN. We will come back.

Senator Feinstein?

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

Mr. Tobey, you and I both heard Dr. Hecker speak last evening at the Nuclear Threat Initiative where he pointed out in his five trips to look at the reactors in North Korea, that Yongbyon had been effectively disabled and two other reactors dismantled. He also indicated that the North Koreans had sent several signals through him to us that they were interested in cooperating.

How do you assess the level of North Korean cooperation at this point with the remaining dismantlement issue?

Mr. TOBEY. In terms of the narrow question of disablement which, as you have noted, there are DOE people at Yongbyon overseeing, the cooperation has generally been good, but has slowed recently from what it could be. But Yongbyon, of course, is not the whole story. The North Korean declaration would necessarily deal with facilities beyond Yongbyon, facilities and activities beyond what goes on at Yongbyon. And so far we have not seen a lot of progress in that regard.

Senator FEINSTEIN. Are you, in essence, saying that they are not cooperative with respect to—I do not know if you want to put forward in this setting what the remaining complications are, but if you do, I think it would be useful for the committee to hear them.

Mr. TOBEY. I think it is yet to be seen. I think we will need to see a North Korean declaration to know how serious they are about their September 19, 2005 commitment to abandon all their nuclear weapons and existing nuclear programs.

Senator FEINSTEIN. So you are saying then that there are other facilities in addition to these that are up and functioning, in other words, with fissile materials?

Mr. TOBEY. Well, I am inferring, to some extent. We know, for example, that they conducted a nuclear test. That test was not conducted at the Yongbyon site. They have, I think, talked in the past about uranium production facilities, mining, et cetera, which also would not be at the Yongbyon site. Clearly, there were some efforts at weaponization, which likely were not at the Yongbyon site.

Senator FEINSTEIN. Thank you very much.

Let me go to the International Atomic Energy Agency. I strongly support the IAEA. I support its mission. I think it is important. I think in the world of the future it is only going to grow more important.

My question is why are we behind on paying our dues?

Mr. TOBEY. Well, we are a strong supporter of the IAEA as well, and as you probably know, we are the largest single contributor to the IAEA. The dues, I think, are largely paid from—although there are some DOE funds that go to the IAEA—the dues are largely paid by the State Department.

Senator FEINSTEIN. So do you know why we are behind?

Mr. TOBEY. I am sorry, Senator. I do not know.

Senator FEINSTEIN. Thank you.

The third question—I still have some time—is Pakistan. Pakistan possesses nuclear weapons. It has an unstable government and a dramatic rise of Islamic fundamentalism. Many people have called it Ground Zero as far as terror is concerned. If you ask some of us what is the most threatening nuclear situation, we would have to say it is Pakistan in terms of those nuclear facilities.

The question I have is what steps can we take to confront this challenge to see that the weapons remain secure and to actually improve the situation in terms of stability of government and therefore stability of the nuclear weapons program.

Mr. TOBEY. We have extended an invitation to Pakistan to join the Global Initiative to Combat Nuclear Terrorism, which they have done. They have participated in a Global Initiative exercise in China. That initiative is aimed at drawing together nations to share best practices, essentially throughout the possible prevention and response cycle for, for example, security practices to prevent the loss of fissile material, emergency response actions to try and recover it, customs and border guards, et cetera. And we are hopeful that Pakistan will avail itself of this opportunity to ensure that they have the best practices possible.

I regard their military as both professional and committed to nuclear security.

Senator FEINSTEIN. My time is up. Thank you very much, Mr. Chairman.

Senator DORGAN. Senator Allard?

Senator ALLARD. Thank you, Mr. Chairman. I would like to start off with a question on the nuclear detonation detection program. We rely heavily on our space assets to implement that program, and we are getting a greater concern, I think, from a number of agencies about the risk that our space assets are being placed in, particularly in light of the fact that China had demonstrated their ability to knock out a satellite. They did their own.

What kind of effort are you making sure to try and protect those assets that we rely so much on our nuclear detonation?

Mr. TOBEY. Senator, as you might imagine, the details of how we might protect such systems pretty quickly get into classified material.

Senator ALLARD. What I need to know is; are you working with other agencies to look at that problem?

Mr. TOBEY. Yes, sir. I would note that diversifying, if you will, proliferating our ability to detect such detonations is an important response. If we have redundancy in our ability, it makes it more difficult for another nation to eliminate that capability.

Senator ALLARD. I just wanted to have some assurance that you were looking at this risk.

Mr. TOBEY. We regard this as a very high priority.

Senator ALLARD. I realize that the details of it would be something that we would not want to talk about in a setting like this, but just your assurance that you have looked at it. I think it does not hurt to let people know that we have some vulnerability out there and they do affect our ability to determine whether other countries are keeping their agreement as far as nuclear weapons agreements are concerned at least.

My understanding is that the language on the Glenn amendment—attempts are being made to put that in the supplemental bill. Is that correct?

Mr. TOBEY. That is my understanding, Senator.

Senator ALLARD. And why are we selecting the supplemental bill as opposed to the regular appropriation bill? Does it have to do with timing or does it have to do with sort of an aversion to the regular appropriation process?

Mr. TOBEY. I confess that that decision was not mine. I am not an expert in legislative procedure. I think it was done in consultation with people on the Hill. I think that was chosen as the most immediate and likely vehicle to pass.

Senator ALLARD. It is important that we deal with this language, the sooner, the better.

Mr. TOBEY. I think in terms of minimizing risk, we would not be able to go forward if there is not diplomatic progress, so the sooner, the better. But I cannot say to you that tomorrow we will be able to do all that we would wish to do in North Korea. It is difficult to predict.

Senator ALLARD. Now, let us just assume that we grant the waiver in a supplemental appropriation bill, and phase 3 work begins as quickly as possible. When would you anticipate completion of phase 3 in a best case scenario?

Mr. TOBEY. Completion of phase 3 would probably be a period of years. Even the completion of phase 2 would——

Senator ALLARD. Five years, 10 years, decades?

Mr. TOBEY. I would say about 5 years would be fair. Much depends on the level of cooperation with North Korea, and it is difficult to predict.

Senator ALLARD. Yes, I understand.

Mr. TOBEY. The canning campaign and even the work that we have undertaken now has varied significantly according to the level of cooperation that the North Koreans have—but even the current phase, in terms of the fuel that is in the reactor now and dealing with that, would likely take the balance of this year.

Senator ALLARD. Now, I would like to move on to the fissile materials deposition. That is irradiation of plutonium. It was in the 2000 agreement. How far along are we in reaching the 2000 agreement, and what percentage is the United States responsible for disposing of? Can you share that with us?

Mr. TOBEY. As you know, I am sure, sir, the 2000 Plutonium Management and Disposition Agreement provided for the disposition of 34 metric tons each by the United States and Russia.

Senator ALLARD. Right.

Mr. TOBEY. Frankly, not a lot of progress had been made up until a couple of years ago. Neither the United States nor Russia seemed to have set on a disposition path.

About a year ago, some Members of Congress had asked us to undertake three activities. One, make sure that our baseline was credible and defensible for the facility that we are building in South Carolina. I believe that we have done that. We have set a baseline. We brought in the preconstruction activities under that baseline and slightly ahead of time.

Senator ALLARD. This is the MOX-plus?

Mr. TOBEY. The MOX facility, exactly.

And we have significant contingency and reserves. 90 percent of the design is complete, which is very, very high for a facility of this size at this stage of construction. Construction began on August 1. So it is well underway. I think our path is pretty clear.

The second thing that I understood Congress to ask us to do was to look at additional missions for the facility. We found three potential additional missions, and we are in a position to execute those missions if there is a decision to do so. We do not need to make that decision today, even under optimal circumstances. But they would add substantially to the mission of the facility, disposing of perhaps 50 percent, maybe even more, additional material; making it a much more cost effective project.

And then third, they asked us to try and get the Russian program in order. Secretary Bodman and Rosatom Director Kiriyenko signed a joint statement several months ago that provides for what we believe is a technically and financially credible path for the Russian disposition of plutonium, using fast reactors. I think it is key to understand that the Russian path is consistent with their own energy plans and, therefore, is more likely to be pursued, not out of a sense of obligation or because we blindly trust what they are doing, but out of Russian self-interest.

Senator ALLARD. Thank you. My time is expired.

Senator DORGAN. Senator Domenici, do you have some additional questions about Russia?

Senator DOMENICI. Yes, I do.

I did not understand your answer when you talked about additional work or missions for the MOX facility. What are you talking about?

Mr. TOBEY. The Department will use the U.S. MOX facility to dispose of at least 34 metric tons of surplus weapon-grade plutonium oxide, which includes both nuclear weapons pits and certain other non-pit plutonium metal and oxide material. As described in a technical report that the Department submitted to Congress in July 2007, the Department is also considering sending additional plutonium from nuclear weapons pits declared surplus to national security needs, and additional amounts of non-pit plutonium, pending further environmental and technical analysis and final decisions by the Department. Also, as described in the July 2007 technical report, the facility may provide an option to fabricate initial core loads for fast reactors to support the Global Nuclear Energy Partnership, depending on analysis and decisions which could optimally be made well into the future.

Senator DOMENICI. I am glad to hear that there are other missions, and we are very fortunate that we struck a deal with the Russians. Even though they did not live up to their side, it got us off our duff and we started the MOX program, about 25 years late or 30, but that is pretty good.

Let me ask you on the Russian assistance. Since 1992, the U.S. Government has spent nearly $10 billion on the Nunn-Lugar-Domenici program on efforts to improve controls on nuclear weapons materials and expertise. Most of it has been spent in Russia. As security upgrades are completed and material returned or eliminated, where does the program go from here?

Russia now has a budget surplus as a result of oil and gas exports. What is NNSA doing to try to see that Russia pays its share of the nonproliferation costs for securing its material? And I will ask Dr. Bunn some questions on that subject. Could you answer that part?

Mr. TOBEY. Certainly, sir, I will try. We have made clear to the Russians that Congress has directed that our work will end in 2012. So they are on fair warning that in 2012, U.S. nuclear material security efforts in Russia will end. And we expect them to sustain the efforts that we have put into place. As you noted, our investments have been substantial. NNSA's will be about $2 billion.

We have begun to compare with the Russians budgets for the first time, to my knowledge anyway. When I sat down with our Russian counterpart who works for the 12th GUMO, Lieutenant General Verkhovtsev, he told us about his budget request for sustaining nuclear material security upgrades. He assured us that he had gotten what he had requested. I think that level will have to go up if it is going to truly be sustained, but for the first time, we are beginning to compare our budgets so that as we draw down toward that 2012 mark, they recognize they will need to step up in order to ensure that the investment that we have made in nuclear security is sustained.

I would also note that we are making some progress on cost sharing in other ways, so for example, the agreement that we signed with them to accelerate radiation detectors at Russian border crossings provides for Russia bearing half the costs of those installations.

Senator DOMENICI. Well, I just would like—since you indicated I have been very active in this whole area—it is correct. I do want to express my thoughts even though I have only about 8 months left here. I believe that insisting that Russia pay the maximum amount as their share on these programs seems to me to be important if we are going to maintain the programs because I think with us having very unbalanced budgets, borrowing money in huge quantities to keep our Government going and Russia being very solvent, I think a couple of these programs would die on the floor of the Senate if somebody brought that subject up and said this is no longer fair. So I just urge that wherever we can, the Russians be asked to pay their share.

It was not the case when we started. We paid for all of it, the early programs that Sig Hecker is aware of, the cameras that were purchased for them and the facilities so they would have doors that were reliable instead of open, hanging things. You remember that? We paid for all that. And I guess that was right. It was probably good money spent.

Mr. TOBEY. Senator, I certainly agree with all of that, and we are working in that direction. I would note though that just because a Russian oil company is flush with cash—and they are—does not necessarily mean that nuclear institutes in the Urals are flush with cash. And we spend the money there because it is in our interest.

Senator DOMENICI. I understand.

Mr. TOBEY. I know you know this. I just wanted to make absolutely clear for others that we do this because it is in our interest that Russian nuclear weapons material be secured.

Senator DOMENICI. Well, there is no question it is in our interest. We know that. I have been a staunch advocate. Sometimes nobody objected. Sometimes they did not even ask a question on the floor about us using this money.

But I am just telling you what I think on the future, and I think the Russians understand. And I know they have budgets that come from the big central headquarters and they do not always get what they need, but that is really not an excuse for an adequate match and adequate payment because they would pay it from central headquarters if they knew we were not, if they were serious about nonproliferation.

Last year Congress approved an increase of $125 million above the request for nonproliferation and verification research and directed you to invest $20 million toward the building of a laboratory scientific capability. It appears that this direction has not been followed. How was the money spent and what long-term capability has NNSA invested in at the labs?

Mr. TOBEY. Sir, we have paid close attention to that direction, and I actually do have a list of investments. I have talked to your staff about this, and I admit that we had not provided the level of detail that would make this clear. But I brought with me today that level of detail, and I would be happy to provide it.

Senator DOMENICI. Will you please furnish it?

[The information follows:]

NONPROLIFERATION AND VERIFICATION R&D—FISCAL YEAR 2008—$133 MILLION PLUS-UP SPEND PLAN

—$25.0 million PNNL Area 300 (subject to 1 percent rescission)—spent on balance of construction (PSF) and completion of the Foundation/Steel contract.

—*$20.5 million.*—"an additional $20.5 million is provided for nuclear explosion monitoring" (subject to 1 percent rescission).

—*$5 million.*—"The Department is directed to conduct a competitive solicitation open to all Federal and non-Federal entities toward an integrated suite of research, technology development and demonstration areas including infrasound, hydro acoustics for ground based systems treaty monitoring activities. The competitive process should award not less than $5 million of the additional funding for nuclear explosion monitoring for research and development for ground-based treaty monitoring."

—*$2.5 million.*—For national laboratory seismic calibrations of threat regions and radionuclide system activities.

—*$2.0 million.*—Detonation forensics technology and related base science activities.

—*$11.0 million.*—Space-based nuclear detonation detection system R&D.

—$20.0 million "for the implementation of a sustained research and development capability in nuclear detection and nuclear materials security" (subject to 1 percent rescission).

—$10.0 million Radiation Detection R&D.

—$5.0 million Radiation Detection Materials R&D.

—$5.0 million Nuclear Material Security R&D (supporting nuclear safeguards (NA–24) and alternate source development (NA–21)).

—$60.0 million "in proliferation detection to expand research in critical research and development for high-risk, high return nuclear detection capabilities" (subject to 1 percent rescission).

—$5.0 million, Small Business Innovation Research taxes.

—$1.0 million, foreign nuclear weaponization detection R&D program, Goals, Objectives and Requirements and technology road-mapping process.

—$0.5 million Hf-178 project at request of SASC.

—$20 million University basic research.
—$9 million Testing and Evaluation, including upgrade of infrastructure at Nevada Test Site.
—$22.26 million, fully fund fiscal year 2008 projects/re-capitalization and equipment purchases at National Labs.
—$7.5 million Earmarks (subject to 1.6 percent rescission).
—$3.0 million GMU.
—$1.5 million New England Research.
—$2.0 million TAMU/NSSPI.
—$1.0 million ODIS.

Mr. TOBEY. Mr. Chairman, I would like to put in the record, for purposes of the committee's use, a chart on nonproliferation funding just because I want it to be noted that we moved the MOX program, which is about $500 million. We moved it from nonproliferation to another part of our budget, and that did change the congressional funding line substantially. But it does not mean we did less. It is just that we did not put MOX in the nonproliferation category. Maybe it belongs there but we took it out and put it somewhere else.

Senator DOMENICI. That is my last question. I will submit some in writing.

I want to thank you for all the work you have done, and I wish you well especially in the North Korean situation. I just cannot believe, with everything everyone knows about what they are doing and the fact that they are going to have to do something in their self-interest soon to get help—and I am sure of that. We have to keep the pressure on some way and get it done. Thank you.

Mr. TOBEY. Thank you, sir.

Senator DOMENICI. Thank you, Mr. Chairman.

Senator DORGAN. Senator Domenici, thank you.

I believe Senator Feinstein has one additional question?

Senator FEINSTEIN. One additional question.

Mr. Tobey, Dr. Bunn in his statement states a goal that I think is a very good one, and he says, "Our goal should be to remove all nuclear material from the world's most vulnerable sites and ensure effective security wherever material must remain within 4 years." Now, that is a quote, but I think it is a worthy goal.

How does this budget help us achieve that? I can ask this in writing too. What more needs to be done? What additional resources are necessary in what areas, and how would a verifiable global treaty ending production of nuclear materials for weapons complement this effort?

If you can answer any of it offhand, that would be great. I would like to send this to you in writing.

Mr. TOBEY. I would be happy to give you a fuller answer.

Senator FEINSTEIN. Good.

Mr. TOBEY. I can offer an answer to at least some of that.

First of all, as I mentioned earlier, we are mindful of the suggestions that Matt Bunn makes and we will certainly take a hard look at whether or not we can achieve that goal. I would argue that we actually do take significant steps toward it with this budget in several ways.

First of all, we continue our acceleration of the conversion of HEU reactors to LEU and the repatriation of fuel. I know that has been a concern of his, and over the last year or two, we have picked

up the pace, in part in response to some of the suggestions that he has made.

We also will continue our work to secure nuclear weapons material in Russia, completing the security upgrades under the Bratislava Initiative, and extending actually beyond that to a few sites that we have received since then. I regard that as, frankly, further evidence of success because it shows that the cooperation in Russia is even more extensive than it had been in the past.

And then we will also be working in other ways to minimize the use of highly enriched uranium. So, for example, we are looking at development of new fuels that will allow the conversion of the final set of reactors that will require a somewhat different type of fuel.

Senator FEINSTEIN. Thank you. That is very helpful. We will put it in writing too in any event. Thank you.

Thank you, Mr. Chairman.

Senator DORGAN. Administrator Tobey, thank you very much for your work and thank you for being with us today. We appreciate your testimony.

Mr. TOBEY. Thank you, Mr. Chairman.

Senator DORGAN. We look forward to continuing to work with you.

NONDEPARTMENTAL WITNESSES

STATEMENT OF DR. SIEGFRIED S. HECKER, CO-DIRECTOR, CENTER FOR INTERNATIONAL SECURITY AND COOPERATION, STANFORD UNIVERSITY

Senator DORGAN. Next we will ask our other two panelists to come forward, Dr. Matthew Bunn, who is a senior research associate at the Belfer Center for Science and International Affairs at the John K. Kennedy School of Government at Harvard University. He will be joined by Dr. Siegfried Hecker, the co-director of the Center for International Security and Cooperation at Stanford University.

This committee appreciates the work that both of you do, and we will ask you to proceed. Dr. Hecker, would you proceed first and then Dr. Bunn? And then we will inquire. As I indicated previously, your entire statement will be made a part of the permanent record and you may summarize.

Dr. HECKER. Thank you, Chairman Dorgan, Senator Domenici, Senator Feinstein, and Senator Allard. It is a great pleasure to be here, and thank you for inviting me to comment on the National Nuclear Security Administration's defense nuclear nonproliferation program and its 2009 budget.

Thank you for admitting my written statement. What I will do is to briefly summarize the three main points that I have in my statement.

But let me first say that my opinions have been shaped by 34 years at the Los Alamos National Laboratory and nearly 20 years of practicing nonproliferation with my feet on the ground in places like Russia, China, India, and North Korea and Kazakhstan. And I must say that much of this I have done with the strong encouragement and support of Senator Domenici, and I thank him for that over the years.

My first point is that—and this has really been covered in great detail by all of your statements, but just to reiterate my point—the proliferation of nuclear weapons and weapons capability is growing. Today, as you have indicated, we face the threat from North Korea, nuclear ambitions in Iran, the nuclear puzzle in Syria, and the recently nuclear-armed states in Pakistan and India. We have an improved but not satisfactory nuclear security situation in Russia and the other states of the former Soviet Union. The danger of nuclear terrorism is real.

But this is not a fight that the United States can win alone. We cannot simply push back the dangers beyond our own borders. It is imperative that we forge effective global partnerships to combat the threat of nuclear terrorism and the proliferation of nuclear weapons. And meeting these challenges requires diplomatic initiative and technical cooperation. The United States must lead in that

diplomacy and the DOE/NNSA must provide the technical leadership and capabilities.

The NNSA has done a commendable job in nuclear threat reduction and in combating nuclear proliferation. However, as you have also indicated, my own sense is that these activities are not commensurate with the magnitude of the urgency of the threat that we face today. So I very much agree with the sentiment that you have expressed.

A second point is cooperative threat reduction, as was already indicated, began with Nunn-Lugar, followed by Nunn-Lugar-Domenici legislation, directed at the aftermath of the breakup of the Soviet Union. We must stay engaged with Russia and the other states of the Soviet Union. Much progress has been made, but more needs to be done. We have to change the nature of the relationship to one in which Russia carries more of the burden. So, Senator Domenici, I very much agree with your comment. However, we must also make sure that we continue to have a seat at the table, and to do that requires some investments of our fund to do so to make certain that the Russians actually work in the areas that are also still very much in our common interests.

We should also expand the cooperative reduction programs aggressively to countries that require technical or financial assistance. The nuclear threat exists wherever nuclear materials exist. These materials cannot be eliminated, but they can be secured and they can be safeguarded. We should more strongly support the IAEA and provide support for countries, for example, that try to implement the U.N. Security Council Resolution 1540 to prevent nuclear terrorism.

But mostly, Mr. Chairman, in the spirit of what you said in your opening statement, as we look back in the future to what should we have done today, I look back to the early 1990s when we at the laboratory and the nonproliferation communities had an enormous number of ideas as to what to do when the Soviet Union breaks up. And similarly now, we must be equally creative in looking out and seeing what should we be doing. The ideas are out there, and it is a matter of making sure that we encourage them.

But we must also enlist the other nations such as China, India, and for that matter, Russia to build a strong global partnership to prevent proliferation and nuclear terrorism. India and China have, for the most part, sat on the sidelines while the United States has led this fight. And Russia has not engaged commensurate internationally with its nuclear status. And these efforts are particularly important today as we look at the potential renaissance of global nuclear power.

And the third point that I want to make is that the hallmark of all of these efforts of global cooperation must be technology partnership and an in-country presence. The DOE/NNSA has the principal expertise in this country in its laboratories across the complex. It should be applauded for sending its technical experts around the world, often in very difficult situations. And I must tell you just this past February, in fact, on Valentine's Day, I ran into the DOE contingent in North Korea in Yongbyon on a bitterly cold day. They were not out there for a party.

However, there are both structural reasons and budgetary shortfalls that we find today that that talent that we rely on is actually fading away. And the issue that I want to make sure that I put on the table is that, of course, budgets are extremely important, but budgets are not everything. We do not have in place today the necessary personnel recruitment. We have no longer the working environment in the laboratories or the pipeline of students from the universities to replenish the talent to do that job. So the working environment, the research environment of these laboratories is also crucial, along with appropriate budgetary support. So I strongly support the NNSA Next Generation Safeguards Initiative which is aimed at tackling this problem as to what does one do about the capabilities in our laboratory system.

Mr. Chairman, when I first visited Russia's secret cities in 1992, shortly after the fall of the Soviet Union, I feared that its collapse may trigger a nuclear catastrophe. The fact that nothing really terrible has happened in the intervening 16 years is in great part due to the DOE/NNSA programs that you are considering here today. And we must be just as innovative now, as I had indicated, and just as creative to deal with the threat that has changed dramatically since 1992.

PREPARED STATEMENT

Now, since I see my time is up, in my statement I also mention the implications of recent trips to North Korea. As has been pointed out, I have been there five times over the past 4 years, and I was also recently in India. But since I am out of time, I will leave those for your questions.

Thank you for your attention.

[The statement follows:]

PREPARED STATEMENT OF DR. SIEGFRIED S. HECKER

Thank you Chairman Dorgan, Senator Domenici and distinguished members of the committee for giving me the opportunity to comment on the National Nuclear Security Administration's Defense Nuclear Nonproliferation programs and 2009 budget request.

Today I would like to make three points:

—Nuclear threat reduction continues to be one of the highest U.S. national security priorities. Unfortunately, the threat has become more complex and challenging since threat reduction programs began in 1992 with Russia and other states of the former Soviet Union. Today, we face a nuclear threat in North Korea, nuclear ambitions in Iran, a nuclear puzzle in Syria, recently nuclear-armed states in Pakistan and India, and an improved, but not satisfactory, nuclear security situation in Russia and other states of the former Soviet Union. Moreover, global energy and climate forces have brought about a resurgence of interest in commercial nuclear power that places additional demands on the threat reduction agenda. I favor a significant expansion of DOE/NNSA's programs in these areas beyond the President's budget request.

—The greatest threats we face today are a breakdown of the nonproliferation regime and the possibility that terrorists may acquire nuclear weapons or fissile materials. To keep the most dangerous materials out of the hands of the world's most dangerous people requires a global network of nations that are committed to and capable of securing their own nuclear materials, preventing export, and are committed to nonproliferation. We must aggressively expand cooperative threat reduction programs to nations that require either technical or financial assistance and enlist those countries that have the technical and financial resources, but have historically played either a limited or no role in international nonproliferation efforts—namely, Russia, China and India. The hallmark of such cooperation must be partnership, technology and in-country presence.

—Nuclear threat reduction and nonproliferation efforts must have strong technical underpinnings and participation. The close interplay of technology and diplomacy is crucial to effective policy and implementation. The NNSA and its laboratories represent the primary technical talent in these areas. Unfortunately, financial support and the nuclear research environment are insufficient to meet the challenges confronting us. I strongly support the DOE/NNSA Next Generation Safeguards Initiative and other efforts aimed at attracting more technical talent to these important areas.

Mr. Chairman, you requested that I comment on the adequacy of the President's fiscal year 2009 budget request for the National Nuclear Security Administration nuclear weapon nonproliferation efforts as well as the sufficiency of those efforts generally. The committee staff also requested that I comment on the broader policy issues, including on my recent visits to North Korea and India and what we should be doing to secure fissile materials around the world. I will touch on those subjects briefly and attach two articles that deal with some of these issues in greater detail.

THE BUDGET AND ADEQUACY OF THE DEFENSE NONPROLIFERATION PROGRAMS

I will restrict my comments to the big budgetary picture. The overall budget request is modest compared to the importance and impact of NNSA's nonproliferation efforts. I recognize the demands on the Federal budget, yet the amount of money spent on these programs is small compared to dealing with the consequences of failure in any of its elements.

I strongly support NNSA's comprehensive effort to deal with nuclear threats and steps that it has taken to tailor its programs to the changing nature of the threats. Nevertheless, I believe we need a greater sense of urgency in completing some of the ongoing efforts and in launching new ones with adequate budgetary support.

The greatest threats we face today are a breakdown of the nonproliferation regime and the possibility that terrorists may acquire nuclear weapons or fissile materials. The most immediate challenges are North Korea and Iran. However, the recent developments in Syria demonstrate that efforts to acquire the bomb are more widespread than believed. The importance of keeping fissile materials out of the hands of terrorists is generally appreciated; the technical difficulty of doing so is not. I describe the technical challenges in detail in Attachment I. In addition, the resurgence of nuclear power, necessary to combat the world's energy and environmental crisis, must be supported by enhanced nonproliferation efforts if it is to succeed.

CHANGING PARTNERSHIP WITH RUSSIA

The nuclear threat changed dramatically with the end of the Cold War and the breakup of the Soviet Union. We came to be threatened more by Russia's weakness than its strength. Nunn-Lugar legislation followed by Nunn-Lugar-Domenici legislation established the Cooperative Threat Reduction program aimed primarily at Russia and the other states of the former Soviet Union. This innovative approach of working cooperatively with these nations helped them deal with the unprecedented situation of how to provide security for an enormous arsenal of nuclear weapons and an equally huge stockpile of fissile (bomb-grade) material in states that changed their political and economic systems dramatically, and whose centrally-controlled institutions collapsed almost overnight. Much progress has been made in helping Russia and the other states improve the security of their nuclear weapons and materials. Most importantly, nothing really terrible has happened in the Russian nuclear complex in the 16 years since the breakup of the Soviet Union.

However, much remains to be done. My colleague, Dr. Matthew Bunn, who is also testifying today, has provided detailed annual status reports of accomplishments and challenges. I want to provide a perspective based on my many visits to the Russian nuclear complex since 1992. As director of the Los Alamos National Laboratory at the time, I visited the closed and formerly secret cities housing Russia's nuclear weapons laboratories in February 1992. The nuclear facilities and materials that were previously protected by guns and guards were now vulnerable. We developed scientific collaborations to build trust, which allowed us, 2 years later, to sign the first contracts with three Russian institutions for materials protection, control and accounting (MPC&A) cooperation. This lab-to-lab program helped Russia begin to develop a modern system of protection and safeguards to secure its nuclear materials. Our focus was always that it is in their best interest to secure their own materials. The responsibility is theirs; all we can do is help. We helped them expand this program to the Russian nuclear navy and the civilian sector. We then also expanded the program to some of the other states of the former Soviet Union. With Senator Domenici's help, we tackled the problem of helping Russia secure its nuclear knowledge by engaging Russian technical specialists in various civilian research and in-

dustrial projects to help in the massive worker reorientation challenge the Russian nuclear complex faced. These programs have recently come under unjust criticism by the Government Accountability Office. It was critical to augment the hardware-oriented technology programs with people-oriented efforts to enhance nuclear security.

Much of the focus on the MPC&A program with Russia has been to complete physical security upgrades. This phase of the program is nearing completion. Together with the general tightening of security during the Putin administration, these efforts have greatly improved the current nuclear security situation in Russia. The focus of U.S. efforts must now shift to the much more difficult problem of having the Russian complex sustain these security improvements and to develop better practices in the control and accounting of nuclear materials. Progress has been slow, partially because Russia has reverted to the Soviet practice of relying mostly on physical security and secrecy, and partly because Russia has a very different view of its vulnerabilities than we do. Russian practices reflect the belief that the Chechen rebels pose the greatest threat. Much less attention is paid to a potential insider threat.

A different approach to cooperative threat reduction will be required to make additional progress with the Russian nuclear complex. Money will be less important, but not irrelevant. In the 1990s, U.S. financial support was imperative. Today, thanks to oil prices of nearly $120 a barrel, Russia has a large budget surplus. Yet, if the United States is to continue to influence Russian security and nonproliferation practices, it will need to continue to invest some funds to have such influence. Once Russia completes the current round of facility security upgrades with NNSA support, then I recommend that NNSA support its laboratories to conduct a broad range of cooperative programs with the Russian nuclear complex. Some programs will have direct security implications—for example, continued work on best practices for MPC&A (especially control and accounting), promoting a security culture, eliminating the use of highly enriched uranium (HEU) in civilian applications, instrumentation development for nuclear detection and forensics, nuclear attribution, nuclear materials registries and databases, regulations and practices to protect radiation sources, emergency response to nuclear incidents, and proliferation resistant reactors and fuel cycle research. Other programs will have indirect, but still important, benefits—for example, nuclear energy R&D, environmental R&D, fundamental research in nuclear materials, radiochemistry and analytical chemistry techniques. We must also continue to encourage Russia to eliminate much of its surplus stock of fissile materials and to consolidate its still massive nuclear complex. In summary, we should strengthen and broaden our nonproliferation collaboration with Russia by supporting our own technical specialists to work with Russian technical counterparts. We should phase out direct financial support to Russia except in those cases where the investment is necessary to keep it meaningfully engaged.

EXPANDING COOPERATIVE THREAT REDUCTION BEYOND RUSSIA

I applaud the NNSA efforts to expand its nonproliferation activities and threat reduction programs beyond Russia. These programs in the other states of the former Soviet Union have significantly reduced the global nuclear threat. The breakup of the Soviet Union created four nuclear weapons states out of one. The CTR program reversed that dangerous situation by getting Ukraine, Kazakhstan and Belarus to return Soviet nuclear weapons to Russia by 1996. However, these states also had considerable inventories of nuclear materials and a robust nuclear infrastructure that was largely left in place. Similarly, other states such as Uzbekistan and Georgia had nuclear materials and nuclear facilities. The former Soviet satellite states in Eastern Europe also had vulnerable nuclear materials and facilities. NNSA cooperative programs in these countries have reduced, but not eliminated, the threat. These programs should be expanded and molded into longer-term partnerships with these states to help them manage their nuclear dangers while also getting the benefits of civilian nuclear applications.

The NNSA also correctly assessed the need for cooperative nuclear threat reduction beyond the borders of the former Soviet Union. To keep the most dangerous materials out of the hands of the world's most dangerous people requires a global network of nations that are committed to and capable of securing their own nuclear materials and preventing export. There are approximately 40 countries that possess either nuclear materials or the necessary nuclear infrastructure to produce nuclear materials. There are more than 100 countries that use ionizing radiation sources (for medicine, industry, agriculture or research) that could fuel a radiological dispersal device; the so-called dirty bomb. Whereas the importance of securing nuclear materials is generally appreciated today, the technical difficulty is not. In Attach-

ment I to this testimony I detail why this is much more difficult than simply locking up these materials the way we guard gold at Fort Knox.

The technical components of global security initiatives are crucial. To secure nuclear materials requires global partnerships and global reach. The DOE/NNSA and its laboratories are in the best position to develop such partnerships. I recommend a two-pronged approach: (1) Aggressively expand cooperative threat reduction to countries that require either technical or financial assistance; and (2) Enlist those countries that have the technical and financial resources; but have historically played either a limited or no role in international nonproliferation efforts. In both cases, cooperation with the International Atomic Energy Agency (IAEA) is imperative.

Aggressively Expand Cooperative Nuclear Threat Reduction Globally.—The NNSA Global Threat Reduction Initiative has made significant gains in securing or removing highly enriched uranium from research reactors and research facilities in countries that had difficulty securing it. For example, partnerships between host countries, the United States, Russia and the IAEA resulted in the repatriation of HEU from Romania, Bulgaria, Uzbekistan and other countries to Russia. In many cases, the NNSA has helped to convert research reactors to operate with low enriched uranium to remove the proliferation risk and allow the removal of HEU. Similar partnerships have helped countries to better manage and secure their radiation sources. The financial requirements for these efforts have been modest. These programs should be expanded and expedited.

Countries such as Pakistan, Libya and Kazakhstan pose special challenges. In my view, Pakistan represents the greatest nuclear security challenge. It has all the technical prerequisites: HEU and plutonium; enrichment, reactor and reprocessing facilities; a complete infrastructure for nuclear technologies and nuclear weapons; largely unknown, but questionable, nuclear materials security; and missiles and other delivery systems. It views itself as threatened by a nuclear India. It has a history of political instability; the presence of fundamental Islamic terrorists in the country and in the region; uncertain loyalties of some civilian (including scientific) and military officials; and it is home to A.Q. Khan, the world's most notorious nuclear black marketeer. Helping Pakistan secure its nuclear materials during these challenging times is made difficult by the precarious position of its leadership and the anti-American sentiments of much of its populace. Yet, such cooperation is imperative.

Libya presented a very special case that required technical cooperation. Once Libya decided it was in its interest to eliminate its covert nuclear program, it was crucial to do so effectively and completely, and to learn as much as possible about nonproliferation patterns and practices from Libya's nuclear program history. NNSA technical specialists did a superb job in both cases.

Kazakhstan also presented a special challenge. It possessed nuclear materials and nuclear reactors when it achieved independence from the Soviet Union. Next to Russia, it had the most extensive and sophisticated nuclear infrastructure, including the sprawling Semipalatinsk nuclear test site. Much progress has been made thanks to NNSA cooperative programs, those of the Department of State and the Department of Defense, and the non-governmental efforts of the Nuclear Threat Initiative. Yet, several serious challenges remain, such as the final disposition of the spent fuel from its fast reactor at Aktau, remain.

I recommend that the NNSA extend its technical reach even further. By working closely with the IAEA, it can help countries effectively meet their obligations under the United Nation's Security Council Resolution 1540. Resolution 1540 requires states establish and enforce legal barriers to acquisition of weapons of mass destruction whether by terrorists or by states. It requires states to ensure that they have the infrastructure in place to address the threat posed by non-state actor involvement in any aspect of the proliferation of weapons of mass destruction. The United States was instrumental in developing this resolution and in getting it adopted. Now, it must take the next step and help provide technical assistance to countries that are struggling to meet its requirements.

Enlist the Developed Nuclear Countries to More Effectively Secure Nuclear Materials and Prevent Nuclear Proliferation.—During the Cold War, the United States and Soviet Union cooperated to prevent nuclear proliferation. After the break up of the Soviet Union, U.S. efforts focused on helping Russia deal with its risks. As indicated above, these risks have been reduced considerably through U.S.-Russian cooperation. However, Russia has not re-engaged effectively to strengthen international efforts. Although it has cooperated with the United States in repatriating some weapons-usable nuclear material from the former states of the Soviet Union or its former satellites, its leadership on the global scene is not commensurate with its nuclear status. Although it has promoted international cooperation in reactor

technology, providing nuclear fuel services, and storing nuclear waste, it has promoted global export of its own nuclear technologies without sufficient consideration of nuclear proliferation consequences. It has not contributed much to the resolution of North Korea's nuclear crisis and has been less than helpful in resolving the Iranian nuclear dilemma.

Historically, China has not played a constructive role in limiting nuclear proliferation. Its past and current relationship with Pakistan remains troublesome. However, in recent years China has shown an interest in becoming constructive. Its 2005 nonproliferation policy paper represents a step in the right direction. China is tightening its export controls and has joined the Nuclear Suppliers Group (NSG). It has begun to engage constructively with the United States to improve the security of its nuclear materials in the civilian sector. The two countries have also begun to cooperate to improve the management and security of radiation sources in China. China has chosen not to engage more fully with the United States to cover its defense nuclear sector because its grievances over the Cox Report have not been addressed. In the past few years, China has also played a constructive role in trying to resolve the North Korean nuclear crisis by hosting the Six-Party Talks, although its approach differs from that of the United States because its strategic interests in North Korea differ. The bottom line is that China can and must do more to work effectively on global nuclear proliferation challenges. Although China will be guided by its own interests, the United States will play a pivotal role in how and when China engages.

India has, not surprisingly, been missing from the global nonproliferation effort. Since India is outside the nonproliferation regime because it did not sign the NPT, it is viewed by many as a proliferator. It views itself as a legitimate nuclear weapon state with a commendable nonproliferation record. India's nuclear program has been shaped largely by the international sanctions that followed its first nuclear test in 1974. The sanctions appeared to have done little to limit India's nuclear weapon program, but they have limited its nuclear energy program and prevented cooperation in nonproliferation. Some welcome progress has been made recently in the area of nuclear reactor safety through cooperative efforts between the U.S. Nuclear Regulatory Commission and the Indian Atomic Energy Regulatory Board. There is much that should be done to work with India on its domestic safeguards and on its international nonproliferation support.

The European Union has been a constructive member of the international nonproliferation effort. Several of its members have promoted global nuclear security and combating nuclear terrorism through G–8 initiatives with the United States. The EU–3 (Germany, France and the United Kingdom) have led the frustrating nuclear negotiations with Iran over the past few years.

In recent years, the United States has carried the brunt of the international burden in preventing nuclear proliferation and combating the potential of global nuclear terrorism. It played the leading role in helping Russia cope with the nuclear dangers inherent in the breakup of the Soviet Union. We have turned our attention to focus on the global nature of the threat but, despite U.S. efforts, we appear to be losing ground. It is critical to enlist the full participation of the other major players in the nuclear arena. They should be enlisted in partnerships that span a broad spectrum of nuclear cooperation: This should include, for example, best practices in nuclear materials security, development of nuclear materials data bases, nuclear detection technologies, proliferation risk analysis, emergency response, nuclear forensics and attribution.

The IAEA's role should be strengthened. The international safeguards effort is under enormous strain. The special inspection in North Korea and Iran require significant effort. The IAEA's overall workload has increased dramatically over the past 25 years. The number of safeguarded facilities has increased more than threefold and the amount of HEU and separated plutonium has increased six-fold. The Additional Protocol has increased the number and complexity of inspections. Yet, the overall budget of the agency has remained relatively flat. The expansion of commercial nuclear power will tax the IAEA beyond its current capacity.

STRENGTHENING THE NONPROLIFERATION REGIME AND EXPANDING NUCLEAR POWER

The nonproliferation regime is under stress. North Korea's nuclear program and Iran's determined drive to uranium enrichment demonstrate how some nations use the NPT's promotion of civilian nuclear programs clandestinely to develop nuclear weapons or develop the nuclear weapon option. This problem is compounded by the fact that Article X allows nations to withdraw from the treaty without penalty. The recent revelations about Syria's clandestine nuclear program are especially troublesome because it was generally believed that national technical means would detect

such a massive effort long before it entered such an advanced stage. The nonnuclear weapons states express an additional concern. They contend that the nuclear weapon states have not met their Article VI obligations toward nuclear disarmament. These differences contributed to the disastrous outcome of the 2005 NPT review conference. Prospects for the 2010 conference look just as grim unless progress is made on the North Korean and Iranian problems and on Article VI obligations.

All of these concerns have surfaced just when commercial nuclear power is poised to take off globally because of worldwide energy demand and concerns about global climate change. An expansion of nuclear power will bring additional challenges to secure more nuclear material in more countries and to prevent additional states from turning their nuclear energy capabilities into nuclear weapons programs. The DOE's Global Nuclear Energy Partnership is a step in the right direction, but it needs better definition domestically and must become truly global to take into account the needs of the principal partners as well as those interested in future nuclear power.

STRENGTHENING U.S. TECHNICAL CAPABILITIES TO COMBAT PROLIFERATION AND NUCLEAR TERRORISM

The proliferation of nuclear weapons and weapons capability is growing. The danger of nuclear terrorism is real. This is not a fight the United States can win alone. We cannot simply push the dangers beyond our borders. It is imperative to forge effective partnerships to combat the dangers of nuclear terrorism and the proliferation of nuclear weapons. Meeting these challenges will require diplomatic initiative and technical cooperation. The United States must lead international diplomacy and DOE/NNSA must provide technical leadership and capabilities.

Unfortunately, the technical talent and facilities at the DOE/NNSA laboratories are steadily eroding. The technology base for nonproliferation and counter-terrorism activities rested on robust research programs in nuclear weapons and nuclear energy. Nuclear energy programs in the United States are just re-emerging from a couple of decades of inactivity. Nuclear weapons research has declined and has increasingly restricted its breadth of research. Moreover, facilities that were previously available for safeguards research are more difficult and costly to access. Consequently, more of the burden has fallen on the nonproliferation and verification budget of the NNSA. It has not kept up with the increased need for technical innovation in these areas.

In addition, much of the safeguards technology developed and deployed around the world was typically demonstrated and refined domestically in U.S. nuclear facilities. These domestic safeguards technology development programs provided the foundation for measurement technologies, systems analysis and modeling in safeguards. For example, in the mid-1990's the Los Alamos National Laboratory had over $7 million in domestic safeguards funding primarily focused on advancing the state of the art in nondestructive analysis. Today, it is approximately $250,000. Most of the domestic funds are expended for physical protection—guns, bullets and concrete to repel external threats based on the design basis threat. Consequently, we are falling behind in applying modern technologies to safeguard our domestic facilities and our technology base for safeguards is at risk. Moreover, it has become increasingly difficult to operate domestic nuclear facilities productively. The regulatory environment combined with a risk-averse operating environment has made it difficult to get work done, consequently losing the interest of some of the talent necessary for such programs. Recruitment of new talent in safeguards and other areas important in safeguards and verification has been difficult. A recent study by the American Physical Society and the American Association for the Advancement of Science [1] pointed out the great difficulty in educating and training scientific talent in nuclear forensics and disciplines such as radiochemistry.

The DOE/NNSA leadership has recognized these problems and recently launched the Next Generation Safeguards Initiative. This initiative would strengthen domestic capabilities by launching a generational improvement in safeguards technologies. It would greatly enhance the application of modern information technologies to safeguards. Other priorities include advanced safeguards approaches and proliferation risk assessments; enhanced modeling and simulation tools to better integrate safeguards into the design of new facilities; improved automation and automated process monitoring systems with real-time data transmission; better measurement technologies; and portable and multifunctional detectors. The Initiative recognizes the need to transfer these improvements to the IAEA so that it can deploy them in the

[1] Michael May, Chair, "Nuclear Forensics Role, State of the Art, and Program Needs," Joint Working Group of, AAAS, APS Physics, 2007.

field to meet the demand for greater and more sophisticated inspections. It also recognizes the need to build university-laboratory partnerships to provide educational support and training opportunities for the next generation of safeguards specialists. The Initiative also properly recognizes the need to leverage the nuclear capabilities of other nations to strengthen domestic and international safeguards capabilities. I strongly encourage the DOE/NNSA to develop this initiative and Congress to provide adequate funds.

I want to make some final comments on the importance of having our technical specialists on the ground in country. The NNSA technical teams in Russia have been crucial in assessing the risks in the Russian nuclear complex, in comparing technologies and approaches to nuclear security and to learn from Russia's practices and experience. My recent trip to India's nuclear centers underscored the importance of an in-country presence. I gained a much better appreciation for their domestic safeguards and security practices. I learned just how strongly the Indian nuclear energy program is geared to self-reliance. I learned how international sanctions over more than 30 years have slowed India's drive toward nuclear energy, but most likely not done much to slow its nuclear weapon progress. I found that whereas sanctions slowed progress in nuclear energy, they made India self-sufficient in nuclear technologies and world leaders in fast reactor technologies. While much of the world's approach to India has been to limit its access to nuclear technology, it may well be that today we limit ourselves by not having full access to India's nuclear technology developments. Such technical views should help to advise the diplomatic efforts with India.

I have been in North Korea five times in the past 4 years and visited the Yongbyon Nuclear Center three times, including this past February 14. I have had sufficient access to make a reasonable technical assessment of North Korea's nuclear capabilities. North Korea has the bomb, but not much of a nuclear arsenal. It has most likely produced and separated between 40 and 50 kilograms of plutonium, sufficient for about six to eight bombs. I believe that North Korea is seriously disabling its Yongbyon nuclear facilities and that elimination of plutonium production is within reach. I was able to witness the activities of the DOE/NNSA technical teams on the ground in Yongbyon. They have done a superb job supervising the disablement of the Yongbyon facilities and they have very ably advised and supported the diplomatic process. I provide a detailed report of my observations and conclusions in Attachment II.

Senator DORGAN. Dr. Hecker, thank you very much.

Dr. Bunn, you may proceed.

Senator DOMENICI. Dr. Bunn, would you wait a minute?

Before Mr. Tobey leaves, I wonder if I could tell him that I want to ask a question for the record. I am going to leave it.

Senator DORGAN. Yes.

Senator DOMENICI. I am you going to leave a question about the 123 agreement and what we can expect from it. So that will be here for you before you leave.

Thank you, Mr. Chairman.

Thank you very much, Dr. Bunn.

STATEMENT OF DR. MATTHEW BUNN, BELFER CENTER FOR SCIENCE AND INTERNATIONAL AFFAIRS, JOHN F. KENNEDY SCHOOL OF GOVERNMENT, HARVARD UNIVERSITY

Dr. BUNN. Thank you. It is an honor to be here today to talk about preventing nuclear terrorism and nuclear proliferation, which are critical issues for our national security.

Money is probably not the most important constraint on our ability to reduce these risks, but there are several areas where bigger budgets could mean faster progress.

NNSA's nonproliferation programs are excellent investments in our national security and they are making substantial progress, as we have already heard. But the next President will find that much more still remains to be done, and with this year's budget, Congress should really focus on making sure that the next team has

the resources and the flexibility to hit the ground running when they take office in January.

I urge Congress to complete a budget this year. Operating on continuing resolutions for months into the fiscal year can be crippling for some of these fast-changing programs that have to respond to rapidly changing opportunities.

So let me outline a few priorities.

The first priority is preventing nuclear terrorism, and our most effective tool for doing that is to secure nuclear weapons and materials at their source so they cannot be stolen and fall into terrorist hands. We urgently need a global campaign to ensure that all the caches of nuclear weapons and materials, not just the ones in Russia, are secure and accounted for to standards sufficient to defeat the kinds of threats that terrorists and criminals have shown they can pose in ways that will work and in ways that will last after our assistance phases out. There are many obstacles to achieving that objective. It is going to take sustained leadership from the highest levels of the Government.

The International Nuclear Materials Protection and Cooperation Program face costs in Russia that have shot up since their budget was put together. More expensive estimated costs to help Russian sites prepare to sustain security on their own and new opportunities in both Russia and South Asia. And I recommend an increase of about $60 million to $70 million in their budget.

In the case of the Global Threat Reduction Initiative, more money is needed to further accelerate the conversion of highly enriched uranium-fueled research reactors to proliferation-resistant LEU fuel, to accelerate the pace of removing nuclear material, to broaden that removal to cover a larger fraction of the world's HEU and a broader set of policy tools for convincing sites to give it up, and to secure radiological sources in research reactors around the world. All told, I think that they might need as much as an additional $200 million or more to move forward as rapidly as they can in reducing these security risks.

We also need additional steps to establish effective global standards for nuclear security, building on Security Council Resolution 1540 that requires every state to have effective nuclear security in place.

I believe we also need a larger investment in nuclear forensics where, at least at some of our labs, they have actually had to lay off some of their people working on nuclear forensics in recent times.

Next, it is critical that the next President engage with the governments of North Korea and Iran to put together a package, an international package, of carrots and sticks big enough and credible enough to convince them to give up their nuclear weapons ambitions and allow the verification that we would require. That will be mostly a White House and State Department effort, but Congress should be prepared to provide supplemental funding as needed for NNSA to take part in the verification of packaging of nuclear material, the dismantlement of nuclear facilities, and so on.

Third, we need to reduce the demand for nuclear weapons, an effort that has been much more successful than many people realize. Here again, the White House, the State Department, and the De-

fense Department will be taking the lead, but things that NNSA does make a difference as well. When we send a signal that despite having the world's most powerful conventional forces, we are going to need a large arsenal of nuclear weapons essentially forever, that we need new nuclear weapons and we need a complex that can rapidly build more nuclear weapons, we strengthen the arguments of nuclear hawks in other countries arguing that their own countries need nuclear weapons as well.

Moreover, it is very difficult to get the votes of non-nuclear weapons states, even our closest allies, for stronger safeguards, tougher export controls, better enforcement, all of which mean more constraints on them if we are not willing to accept constraints ourselves and live up to our NPT obligation to move toward disarmament. The next President is going to have to hit the ground running to reestablish our disarmament credentials, given that the next NPT review is coming up in 2010.

I believe that we need, given the experience of the A.Q. Khan network, a dramatically improved ability worldwide to stop black market nuclear trafficking. This will involve stepped-up police and intelligence cooperation, but we also need at NNSA, I think, an expanded effort to help countries around the world put effective export controls, border controls, transshipment controls in place, as required by UNSC 1540. And I recommend an increase of about $10 million to $15 million for that effort.

As we look at the growth and spread of nuclear energy around the world, we need to make sure that that does not contribute to the spread of nuclear weapons. Congress took an important step last year in providing $50 million for a fuel bank that will give countries additional assurance that they can rely on international supplies of fuel rather than building their own enrichment plants. And I am hopeful, although there are still some issues in play, that we can reach agreement to establish one or more fuel banks by the end of this year.

At the same time, we need to pursue even stronger incentives to convince states not to build their own enrichment and reprocessing plants. I think in that context, building a reprocessing plant of our own in the near term in my view would be a step in the wrong direction. I think that the Congress provided about the right amount of money for GNEP last year. I would encourage you to provide a similar budget this year and to provide the kind of direction that this subcommittee did last year for GNEP.

As we have heard already, NNSA is launching a Next Generation Safeguards Initiative designed to reinvest in both the technology and the people for strong safeguards, which we urgently need, and I would recommend an increase of $10 million to $15 million for that initiative as well beyond the budget request.

Now, with respect to the programs to redirect weapons expertise in the former Soviet Union and elsewhere, there has been a lot of criticism of those programs recently, much of which I believe is unjustified. I do believe that those programs, despite the improving Russian economy, do still have a value that is worth the small investment that we make in them.

Finally, we need information to support all of these policies. We need good intelligence and we need good analysis. I commend Con-

gress for supporting increases in DOE's intelligence budget in recent years, and those increases have supported important new programs like the Nuclear Materials Information Program.

But it is my understanding that at some of the laboratories, some of the critical intelligence capabilities, such as Livermore's Z Division, have been substantially cut back in the last year or so, and I would urge Congress to take action to reverse that because those capabilities are really some of the most important nuclear intelligence capabilities our Government has.

I also recommend that Congress provide roughly $10 million so that NNSA can start taking a page from the play book of the Department of Homeland Security in establishing centers of excellence and other ways that they can draw on expertise from academia and from other non-government institutions to help them do their job better.

PREPARED STATEMENT

In my prepared statement, I also talk about the issues of reducing plutonium and HEU stockpiles which remain troublesome problems, as Senator Domenici mentioned, but in the interest of time, I will leave that to questions.

Thank you very much, Mr. Chairman, members of the committee.

[The statement follows:]

PREPARED STATEMENT OF DR. MATTHEW BUNN

Mr. Chairman and members of the committee: It is an honor to be here today to talk about critical issues for U.S. and world security—nuclear terrorism and nuclear proliferation, and what more the National Nuclear Security Administration (NNSA) can do to prevent them.

My basic message today is simple: while money is not the most important constraint on progress for most of the Nation's efforts to prevent nuclear proliferation and terrorism, there are several areas where additional funds could help reduce major dangers to our national security.

NNSA's nonproliferation programs are critical tools in our Nation's nonproliferation toolbox. There can be no doubt that America and the world face a far lower risk of nuclear terrorism today than they would have had these efforts never been begun. These programs are excellent investments in U.S. and world security, deserving strong support; Americans and the world owe a substantial debt of gratitude to the dedicated U.S., Russian, and international experts who have been carrying them out.

With this year's budget, Congress should focus on making sure a new team has the resources and flexibility to hit the ground running in reducing proliferation threats when they take office in January. I would urge Congress to complete a budget despite the pressures of an election year; operating on continuing resolutions until many months into a new fiscal year can be crippling for fast-changing programs such as these, making it very difficult to seize opportunities as they arise.

These programs are making substantial progress in reducing proliferation threats. But in many areas, there will still be much more to do when a new team takes office. While many of the programs in Russia are nearing completion, and their budgets will decline, efforts elsewhere around the world must expand to address the global threat, taking up the slack. Clear indicators of the global nature of the threat are everywhere—from the nuclear programs in North Korea and Iran, to the global attacks by al Qaeda and their repeated efforts to get the materials and expertise needed to make a bomb, to roughly 20 countries where the A.Q. Khan black-market nuclear network succeeded in operating for the more than 20 years before finally being disrupted, to the break-in at the Pelindaba site in South Africa last November, when four armed men penetrated the security fence without setting off any alarm at a site with hundreds of kilograms of weapon-grade highly-enriched uranium (HEU), and spent 45 minutes inside the facility without ever being engaged by the site's security forces.

I will not attempt to assess every element of NNSA's nonproliferation budget. Rather, I will outline several key nonproliferation priorities, and make recommendations for further steps NNSA or other parts of DOE can take to address them. Many of the needed actions to strengthen the global nonproliferation regime must be taken by the White House or the State Department; NNSA's critical role is in providing the technical expertise needed to back up nonproliferation initiatives, particularly in the management of nuclear weapons and materials.[1] Most of these programs are constrained more by limited cooperation (resulting from secrecy, complacency about the threat, concerns over national sovereignty, and bureaucratic impediments) than they are by limited budgets; sustained high-level leadership focused on overcoming the obstacles to cooperation is the most important requirement for success.[2] But in some cases, programs could move more quickly to seize risk reduction opportunities that already exist if their budgets were increased—and in still more cases, more money would be needed to implement a faster and broader effort if the other obstacles could be overcome.

PREVENTING NUCLEAR TERRORISM

The first priority is to prevent terrorists from incinerating the heart of a major city with a nuclear bomb—as al Qaeda have made clear they hope to do. This remains a real danger, though no one can calculate the probability of such a catastrophe.[3]

The step we can take that most reduces this danger is securing nuclear weapons and materials at their source—for making plutonium or HEU is beyond the plausible capability of terrorist groups, and if we can keep these materials and nuclear weapons themselves out of terrorist hands, we can keep terrorists from ever getting a nuclear bomb. NNSA's programs are in the process of completing the security upgrades in Russia planned as part of the Bratislava initiative, and those upgrades are dramatically reducing critical risks. But the problem of inadequately secured nuclear stockpiles is not just a Russian problem, it is a global problem. Hundreds of buildings in more than 30 countries contain enough of the essential ingredients of nuclear weapons to require the highest standards of security. The world urgently needs a global campaign to ensure that all the caches of nuclear weapons and the materials needed to make them worldwide are secure and accounted for, to standards sufficient to defeat the threats terrorists and criminals have shown the can pose, in ways that will work, and in ways that will last. Overcoming the many obstacles to achieving this objective will require sustained political leadership from the highest levels of our Government.

BUDGET INCREASES FOR MPC&A AND GTRI

But getting the job done as fast as it can be done will also require more money. In the case of the International Nuclear Materials Protection and Cooperation program (more commonly known as Materials Protection, Control, and Accounting, or MPC&A), construction costs in Russia have shot up since the administration prepared its budget request; helping Russian sites to prepare to sustain high levels of security is proving more expensive than expected; and new understandings have opened new opportunities for nuclear security cooperation in both Russia and South Asia. All told, I recommend an increase of $60–$70 million over the requested budget for the MPC&A effort.

In the case of the Global Threat Reduction Initiative (GTRI), there are now 45 HEU-fueled research reactors that could convert to low-enriched uranium (LEU) that cannot power a nuclear bomb with LEU fuels already available; GTRI has already accelerated the pace of these conversions, but with more money, these reactors could be converted faster. There will also be a need to build a fabrication plant for the higher-density LEU fuels now in development, in order to convert additional reactors, and GTRI will likely have to play a role in that—either by paying to build the plant or by guaranteeing fabrication contracts to give private firms sufficient in-

[1] Most of that expertise resides at the national laboratories, not at DOE headquarters. This requires a continuing effort to build effective headquarters-laboratory partnerships, giving the labs the freedom to do what they do best, while keeping the policy-making functions with Federal officials.

[2] For an in-depth assessment of the programs focused on security for nuclear weapons and materials, see Matthew Bunn, Securing the Bomb 2007 (Cambridge, Mass.: Nuclear Threat Initiative and Project on Managing the Atom, Harvard University, September 2007). The 2008 edition is forthcoming.

[3] See, for example, testimony of Charles Allen, Rolf Mowatt-Larsen, Matthew Bunn, and Gary Ackerman to the Senate Committee on Homeland Security and Governmental Affairs, hearing on "Nuclear Terrorism: Assessing the Threat to the Homeland," 2 April 2008.

centives to pay for building their own own facilities. Additional funds could also accelerate the pace of removing nuclear material from vulnerable sites around the world (in part because here, too, prices are escalating). And more money is also needed to secure radiological sources and research reactors around the world—including here in the United States, where upgrades are needed for some 1,800 locations with sources of 1,000 curies or more, and for the Nation's 32 domestic research reactors. Moreover, GTRI is so far planning to return only a small fraction of the U.S.-origin HEU abroad; while most of the remainder is in developed countries, in many cases there is good reason to bring this material back as well, and more funds would be required to give these facilities incentives to give up their HEU. Finally, NNSA does not yet have a program focused on giving underutilized HEU-fueled reactors incentives to shut down—in many cases likely to be a quicker and easier approach than conversion. All told, I believe that an additional $200 million or more is needed for GTRI to move forward as rapidly as possible in reducing these risks.[4]

OTHER NEEDED NUCLEAR SECURITY STEPS

Several additional steps could significantly contribute to efforts to secure nuclear stockpiles worldwide.

Building the Sense of Urgency.—The fundamental key to success in these efforts is convincing political leaders and nuclear managers around the world that nuclear theft and terrorism are real threats to their countries' security, worthy of a major investment of their attention and resources. If they are convinced of this, they will take the needed actions to prevent nuclear terrorism; if they remain complacent about the threat and how much it could affect them, they will not take those actions. Congress should consider making funds available for activities to build this sense of urgency and commitment, including joint briefings on the nuclear terrorist threat, nuclear terrorism exercises and simulations, helping states perform realistic "red team" tests of their nuclear security systems, and more.[5] Such efforts might be implemented under the rubric of the Global Initiative to Combat Nuclear Terrorism—which has the potential to become the kind of global campaign to improve nuclear security that is urgently needed, though to date it has focused more on matters such as police training and emergency preparedness than on nuclear security upgrades.

Forging Effective Global Nuclear Security Standards.—As nuclear security is only as strong as its weakest link, the world urgently needs effective global nuclear security standards that will ensure that all nuclear weapons and weapons-usable materials are protected against the kinds of threats terrorists and criminals have shown they can pose—at a bare minimum, against two small teams of well-trained, well-armed attackers, possibly with inside help, as occurred at Pelindaba. (In some countries, protection against even more capable threats is required.) U.N. Security Council Resolution 1540 legally requires all countries to provide "appropriate effective" security and accounting for all their nuclear stockpiles. The time has come to build on that requirement by reaching a political-level agreement with other leading States on what the essential elements of appropriate effective security and accounting systems are, and then working to ensure that all States put those essential elements in place. In last year's defense authorization act, Congress called on the administration to seek to develop such effective global standards; Congress should now act to ensure that the administration is taking this step, and provide funding to support such efforts if needed. Ultimately, effective security and accounting for weapons-usable nuclear material should become part of the "price of admission" for doing business in the international nuclear market.

Achieving Sustainability.—UIf the upgraded security equipment the United States is helping countries put in place is all broken and unused in 5 years, U.S. security objectives will not be accomplished. NNSA is working closely with Russia to try to ensure that Russia puts in place the resources, incentives, and organizations needed to sustain high levels of security for the long haul—but there is much left to do, and similar efforts will be needed wherever nuclear security upgrades are undertaken. As most nuclear managers only invest in expensive security measures when the government tells them they have to, strong regulation is essential to achieving and maintaining stringent standards of nuclear security, and there is far more to do to get effective nuclear security and accounting regulations in place around the world.

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[4] This does not include the potential cost of packaging and removing plutonium and plutonium-bearing spent fuel from North Korea, if an agreement to take those steps is reached. That substantial cost would likely have to be funded through a supplemental request.

[5] For a list of suggestions, see Bunn, Securing the Bomb 2007, pp. xxx.

Strengthening security culture.—As Gen. Eugene Habiger, former DOE "security czar" and former commander of U.S. strategic forces, has remarked: "good security is 20 percent equipment and 80 percent culture." We need to increase efforts to build security cultures that will put an end to guards patrolling without ammunition or staff propping open security doors for convenience. NNSA is working this problem hard, but changing the day-to-day attitudes and practices at scores of facilities in dozens of countries with many different national cultures, where we have only very limited influence, is an extraordinarily difficult policy problem. Convincing nuclear managers and staff that the threats of nuclear theft and sabotage are real will be fundamental, and many of the steps needed to build high-level commitment to nuclear security will also help in building strong security cultures. Efforts similar to those now being undertaken in Russia need to be undertaken wherever nuclear weapons and the materials to make them exist. We also need more effort to learn from cases where facilities or organizations have succeeded in transforming their security or safety cultures—and from cases where they have failed to do so.

Consolidating Nuclear Stockpiles.—We need to do everything we can to reduce the number of buildings and bunkers worldwide where nuclear weapons and the materials needed to make them are located, achieving more security at lower cost. Our goal should be to remove all nuclear material from the world's most vulnerable sites and ensure effective security wherever material must remain within 4 years or less. Over time, the United States should seek an end to all civil use of HEU. And we should not encourage commercial reprocessing and recycling of plutonium, as proposed in the Global Nuclear Energy Partnership (GNEP); even the proposed GNEP processes that do not separate "pure plutonium" would tend to increase, rather than decreasing, nuclear theft and nuclear proliferation risks compared to not reprocessing this fuel.[6] We should also work to reduce the total stockpiles of weapons and materials that must be guarded, including by ending production of more. NNSA's recent success in enabling Russia to shut down one of its three remaining plutonium production reactors—and the shut-down of the remaining two, planned in the next 2 years—is a major milestone. But there is more to be done. It is time to get serious about negotiating a verifiable global treaty ending production of nuclear materials for weapons forever, to stop the production of highly enriched uranium for any purpose, and to stop piling up ever larger stockpiles of separated civilian plutonium. In particular, Congress should direct NNSA to return to the negotiation of a 20-year moratorium on separating plutonium in the United States and Russia that was nearly completed at the end of the Clinton administration. The troubled plutonium disposition effort and opportunities for expanded disposition of HEU are important topics treated in more detail at the end of this statement. Over the longer term, if properly managed, serious pursuit of the steps toward a nuclear weapon free world advocated by Secretaries Shultz, Kissinger, and Perry and Senator Nunn could make a significant long-term contribution to reducing nuclear terrorism risks.[7]

Strengthening International Approaches.—The International Atomic Energy Agency (IAEA) has a key role to play in improving nuclear security—helping to develop standards and recommendations, providing international peer reviews of nuclear security arrangements, coordinating efforts among different donors contributing to nuclear security improvements, and more. Some countries trust the IAEA in a way that they will never trust the United States, and the Agency is uniquely positioned to develop international security recommendations that will be broadly accepted around the world. But the IAEA's Office of Nuclear Security is constantly hampered by its very limited budget, which is tightly constrained by earmarks for donors' favored projects. While U.S. contributions to the IAEA largely flow through the State Department, NNSA has made substantial contributions to the Office of Nuclear Se-

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[6] See discussion in Matthew Bunn, "Risks of GNEP's Focus on Near-Term Reprocessing," testimony before the Committee on Energy and National Resources, U.S. Senate, 14 November 2007, available as of 28 March 2008 at http://belfercenter.ksg.harvard.edu/files/bunn-GNEP-testimony-07.pdf. The radioactivity of the plutonium-bearing materials that would be recovered in proposed GNEP processes is not remotely enough to deter theft by determined terrorists. See Jungmin Kang and Frank Von Hippel, "Limited Proliferation-Resistance Benefits from Recycling Unseparated Transuranics and Lanthanides from Light-Water Reactor Spent Fuel," Science and Global Security 13, no. 3 (2005).

[7] See George P. Shultz, William J. Perry, Henry A. Kissinger, and Sam Nunn, "Toward a Nuclear-Free World," Wall Street Journal, 15 January 2008, and Matthew Bunn, "Securing Nuclear Stockpiles Worldwide," in Reykjavik Revisited: Steps Toward a World Free of Nuclear Weapons (Palo Alto: Hoover Institution, forthcoming). For recent discussions of steps to reduce existing stockpiles of HEU and separated plutonium, see Matthew Bunn and Anatoli Diakov, "Disposition of Excess Highly Enriched Uranium," and "Disposition of Excess Plutonium," in Global Fissile Materials Report 2007 (Princeton, NJ: International Panel on Fissile Materials, October 2007, available as of 28 March 2008 at http://www.fissilematerials.org), pp. 24–32 and 33–42.

curity in the past. I recommend that Congress direct an additional $5–$10 million contribution to the IAEA's Office of Nuclear Security, to strengthen its efforts to contribute to nuclear security worldwide.

Sharing Nuclear Security Best Practices.—Just as the nuclear industry created the World Association of Nuclear Operators (WANO) after the Chernobyl accident, to bring the worst performers on safety up to the level of the best performers, the world needs a World Institute of Nuclear Security (WINS), to provide a focus for exchanging best practices in nuclear security and material control and accounting. The Nuclear Threat Initiative (NTI) and the Institute for Nuclear Materials Management are working with the nuclear community to establish such an institution. To be effective, this should ultimately be led by those with direct responsibility for managing nuclear material and facilities. But it may be necessary for NNSA and others to provide initial seed money to get it going; Congress should consider appropriating a few million dollars for that purpose.

Building Genuine Partnerships.—To be successful, all of these efforts must be pursued in a spirit of genuine partnership, serving both our interests and those of the partner states, with ideas from each side's experts incorporated into the approach; the experts in each country know their materials, their facilities, their regulations and bureaucracies, and their culture better than we do, and we need to listen to them to get the "buy-in" essential to long-term sustainability. In particular, while these programs must look beyond Russia to the world, there is a special need for partnership with Russia, as Russia and the United States bear a special responsibility, with some 95 percent of the world's nuclear weapons and more than 80 percent of its stocks of weapons-usable nuclear material. The shift to a true partnership approach should include establishing joint teams that would help other states around the world upgrade security. The Global Initiative to Combat Nuclear Terrorism, co-led by the United States and Russia, is an important step in the right direction. But as the President and Congress consider actions which strongly affect Russian interests, from missile defense in Europe to the expansion of NATO to Russia's borders, they need to consider the potential impact on the prospects for effective nuclear security partnership as well.

BEYOND NUCLEAR SECURITY

While securing nuclear weapons and materials at their source is the most effective tool to reduce the risk, we cannot expect it to be perfect. We urgently need a substantially stepped-up effort to build police and intelligence cooperation focused on stopping nuclear smuggling and the other elements of nuclear plots in countries all over the world, including additional sting operations and well-publicized incentives for informers to report on such plots. This will make it even more difficult for potential nuclear thieves and those who would like to buy stolen material to connect, and to put together the people, equipment, expertise, and financing for a nuclear bomb conspiracy without detection.

The United States should also work with key states around the world to ensure that they put in place laws making any participation in real or attempted theft or smuggling of nuclear weapons or weapons-usable materials, or nuclear terrorism, crimes with penalties comparable to those for murder or treason.

The Real, But Limited, Role of Radiation Detection.—Radiation detection at ports, border crossings, and elsewhere will play a role in these later lines of defense, but its contribution to reducing the risk of nuclear terrorism will inevitably be limited. The length of national borders, the diversity of means of transport, the vast scale of legitimate traffic across these borders, the small size of the materials needed for a nuclear bomb, and the ease of shielding the radiation from plutonium or especially from HEU all operate in favor of the terrorists. Neither the detectors now being put in place nor the Advanced Spectroscopic Portals planned for the future would have much chance of detecting and identifying HEU metal with modest shielding—though they likely would be effective in detecting plutonium or strong gamma emitters such as Cs-137 that might be used in a so-called "dirty bomb."[8] Most of the past successes in seizing stolen nuclear material have come from conspirators informing on each other and from good police and intelligence work, not from radiation detectors.

Hence, while it is worth making some investment in radiation detection, we should not place undue reliance on this line of defense. That being said, NNSA's Second Line of Defense program has been successful in cooperating with many coun-

[8] See, for example, Thomas B. Cochran and Matthew G. McKinzie, "Detecting Nuclear Smuggling," Scientific American, March 2008, available as of 28 April 2008 at http://www.sciam.com/article.cfm?id=detecting-nuclear-smuggling.

tries to put radiation detection in place at key ports and border crossings, and to take advantage of all the opportunities for cooperation with key countries that it now has before it would require $50–$60 million beyond the budget request.

A Modified Approach to Cargo Scanning.—Beyond the budget, Congress should act to modify the approach to radiation scanning of cargo containers approved last year. By requiring 100 percent of containers coming into the United States to be scanned (an extraordinarily difficult target to meet), offering the possibility of a waiver, and setting no requirements for the quality of the scanning or for what should be done with the information from the scans, Congress may have inadvertently created a situation where the requirement will repeatedly be waived and the scanning put in place will be of low quality and lead to little action. Congress should approve a revised approach in which terrorists would know that each container had a high chance of being scanned; the scans were done with the best available scanning technology; and the scans would be linked to immediate further search and other action in the event of unexplained detections. This would do more to keep terrorists from using containers to smuggle nuclear weapons and materials. At the same time, Congress should insist that the Department of Homeland Security provide a detailed assessment of the vulnerability posed by the countless potential pathways for nuclear smuggling between official points of entry, and should mandate an independent assessment of the cost-effectiveness of large investments in radiation detection at official points of entry when intelligent adversaries have options for going around them.[9]

A strengthened nuclear forensics effort. Congress should also act to strengthen U.S. and international efforts in nuclear forensics (the science of examining characteristics of seized nuclear material or nuclear material collected after a nuclear blast for clues to where it came from). I recommend that Congress increase funding for nuclear forensics R&D by at least $10 million and direct that a robust portion of available funding be spent to maintain and expand the technical capabilities at the U.S. laboratories (currently so much of the funding is staying at the Department of Homeland Security that U.S. laboratories working on forensics of seized materials have had to lay off some of their staff). In addition, I recommend that Congress direct the administration to pursue expanded efforts to put together an international database of material characteristics. Congress should understand, however, that nuclear material has no DNA that can provide an absolute match: nuclear forensics will provide a useful but limited source of information to combine with other police and intelligence information, but will rarely allow us to know where material came from by itself.[10]

COPING WITH NORTH KOREA AND IRAN

The next priority is to cope with the nuclear programs of North Korea and Iran. If both North Korea and Iran become established nuclear weapon States, this will be a dramatic blow to the entire global effort to stem the spread of nuclear weapons, and will put significant pressure on some of their neighbors to follow suit. The Bush administration's no-engagement approach to Iran has clearly failed, allowing Iran to move forward unimpeded with a substantial enrichment capability, just as the administration's earlier "threaten and watch" approach to North Korea failed utterly, leaving North Korea with a tested nuclear bomb and enough plutonium to make 5–12 nuclear weapons. The next president needs to take a new tack, putting together international packages of incentives and disincentives large enough and credible enough to convince the North Korean and Iranian governments that it is in their national interests to agree to arrangements that would put a wide and verifiable gap between them and a nuclear weapons capability. If we want these governments to address our concerns, the U.S. Government will have to address some of their key concerns—which may in the end require difficult choices, such as providing Iran with a security assurance as part of such an agreement, and acknowledging that at this point, a ban on all enrichment in Iran, however desirable, can no longer be achieved.[11] It is primarily the White House and the State Depart-

[9] For a more optimistic view on this part of the problem, see Levi, On Nuclear Terrorism, pp. 87–96.

[10] See Nuclear Forensics Working Group (Michael May, chair), Nuclear Forensics: Role, State of the Art, Program Needs (Washington, DC: American Physical Society and American Association for the Advancement of Science, February 2008).

[11] For a discussion of the risks to U.S. national security of continuing to insist on zero enrichment in Iran, see Matthew Bunn, "Constraining Iran's Nuclear Program: Assessing Options and Risks," presentation at Oak Ridge National Laboratory, 15 November 2007, available as of 28 April 2008 at http://belfercenter.ksg.harvard.edu/files/Matthew__Bunn__Oak__Ridge.pdf. For an

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ment that need to take action, but Congress should be prepared to provide supplemental funding as needed for NNSA support to verification, packaging and removing nuclear materials and equipment, and helping to decommission nuclear facilities and redirect nuclear experts.

REDUCING DEMAND FOR NUCLEAR WEAPONS

The third priority is to reduce the demand for nuclear weapons around the world. Efforts to reduce demand have been more successful than is usually recognized. Today, there are more countries that started nuclear weapons programs and then decided to give them up and accept international inspections than there are states with nuclear weapons—meaning that even once states start nuclear weapons programs, efforts to convince them that nuclear weapons are not in their interest succeed more often than they fail.

Here, too, many of the needed steps require White House, State Department, or Defense Department action. But NNSA's programs can have an important effect on the demand for nuclear weapons as well. When the country with the most powerful conventional forces on earth insists that large numbers of nuclear weapons are essential to its security, that they will remain essential forever, that new nuclear weapons are needed, and that a transformed complex that is "responsive" in the sense that it could rebuild a larger nuclear arsenal if need be is also essential, this strengthens the arguments of those in other countries arguing that their country also needs nuclear weapons. Perhaps even more important, it will be far more difficult to get political support from non-nuclear-weapon states for stronger safeguards, more stringent export controls, tougher enforcement, and the other measures urgently needed to strengthen the global nonproliferation regime—all of which involve more constraints and costs for them—if the United States and the other NPT weapon states are seen as failing to live up their legal obligation, under Article VI of the Nonproliferation Treaty (NPT), to move in good faith toward nuclear disarmament.

I believe that the case has not been made that the claimed benefits of the Reliable Replacement Warhead (RRW) outweigh these and other potential downsides. I recommend that the Congress continue to refuse to fund that program, and direct NNSA to focus on a smaller, cheaper complex designed only to support a much smaller nuclear stockpile for the future. The next president should recommit the United States to the Comprehensive Test Ban Treaty, and work to build the support in the Senate that will be necessary for ratification.

More broadly, the United States and Russia, as the states with the world's largest nuclear stockpiles, should agree to reduce their total stockpiles of nuclear weapons to a small fraction of those they hold today, and to declare all their HEU and plutonium beyond the small stockpiles needed to support the remaining agreed nuclear weapon stockpiles (and modest set-asides for naval fuel) as excess to their military needs. Both countries should put this excess material in secure storage sites subject to international monitoring, and reduce these stocks through use or disposal as quickly as that can safely, securely, and cost-effectively be done.[12]

Toward these ends, I recommend that Congress provide funding and direction for NNSA to:

—Further increase the rate of dismantlement of nuclear weapons and HEU components;
—Establish international monitoring of HEU and plutonium declared excess to date; and

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imaginative proposal for a multilaterally owned and staffed enrichment facility in Iran, designed so that it can be easily and permanently disabled if Iran ever takes action to turn it to weapons use, see Geoffrey Forden and John Thompson, Iran as a Pioneer Case for Multilateral Nuclear Arrangements (Cambridge Mass.: Science, Technology, and Global Security Working Group, Massachusetts Institute of Technology, 2006 (revised 2007), available as of 28 April 2008 at http://mit.edu/stgs/irancrisis.html. For a discussion of the current issues, and of a proposal similar to the Forden-Thompson proposal, see William Luers, Thomas R. Pickering, and Jim Walsh, "A Solution for the U.S.-Iran Nuclear Standoff," New York Review of Books, 20 March 2008, available as of 28 April 2008 at http://www.nybooks.com/articles/21112.

[12] In the Trilateral Initiative, the United States, Russia, and the IAEA developed technologies, procedures, and legal agreements that would make it possible for excess material to be placed under international monitoring irrevocably, without revealing classified information. I will address the issue of disposition of excess material in more detail at the end of this testimony. For visionary discussions of the need for both near-term steps to reduce nuclear danger and a broad vision of a world without nuclear weapons, see George P. Shultz, William J. Perry, Henry A. Kissinger, and Sam Nunn, "A World Free of Nuclear Weapons," Wall Street Journal, 4 January 2007, and "Toward a Nuclear-Free World," Wall Street Journal, 15 January 2008.

—Participate in the British initiative to develop approaches to international verification of nuclear disarmament.

These steps are particularly important in the lead-up to the NPT Review Conference in 2010. In 2005, at a moment when the world needed to build consensus on steps to strengthen the global effort to stem the spread of nuclear weapons, the NPT Review Conference collapsed in disarray, in substantial part because the Bush administration refused to even discuss the steps toward disarmament the United States and all the other NPT parties had committed to at the previous review. We cannot afford a similar failure at the upcoming review in 2010. The next president will have to move quickly to re-establish U.S. credibility on nuclear disarmament.

I fear that the recent U.S.-India nuclear cooperation agreement, modifying longstanding nonproliferation rules, may also add to the arguments of nuclear weapons advocates in other countries. Already, Iranian colleagues tell me that nuclear hawks in Tehran have pointed to this accord, arguing that while much of the international community sanctioned India after the 1998 tests, the United States was soon back, looking for a strengthened relationship and expanded trade, and has now said, in effect, "all is forgiven"—and that in much the same way, sanctions on oil-rich Iran would never last long, however far it might push its nuclear program. Congress should carefully consider whether the benefits of this agreement are worth these risks.

STOPPING BLACK-MARKET NUCLEAR NETWORKS

The experience of the global black-market nuclear network led by Pakistan's A.Q. Khan—which operated in some 20 countries for over 20 years before it was finally disrupted, at least in part—makes clear that urgent steps are needed to strengthen the world's ability to detect and stop such black-market networks, and to strengthen global export controls. Unfortunately, it is clear that black-market nuclear networks continue to operate, and to pose serious dangers to the global future.

As with stopping smuggling of nuclear materials, stopping nuclear technology networks will require stepped-up international police and intelligence cooperation; the police and intelligence response must be just as global as these networks are.

It will also require a radical improvement in global controls over exports and transshipments of sensitive technologies. In addition to requiring "appropriate effective" nuclear security and accounting, UNSC 1540 requires every U.N. member state to put in place "appropriate effective" export controls, border controls, and trans-shipment controls. We should be making greater use of this new nonproliferation tool, helping to define what essential elements must be in place for states' controls in these areas to be considered appropriate and effective, and helping states put those essential elements in place. Today, important export control assistance programs are in place which are making a real difference—but they remain limited to a handful of key countries, despite the Khan network's demonstration that countries that no one thought of as having sensitive technology may provide key nodes for a black-market network. I recommend that Congress increase the budget for NNSA's export control assistance program by at least $10–$15 million, and direct the administration to develop a plan for making sure all countries fulfill their UNSC 1540 obligation to put effective controls in place.

REDUCING THE PROLIFERATION RISKS OF NUCLEAR ENERGY

Today, demand for nuclear energy is growing, in response to concerns over fossil fuel prices and availability and over climate change. It is crucial to take steps today to ensure that the spread of nuclear energy does not contribute to the spread of nuclear weapons.[13]

The most critical technologies of concern are enrichment and reprocessing, either of which can be used to support a civilian nuclear fuel cycle or to produce material for nuclear weapons. Every State that establishes an enrichment plant or a reprocessing plant is in a position, should it ever choose to do so, to withdraw from the NPT and quickly produce nuclear material for nuclear weapons. Restraining the spread of these technologies is a critical nonproliferation goal.

There is no prospect, however, for an effective agreement that would ban additional states from developing enrichment and reprocessing technology; states simply will not agree to forswear this possibility indefinitely. The United States should eliminate "forswear" "forgo" and similar "f words" from our vocabulary in discussing

[13] For a discussion, see Matthew Bunn, "Proliferation-Resistance (and Terror-Resistance) of Nuclear Energy Systems," presentation to "Systems Analysis of the Nuclear Fuel Cycle," Massachusetts Institute of Technology, 20 November 2007, available as of 28 April 2008 at http://belfercenter.ksg.harvard.edu/files/bunn__proliferation__resistance__lecture.pdf.

these topics. The best that can be done is to convince suppliers to limit exports of these technologies to additional countries—which they have been doing since the mid-1970s—and, just as important, to give states strong incentives to rely on international suppliers for these services rather than making the large investments required to build enrichment and reprocessing plants of their own.

Congress took an important step in this direction last year in providing $50 million for an international fuel bank, which would increase states' confidence that international supply would not be disrupted. The IAEA is still struggling to reach agreement on the terms and conditions for this bank, and to recruit additional donors. If all goes well, however, agreement on one or more fuel banks could be reached this calendar year.

A fuel bank will be a useful step—but as the commercial market already provides strong assurance of fuel supply for most states, a fuel bank alone will only create a modest additional incentive to rely on international supply. The United States, Russia, and other nuclear suppliers are now working together to put together other incentives—including help with infrastructure for nuclear energy, financing, and the like. "Fuel-leasing"—fresh fuel supply combined with a promise to take the spent fuel away—could be a particularly powerful incentive for states to rely on international supply, since it could potentially allow more states to use nuclear energy without having to establish their own geologic repositories. I do not believe that take-back of spent fuel from foreign countries will be politically tenable in the United States in the near term, whether the reprocessing and transmutation technologies proposed for the Global Nuclear Energy Partnership (GNEP) are under active development or not; but Russia has legislation in place that allows it to enter into such contracts, and others may decide to enter the market for taking back spent fuel in the future.[14]

One step the United States should not take is to build a reprocessing plant ourselves in the near-term.[15] Sending the message that the United States, with the world's largest reactor fleet, considers reprocessing essential to the future of nuclear energy will make it more difficult to convince other countries not to pursue their own reprocessing facilities. This, like RRW and the weapons complex, is an area where there would be nonproliferation benefits from spending less than the administration's request. I recommend that Congress provide a fiscal 2009 budget for GNEP similar to the fiscal 2008 budget provided in the omnibus appropriation, with program direction similar to that this subcommittee provided in its bill last year. Within that overall budget, spending on development of small sealed-core reactors with high degrees of inherent safety and security should be increased, to roughly $10 million. Such reactors—sometimes known as "nuclear batteries"—might be factory-built, transported to where they would be used with a lifetime core of fuel already inside, and then transported back intact after 10–20 years of electricity generation, with little access to plutonium-bearing fuel and little build-up of weapons-relevant nuclear expertise, potentially making nuclear energy widely available with reduced proliferation risks.

STRENGTHENING SAFEGUARDS

Events in Iran, Libya, and elsewhere make clear that the world needs a stronger nuclear safeguards system. The U.S. Government needs to do more to ensure that the International Atomic Energy Agency has the resources, authority, personnel, and technology it needs to do its job. In particular, the United States is behind on its assessed dues to the IAEA, and Congress should provide funding to pay the back dues and direct that the United States pay its dues on time each year. Congress should also provide increased funding for the United States voluntary contribution to the IAEA, in particular to ensure that funding is available for needed upgrades to the Safeguards Analytical Laboratory.

That funding largely flows through the State Department. NNSA's role has traditionally been focused more on technical support for safeguards. But the U.S. investment in safeguards technology and safeguards experts at the national laboratories

[14] Countries can already contract to send their spent fuel to France, the United Kingdom, or Russia for reprocessing, but France and the United Kingdom require that the high-level waste be returned, so countries still need a geologic repository.

[15] For a more extended discussion, see Matthew Bunn, "Risks of GNEP's Focus on Near-Term Reprocessing," testimony before the Committee on Energy and National Resources, U.S. Senate, 14 November 2007, available as of 28 April 2008 at http://belfercenter.ksg.harvard.edu/files/bunn-GNEP-testimony-07.pdf. See also Edwin Lyman and Frank N. von Hippel, "Reprocessing Revisited: The International Dimensions of the Global Nuclear Energy Partnership," Arms Control Today, April 2008, available as of 28 April 2008 at http://www.armscontrol.org/act/2008_04/LymanVonHippel.asp.

has declined dramatically since the early 1990s. Neither the IAEA nor the U.S. programs to support it have the resources needed to adapt the most modern technologies being developed in the commercial sector to the needs of safeguards, or to pursue longer-term safeguards R&D. NNSA has undertaken a very thoughtful "Fundamental Safeguards Review," and as a result of that has launched a "Next Generation Safeguards Initiative." Within nuclear energy R&D, more focus is also needed on "safeguards by design"—building effective safeguards and security in from the outset in design and construction of new facilities, just as is done with safety today. I recommend an increase of $10–$15 million in the funding for this critical effort, to finance both expanded R&D and expanded efforts to recruit, train, deploy, and retain the next generation of safeguards experts.[16]

LIMITING PROLIFERATION OF NUCLEAR, CHEMICAL, AND BIOLOGICAL EXPERTISE

Despite the recent improvements in the Russian economy, I believe that NNSA's scientist-redirection programs continue to offer benefits to U.S. security worth the modest investments the U.S. Government makes in them. Contrary to recent newspaper reports,[17] the fact that some institutes that have received NNSA funds also have some experts who have worked on a safeguarded power reactor in Iran does not in any way mean that NNSA programs have somehow contributed to Iran's nuclear program. Moreover, while a substantial fraction of the long-term jobs these programs have created have gone to people who are not weapons scientists,[18] that is hardly a surprise. It is hard to think of a new business in the United States or elsewhere that has former weapons scientists for 100 percent, or even 80 percent, of its employees.

At the same time, there is clearly a need to reform these efforts to match today's threats. The dramatically changed Russian economy creates a very different threat environment. The experience of the A.Q. Khan network suggests that dramatic leakage of proliferation-sensitive expertise may come from well-to-do experts motivated by ideology and greed, and not only from desperate, underemployed experts. For a terrorist group, a physicist skilled in modeling the most advanced weapons designs—the kind of person who has often been the focus of these programs in the past—may be much less interesting than a machinist experienced in making bomb parts from HEU metal, or a guard in a position to let thieves into a building undetected. Experts who are no longer employed by weapons institutes, but whose pensions may be inadequate or whose private ventures may have failed, could pose particularly high risks, but they are not addressed by current programs focused on redirecting weapons expertise. We need to find ways to address all of the highest-priority risks—but we are not likely to have either the access or the resources to do everything ourselves. The solution is likely to require working in partnership with Russia and other countries, to get them to do most of what needs to be done. I recommend that Congress provide roughly $30 million (comparable to the fiscal 2008 appropriation) for the Global Initiatives for Proliferation Prevention program, with direction to provide an in-depth analysis of what the most urgent risks of proliferation of weapons expertise are, and how they might best be addressed.

INTELLIGENCE AND ANALYSIS TO SUPPORT POLICY

Good information and analysis is critical to implementing successful nonproliferation policies. I recommend increases in two areas.

First, the increased budgets for DOE intelligence that Congress has supported in recent years have supported a number of important new initiatives, such as the Nuclear Material Information Program (NMIP), intended to compile key information on nuclear stockpiles, their security, and the threats to them around the world. But this may have left too little remaining to support the critical capabilities at the national laboratories. It is my understanding that there have been drastic cuts in the budget for Livermore's Z Division, for example—which for decades has provided some of the highest-quality nuclear intelligence analyses available to the U.S. Government (including having been correct about Iraq's aluminum tubes). I recommend

[16] For a similar recommendation for reinvestment in safeguards,, see American Physical Society Panel on Public Affairs, Nuclear Energy Study Group, Nuclear Power and Proliferation Resistance: Securing Benefits, Limiting Risks (Washington, DC: APS, May 2005, available as of 28 April 2008 at http://www.aps.org/policy/reports/popa-reports/proliferation-resistance/upload/proliferation.pdf).

[17] Matthew Wald, "U.S.-Backed Russian Institutes Help Iran Build Reactor," New York Times, 7 February 2008.

[18] See U.S. Government Accountability Office, Nuclear Nonproliferation: DOE's Program to Assist Weapons Scientists in Russia and Other Countries Needs to be Reassessed (Washington, DC: December 2007).

that Congress act to ensure that these critical capabilities are maintained and expanded, while also ensuring that efforts like NMIP have the funding they need.

Second, many important ideas for preventing proliferation come from independent analysts outside the Government. Yet U.S. nonproliferation programs rely much less on work by universities and non-government organizations than many other parts of the U.S. Government do. The U.S. Department of Homeland Security, for example, despite being a relatively new department operating in areas that are often shrouded in secrecy, has established several "centers of excellence" for university-based analysis of particular categories of homeland security problems, along with other programs focused on bringing in academic expertise to contribute to improving homeland security. NNSA should do more to do the same. I believe that each of the largest and most important nonproliferation programs would benefit from having a standing advisory group of outside experts regularly reviewing its efforts and suggesting ideas for improvement. In addition, I believe that NNSA could benefit greatly from a small investment in non-government analyses of key proliferation risks and how they might be reduced more effectively. I recommend that Congress provide $10 million specifically directed for NNSA to support such non-government analyses of effective approaches reducing proliferation risks—and to additional training of the next generation of nonproliferation experts. Depending on the degree of success of this effort, appropriate levels of funding might increase in later years.

REDUCING PLUTONIUM AND HEU STOCKPILES

Finally, disposition of the large excess stockpiles of plutonium and highly enriched uranium (HEU) in the United States and Russia continues to pose an important but difficult policy problem.[19] As suggested above, the United States and Russia should agree to reduce their nuclear weapon stockpiles to very low levels and to eliminate all stocks of separated plutonium and HEU beyond those needed to support those low, agreed warhead stockpiles. This would mean disposition of far larger stocks of material in both Russia and the United States than have been declared excess so far. Since this will take many years, in the near term the United States and Russia should move to legally commit their excess material to peaceful use or disposal and place it under international monitoring to confirm that commitment—sending an important signal to the world that the United States and Russia are serious about their arms reduction obligations, at relatively minor cost.

Disposition of Excess Plutonium

Last year, Congress rescinded the remaining unobligated balances for U.S. and Russian plutonium disposition, and moved the U.S. plutonium disposition program to the Office of Nuclear Energy. This year, the requested funds are in Other Defense Activities.

The cost of the U.S. MOX program has skyrocketed over the years. DOE's latest published estimates indicate a life-cycle cost for the MOX facility of some $7.2 billion (not counting the substantial cost of the pit disassembly and conversion facility). DOE has never adequately explained why this facility is costing many times what comparable facilities in Europe with more capability cost to build. Even once the expected $2 billion in expected revenue from MOX sales is subtracted, this still comes to over $120 million per ton of excess plutonium.[20]

Something has to be done with this plutonium, but it would be surprising if no effective approach could be found that would manage this material securely for less than $120 million per ton. If judged solely as a nuclear energy initiative, building such a plant would certainly not be worthwhile; it would demonstrate nothing except the ability to replicate in the United States an expensive fuel cycle approach with significant proliferation risks that is already routinely done in Europe, and even if a demonstration fast reactor were built for GNEP in the near term (which I believe would be unwise), the initial core could be fabricated elsewhere at lower cost.

I recommend that Congress approve funding to proceed with the MOX plant for this year, while simultaneously directing DOE to carry out an in-depth study of potentially lower-cost alternatives. In particular, Congress should provide funding for

[19] For more detailed discussions, see Bunn and Diakov, "Disposition of Excess Highly Enriched Uranium," and "Disposition of Excess Plutonium."

[20] Total project cost for construction is $4.8 billion. Operations and maintenance is estimated at $2.4 billion. See U.S. Department of Energy, fiscal year 2009 Congressional Budget Request: Other Defense Activities (Washington, DC: DOE, February 2008), pp. The per-ton calculation assumes, over-generously, that the 9 tons of excess plutonium announced in 2007 is entirely additional to the 34 tons covered under the 2000 disposition agreement and costs nothing to process.

DOE to restart development of plutonium immobilization technology, and direct DOE to outline the lowest-cost practicable immobilization option for the entire excess plutonium stockpile; Congress should also direct DOE to include, in its options assessment, the option of transporting the excess plutonium to Europe for fabrication and irradiation in existing facilities there. If, for example, the French were willing to take the United States excess plutonium for $1 billion, the U.S. Government would have saved billions compared to other approaches; if not, that would certainly make clear that even with high uranium prices, plutonium is a costly liability, not an asset.[21]

On the Russian side, critics have raised legitimate concerns about using excess plutonium in the BN–800 fast-neutron reactor, since it creates roughly as much plutonium as it burns. While DOE is working with Russia to modify the reactor from a plutonium "breeder" to a plutonium "burner," consuming more plutonium than it produces, this is largely a distinction without a difference, as the baseline design for the BN–800 produces only slightly more plutonium than it consumes, and the revised design produces only slightly less. More important is the fact that under the 2000 Plutonium Management and Disposition Agreement, spent fuel from plutonium disposition will not be reprocessed until decades from now, when disposition of all the plutonium covered by the agreement has been completed. Thus, a large stockpile of weapons-grade separated plutonium will be transformed into a stockpile of plutonium embedded in radioactive spent fuel—at least for some time to come.

The United States and Russia should agree that (a) the highest practicable standards of security and accounting will be maintained throughout the disposition process; and (b) all separated plutonium beyond the amount needed to support low, agreed numbers of warheads will be subject to disposition. If the United States and Russia agreed on those points, and also agreed that spent fuel from plutonium disposition (a) would not be reprocessed except when the plutonium was immediately going to be reused as fuel, and then under heavy guard, with stringent accounting measures, and (b) would only be reprocessed in ways that did not separate weapons-grade plutonium from fission products, and in which plutonium would never be separated into a form that could be used in a bomb without extensive chemical processing behind heavy shielding, then this disposition approach would deserve U.S. financial support. This is particularly the case as the BN–800 approach fits in to Russia's own plans for the nuclear energy future, unlike previous plans that focused on MOX in VVER–1000 reactors. If the United States does not provide promised financial support for disposition in Russia, Russia may conclude that it is free to use the BN–800 to breed more plutonium from this weapons plutonium, and to reprocess the spent fuel immediately, adding to Russia's huge stockpiles of separated plutonium. Congress should provide sufficient funding for DOE to explore such approaches, and support them if agreement can be reached.

Disposition of Excess HEU

The current 500-ton HEU Purchase Agreement expires in 2013. Russia is likely to have hundreds of tons of additional HEU at that time that are not needed either to support its nuclear weapons stockpile or for naval and icebreaker fuel. Russia has made clear that it has no interest in extending the current implementing arrangements for the HEU Purchase Agreement, under which Russia faces higher costs and lower prices than it would marketing new-production commercial LEU. But a variety of other arrangements are possible that could create substantial incentives for Russia to blend down additional HEU. Congress should direct DOE to enter into discussions with Russia concerning a broad range of possible incentives the United States might be willing to provide to help convince Russia to blend down additional HEU—and should consider setting aside a conditional appropriation in the range of $200 million to finance such incentives if an agreement is reached that requires such funding.

Similarly, the United States can and should expand and accelerate the blend-down of its own excess HEU, beyond the roughly 3 tons per year now planned. Congress should provide additional funding targeted to accelerating the effort to get the HEU out of the canned sub-assemblies and blended down to LEU.

CONCLUSIONS

Mr. Chairman, from al Qaeda to North Korea to Iran to global black-market nuclear networks, the world today faces serious dangers from nuclear terrorism and nuclear proliferation. But there is no reason for despair. Indeed, the global effort

[21] Areva officials indicate that there are now trades among utilities in which some utilities agree to burn MOX fabricated from other utilities' plutonium, suggesting that if the price were right, it might be possible to convince utilities to burn this MOX in Europe.

to stem the spread of nuclear weapons has been far more successful than many people realize. Today, there are nine states with nuclear weapons; 20 years ago, there were nine states with nuclear weapons. (South Africa dropped off the list, became the first case of real nuclear disarmament, while North Korea joined the list.) That there has been no net increase during a period that saw the chaos following the collapse of the Soviet Union; secret nuclear weapons programs in Iraq, Iran, Libya, and, apparently, Syria; the entire period of the A.Q. Khan network's export operations; and the nuclear efforts of al Qaeda and Aum Shinrikyo is an amazing public policy success.

But if we hope to maintain that success into the future, there is a great deal to be done—and substantial parts of the work will need to be done by NNSA. For the coming year, I recommend additional funding and direction to:

—Move toward securing and consolidating all stocks of nuclear weapons and materials worldwide, to standards sufficient to defeat the threats terrorists and criminals have shown they can pose, in ways that will work, and in ways that will last.

—Build effective global standards for nuclear security, in part by building on the foundation provided by UNSC 1540's legal requirement that all countries provide "appropriate effective" security for whatever stockpiles they may have.

—Expand global police and intelligence cooperation focused on stopping nuclear smuggling and terrorist nuclear plots, while modifying our approach to radiation detection and cargo scanning.

—Expand R&D on nuclear forensics.

—Engage with North Korea and Iran to verifiably end their nuclear weapons programs.

—Eliminate funding for RRW; scale back funding for complex transformation to focus on a smaller, cheaper complex to support a smaller stockpile; and increase funding for dismantlement, placing excess materials under international monitoring, and developing international approaches to verifying nuclear disarmament.

—Expand global police and intelligence cooperation to stop black-market nuclear networks, and increase efforts to help countries around the world implement the UNSC 1540 obligations to put in place appropriate effective export controls, border controls, and transshipment controls.

—Provide incentives for states not to build their own enrichment and reprocessing facilities, while reducing the emphasis on near-term reprocessing in GNEP, reducing GNEP's requested budget, and increasing funding for development of small sealed-core reactors with low proliferation risks.

—Reinvest in the people and technology needed for advanced safeguards.

—Continue a modest investment in reducing the risk of proliferation of weapons expertise, while undertaking a fundamental review of the highest-priority risks and the best means to address them.

—Continue to support disposition of excess plutonium in the United States and Russia, while reviewing cost-effective alternatives and seeking new agreements to expand the amount of plutonium subject to disposition and ensure that disposition will be permanent and secure.

—Offer new incentives for Russia to blend far more of its HEU to LEU, and accelerate the blend-down of United States excess HEU.

This is an ambitious agenda. Implementing it will require sustained leadership from the next president, who must move quickly to pursue these and other steps to reduce the threat. I believe that it is critical that the next president appoint a senior White House official with full-time responsibility for leading these efforts and keeping them on the front burner at the White House every day—as Congress directed last year.

Implementing this agenda will also require sustained Congressional support. Congress has a responsibility and an opportunity to exercise in-depth and informed oversight of these efforts, through hearings such as this one and legislation. Congress should give the administration the funding and authority to get the job done, while holding the administration responsible for demonstrable results. In this year in particular, Congress should focus on laying the foundation of policy and authority that will allow the next president to hit the ground running. With a sensible strategy, adequate resources, and sustained leadership, the risks of nuclear terrorism and nuclear proliferation can be substantially reduced. American security demands no less.

Senator DORGAN. Dr. Bunn, thank you very much. We appreciate the comments both of you have made.

Your testimony shows substantial agreement.

By the way, Dr. Bunn, you recommended increased funding in a number of areas. Did you aggregate your request? I noticed you made about three or four in various parts of your testimony.

Dr. BUNN. I have not aggregated them partly because in several areas I do not specify the amount required, and most of those are small ones. I think the total is of the order—it depends on whether you count a conditional appropriation for blending down HEU, but the total is of the order of $600 million or $700 million additional, I believe.

Senator DORGAN. That is a 50 percent increase in the budget.

Dr. BUNN. That is a large number.

Senator DORGAN. You have heard the testimony from Mr. Tobey that the amount requested in the President's budget is sufficient. You disagree with that?

Dr. BUNN. I believe that they are doing excellent work and that they will continue to do excellent work with the budget that they have requested, but I think there are additional opportunities to reduce risks faster and more broadly than they can be reduced with the budget that has been requested.

Senator DORGAN. My question was not whether they are doing excellent work. I made the same observation, of course.

But the question really is what kind of resources are we going to devote to this issue. What is the priority with respect to this issue of nonproliferation? The amount we invest in it tells us a little something about how important we believe it is.

Let me ask a couple of other questions. Dr. Hecker, in your testimony, you write that international efforts have been focused on limiting India's access to nuclear technology, but they have become self-sufficient. So we now do not have access to India's technology developments. You say this should advise our diplomatic efforts.

It seems to me that the message that India and other countries should take from all of this is just ignore the responsibilities, do not sign anything, do not be a part of the international community on nonproliferation, and some day you will get a reward for it because that is, in my judgment, what this agreement with India says. Tell me why that is an inappropriate conclusion.

Dr. HECKER. On the basis of my recent visit to India and in talking with the Indian nuclear establishment, if you are asking why do they stay outside of the nonproliferation arena—is that correct? I am not sure I understood your question correctly.

Senator DORGAN. My question is, why would India and other countries not take as a lesson from this that if they just say we are not interested in the Nonproliferation Treaty, we do not have any intention of being part of this international agreement, and by the way, if we just wait long enough, you will come to us, there will not only be no penalty for it, we will be rewarded for it because we will reach an agreement with the United States on a nuclear agreement? And that agreement will allow us to have certain nuclear facilities behind the curtain with which we can produce the material to build additional nuclear weapons. It seems to me that is the message of this agreement with India. Why would other countries and India not receive that very message? And that message in my judgment is destructive.

Dr. HECKER. That is a reasonable United States point of view.

Let me just, if I may, give you the Indian point of view, as I talked to the Indian nuclear complex people. And they view it very differently. They do not view themselves as a proliferator. They view themselves as a legitimate nuclear weapons state.

They happen to be caught on the wrong side of the divide when the decision was made in 1968, that those five countries that tested before 1968 would now be allowed to keep their nuclear weapons for some time, as article VI states, and others would not be allowed to acquire them. And the way the Indians view this is they did not test before 1968 in spite of the fact that they had substantial nuclear capabilities indigenously, much more so than China. But they, in essence, decided to refrain from nuclear testing. Their reward for refraining from nuclear testing is that they were now caught outside of the nuclear proliferation regime.

They view that as having been discriminatory from the word go. They will never then abide to it. They will never get rid of the nuclear weapons they have now until there is global disarmament. And so they view it and say, well, look, if you in the United States and the other four so-called parties of the permanent five get rid of your nuclear weapons, so will we. So it is not surprising that the Indians take a very different point of view.

To me now the issue is do you recognize the fact that India will not give up its weapons, and as I indicated in my testimony, I do not think our sanctions have particularly stopped its nuclear weapons program. What our sanctions have done, however, is slowed down their nuclear energy programs. In turn, they have made the Indians actually significantly more capable in nuclear energy technology to where today it may actually, I believe, be much in our benefit to have nuclear cooperation for nuclear energy with India. And so one has to do this tradeoff and in the end make the decision as to whether the risks are worth the benefits.

Senator DORGAN. But it is curious, it seems to me, when we talk about nonproliferation, that we are reaching an agreement with a country that will allow them to produce additional nuclear weapons outside of what has been the established normative here, that is, the Nonproliferation Treaty. But I understand your answer from the perspective of India.

I certainly believe the message we are sending to the world is hang in there. This country will recognize your right to build additional nuclear weapons. A lot of other countries would say, well, they are left outside of the effective date as well. That exclusive club that had nuclear weapons—what makes them so exclusive?

But let me go beyond this and ask. The renewed calls these days from some quarters for the reconsideration and ratification of the Comprehensive Test Ban Treaty—a treaty I support, by the way, a treaty unfortunately which the Senate rejected some years ago. Could you give your opinions on the issue? And as a former national laboratory director, Dr. Hecker, could you talk about the certifications and the scientific challenges with CTBT, and has progress been made in those areas? Because some have alleged that the capability does not exist to provide certification.

Dr. HECKER. I was there as director of record in 1996 when that decision was made by President Clinton, and I have reflected often on the overall decision of the Comprehensive Test Ban.

What I would like to say, particularly still being close to having had the responsibility at Los Alamos to certify the safety and the reliability of nuclear weapons, that test ban comes with a price. And there is no question today that, as I look back since 1996, the last 12 years, because of the test ban, it has taken us longer. It has cost us more to recertify nuclear weapons fabrication. That was particularly for the plutonium component that was moved from Rocky Flats to Los Alamos.

It is costing us from the standpoint of understanding the effects of aging in the nuclear stockpile, and slowly our confidence erodes, which could be boosted by nuclear testing. And so there is no question there is some risk associated with that. However, annually the laboratory directors must assess that risk and certify it to the President that the stockpile is still safe and reliable without nuclear testing. And I did so for several years and my colleagues have done so since then.

So now what I have to do is trade that off versus the benefits of a nuclear test ban, and there I say today that the greatest risk of going back to nuclear testing is that the Chinese would go back to testing and the Indians would go back to testing, the Pakistanis would go back to testing. And as I personally today weigh those risks, I definitely come out in favor that it is in our Nation's and the world's interest to actually ratify the Comprehensive Test Ban Treaty.

Senator DORGAN. Dr. Bunn?

Dr. BUNN. Well, I completely agree that it is in our Nation's interest to move forward with the comprehensive test ban. I think that as we look toward trying to strengthen the nonproliferation regime and get other countries to accept stronger safeguards, more export controls, tougher enforcement, and more restraints on fuel cycle facilities, that we will not be able to get that unless we are seen to be living up to our obligations under article VI of the Nonproliferation Treaty. And the most important single thing that the non-nuclear weapons states see as central to that is the Comprehensive Test Ban. And so that is a political factor, in addition to the technical factors that Dr. Hecker was mentioning.

On the technical side, I should also mention—I am sure Sig would agree—that the investments that we have made in the experimental facilities at the DOE facilities, the NNSA facilities, and the supercomputing and simulation capabilities have dramatically improved our understanding of the processes that take place in nuclear explosions compared to what they were before. There is a lot more that we know and there is a lot more that we know on the verification front as well. Seismology has moved forward very significantly since the Senate voted some years ago.

As you know, under General Shalikashvili, the National Academy of Sciences produced a report that looked at all of the technical issues that were raised in the Senate debate on the Comprehensive Test Ban and argued that all of them could be successfully addressed.

So I believe it is very important that the next President, first of all, recommit the United States to the Comprehensive Test Ban and then begin the process that will be necessary to build support over time in the Senate because the last thing we want to do is

bring it to the floor again in the Senate and have it voted down again. That would be, I think, a major mistake.

Senator DORGAN. It is sort of counter-intuitive when we talk about nuclear weapons and risks. I was just thinking, Dr. Hecker, you described the risk of them not working, but we have always built nuclear weapons with the understanding we are building them so that they can never be used. And the risk is not so much that they would not work. The risk is that they would be used and would work. So it is sort of counter-intuitive even to discuss a weapon that, in my judgment, can never again be used on this planet because we have got tens of thousands of nuclear weapons.

I am going to submit questions on RRW and some other issues because I have taken more time than I wished.

Dr. HECKER. Mr. Chairman, if I may just say, I respectfully disagree with that, and that is, that yes, indeed, we expect and hope those weapons will never be used. However, if we have them in the stockpile, first of all, we must assure that they are safe—that is a huge, huge job—and that if our Nation's defense rests on that, that they do work, to both assure our own leaders and also to assure our allies. So I think it is no good to have a deterrent in the stockpile that is deteriorating that we lose confidence in. We must have confidence in spite of the fact that we hope to never use it.

Senator DORGAN. Yes. Our Nation's defense, in my judgment, rests on the notion that they can never be used because there is no defense that provides any assurance for any life in this country if we have exchanges of nuclear weapons on this planet.

The point you make is a scientific point and an understandable point to me, that as long as weapons exist, you want some assurance that they will detonate if used. I think any potential adversary on this planet would be just nuts to believe that our nuclear stockpile somehow is something that does not work.

Having said all that, we have nuclear weapons. First, we have to protect them to make sure they are not in the wrong hands, and when I speak this way about nuclear weapons, people call.

But at any rate, I think both of you have an unbelievable amount of information to provide the Congress and have done so over the years, and I deeply appreciate the work and your testimony today.

I am going to submit questions, as I said on RRW, on and a couple of other things, if you would be kind enough to respond to them.

Senator DORGAN. Let me call on my colleague, Senator Domenici.

Senator DOMENICI. Thank you very much.

Let me just say I am not a scientist like Dr. Hecker. I do not think his answer disagrees with you, it was a scientific answer. But without a lot of words, I want to say that I would put my marbles on your side of the argument, Dr. Hecker. I appreciate your being here to give us your expertise.

Let me talk with you a minute about North Korea, Dr. Hecker. I was privileged a number of years ago, maybe seven. Five Senators and their wives were permitted to land the first American airplane in North Korea at their capital city. We stayed there 2 days. They have an encampment for visitors that is much like Russia had when they had a communist state. It was off on the side and it is beautifully built, and you would never know that poverty

abides everywhere because it is a very nice, beautiful looking place. But the visit truly pointed out what an abominable place it was to live.

I assume in your trips you have been permitted to see more of North Korea than just the place where we put guests. You have visited some cities. You have seen something of their infrastructure and how they live. Is that a fair statement?

Dr. HECKER. Yes. I have been able to see more of North Korea than, let us say, just the inside of the ministry of foreign affairs and Yongbyon. However, everything that they show us, of course, is heavily scripted. But, nevertheless, on the drive out to Yongbyon you see a lot of the countryside, and I had occasion in August 2007 to be going out there when they had the heavy floods that caused the enormous damages. I got a chance personally to view what their infrastructure is like, and quite frankly, for the most part, they have a difficult time getting things together. But when you get into the nuclear complex, they have clearly put their capabilities there.

But the place is changing. Over the five trips that I have taken, I have seen Pyongyang change. I would say, in spite of everything we think, the place is not about to fall apart.

Senator DOMENICI. So you think the government is truly in control.

Dr. HECKER. Yes. You mean the nuclear weapons and the nuclear materials?

Senator DOMENICI. The nuclear weapons and the nuclear materials are in very good shape and controlled adequately by the government. Is that correct?

Dr. HECKER. Right. And I have had that discussion directly with the people at Yongbyon to express our concern, your general concern, about nuclear material security, and what they say, of course, is not to worry. We know how to protect our materials. My assessment in North Korea is that, yes, the government controls those materials. What you have to worry about is making sure that the government itself does not export those materials.

Senator DOMENICI. I think what I am going to do, Dr. Bunn—I have a number of questions. I think I am just going to submit them, but I would just end this conversation with you with a little discussion of Iran. In fact, both of you are free to discuss with me what you like on Iran.

We happen to be talking about two of the most difficult situations when we speak of North Korea and Iran. Could I ask both of you to talk about your concerns with reference to where Iran is today and where you think they are going to go? And are we handling the situation correctly in terms of trying to inhibit them from getting a nuclear weapon at this point? Let us start with you, Dr. Hecker.

Dr. HECKER. My view is that Iran is putting in place all the pieces for what I call the nuclear weapons option, and it is not only the highly publicized facilities at Natanz for uranium enrichment which is one path to the bomb, that is, to enrich uranium to bomb-grade. They are clearly doing that under the umbrella of saying they are doing this for nuclear energy, and it turns out that is legitimate. But, of course, the concern is if they keep going, they can

make bomb-grade material. That is what worries us, and we have no assurance at this point that they will not keep going.

But they also have a program that is much less publicized and that is, they are building a small reactor. And it is the type of reactor that would make good bomb-grade plutonium the same way that North Korea is making bomb-grade plutonium. It is a little different design, but it makes just as good bomb-grade plutonium. And they are continuing with that project although at a reasonably slow pace, but they are continuing. And associated with that, they have developed a heavy water plant that supplies that reactor which is necessary for eventually making bomb-grade plutonium.

The fact that they have all those pieces in place worries me significantly. And yet, as to whether they have made the decision to go to nuclear weapons, I cannot tell that, but the capabilities are such that they could do so in the future.

In terms of what we are doing currently, I guess much like in North Korea, I feel in the end that you are best off if you have an in-country presence, if you have a dialogue regardless as to how distasteful you might find that dialogue. I think we missed a significant opportunity in 2003 with Iran, as we missed a significant opportunity in late 2002 with North Korea. Now it is more difficult to get back in the game.

I still favor the dialogue, but somehow we still also need to look at plan B, what if all of this fails. The most important way that I could see at this point to get Iran to take a somewhat different tack is you have to enlist China and Russia to put a serious squeeze on Iran to make sure that they understand that developing that complete nuclear weapon option cannot be done for free.

Senator DOMENICI. Dr. Bunn?

Dr. BUNN. I think, unfortunately, that our—I agree completely with Sig that we missed a major opportunity in 2003 and also some other opportunities with Iran. I think that our policy of refusing to talk, while the Iranians kept building, essentially just gave the Iranians the opportunity to keep building. And so now we are where we are today with more than 3,000 centrifuges in place in Natanz, and unfortunately, we have to cope with that reality.

I think that the next President is going to have to engage if we are going to get any kind of restraint on the Iranian program, and we are going to have to put together a package of carrots and sticks that is big enough and credible enough. And I think it has to have some significant carrots and not just the sticks to convince the Iranian Government that it is in their interest to reach an agreement that deals with at least some of our security concerns, and if we are going to convince them of that, it has to be something that the advocates of compromise in Tehran can go to the Supreme Leader Khamenei and make the case and win the debate with the hawks in Tehran. And that means we are going to have to address some of the Iranian concerns if we want them to address some of our concerns, and it is going to be a difficult discussion. It is going to involve some hard choices.

I had the opportunity—a couple of years ago, we had in our research group at Harvard a former deputy foreign minister of Iran, and shortly after his arrival, he had said to us that, while he would come, he would not actually write about nuclear matters while he

was in the United States because it was too sensitive back home. A week after he arrived, he sat down in my office and said let us write a joint proposal for how to solve the Iranian nuclear problem. I said, surely, you must be kidding. There is no way that you and I could possibly come to an agreement on what ought to be done with Iran's nuclear program. And in the course of a day, we actually did and then published a piece that was a joint proposal on how to address the Iranian nuclear problem.

So the experience that there are people who remain well placed within the Iranian regime who are willing to compromise made me at least a little more optimistic, but it is going to be a hard problem.

Senator DOMENICI. Thank you very much.

Senator DORGAN. Senator Feinstein?

Senator FEINSTEIN. Thank you very much.

You both are very respected, and it is a very fine thing for us to be able to listen to your views.

Dr. Bunn, I have been reading your statement, and I want to ask you about one part of it in a moment. But could you please send the committee your recommendations as they relate to the numbers, the dollars, for each of the areas in writing? We would appreciate that very much.

But I wanted to express my concern, Mr. Chairman, because I very much agree with your views on this issue, the fact that we have cut out the money for new nuclear programs.

And I do want to raise an issue of the labs. I am very concerned because I am really not sure where this is going. All of the labs are taking cutbacks. I know in some detail about Lawrence Livermore. I do not know about the other two.

However, at Lawrence Livermore, there is a $280 million shortfall. They are terminating 750 people, 250 voluntarily, 500 not voluntarily. Pink slips will go out in May. Three hundred and fifty of them are senior scientists and engineers. That should be a real national security danger point. I have had two discussions with Mr. D'Agostino, whom I respect greatly, who has pointed out to me that the labs now need to become more competitive and they are going into nonproliferation areas. I do not know what this means with specificity. I am very concerned about it.

I am also very concerned about when you add up the cutbacks at Los Alamos, Sandia, and Lawrence you are going to have many, many senior scientists and engineers without employment. I think this is a national security danger point.

I also think that we ought to know exactly where these labs are going. As they have associated themselves with a private contractor, they lose their exempt status. They become LLC's. They have to pay taxes, and there is a fee associated with them which, in the case of Lawrence Livermore, is $44 million this year for Bechtel. So where are these labs going to go long-term now? And what are they going to sell? To whom are they going to sell it? I think we ought to begin to take a good look at that.

Senator DOMENICI. I am with her.

Senator FEINSTEIN. Now, let me go, Dr. Bunn, to your statement, particularly on the limited role of radiation detection. You point out that neither the detectors being put in place nor the advanced

spectroscopic portals planned for the future would have much chance of detecting and identifying uranium metal with modest shielding, although they might be effective in detecting plutonium or strong gamma-emitters used in a so-called dirty bomb.

This is a big area of concern for many of us. You say that it is worth making some investment in radiation detection but not putting undue reliance on this line of defense. The NNSA's second line of defense has been successful in cooperating with many countries to put radiation detection in place at key ports and border crossings. You go on then to describe a modified approach to cargo scanning.

Could you please verbally share this with this subcommittee? This is one of our big concerns. I can speak as somebody on the Intelligence Committee, a big concern about a dirty bomb coming into this country in some way. What do you believe is the most effective way we have of detection?

Dr. BUNN. Well, I think, first of all, that we really need to look at it from a systems point of view and not just does this detector at this particular border crossing work. You have to think about, okay, if I am the bad guy, am I going to see that that detector is in place and go around that border crossing and go somewhere else. So you need to look at it from the point of view of the effectiveness of the total system, not just the effectiveness of a particular detector at a particular point.

Now, I think the detectors we are putting in place now will work very well in detecting the kinds of things that would typically be used in a dirty bomb except in the case of alpha-emitters, like americium 241 that would be hard for them to detect because alphas are not very penetrating. But I think overall the dirty bomb threats are bigger from the big gamma-emitters like cesium and cobalt and things of that kind.

Now, I do believe that in my view Congress made a mistake in insisting on scanning of 100 percent of the containers coming to the United States. I think that is going to be very expensive. I think it is probably not going to be doable because in some cases, for example, a container gets shipped out of one port, heading for another point, and then it gets shifted from one boat to another without ever getting to the other port, and then comes to the United States when you did not know it was headed for the United States when it left the first port. That is just some of the realities of global shipping today.

So I believe what we need to focus on is what would we need to do to deter the terrorists from using those containers, and that means we need to make sure that the terrorists think there is a big risk that that container will be scanned, think that there is some significant risk that what they have put in it will be found if it is scanned, and think that we will take some significant action if it is scanned.

The way the law is written now, there are no standards for how good those scans should be, what actions should be taken if something is found, and I think it creates an incentive to put in a lot of shoddy scanning, frankly. You know, a country claims, oh, yes, I scanned that, but there is no good scanning.

Again, you have to look at the total system. What if you scan a container and then you put a seal on it, but it is a crappy seal and anybody could open the thing after you have scanned it and put something in there and put the seal back on, and nobody would be the wiser? So you have to look at the whole system to understand how effective it is going to be and where the vulnerabilities are because, frankly, the bad guys we are dealing with are intelligent folks, and they are going to be watching what we are doing and trying to figure out what the weaknesses are, just as they noticed that we were not looking for box cutters on airplanes before 9/11.

Senator FEINSTEIN. Thank you very much. I think my time is up. So let me stop now. Thank you.

Senator DORGAN. Senator Allard?

Senator ALLARD. Thank you. I just have one area that I wanted to inquire about and that is the additional dollars to put into the International Atomic Energy Commission. I think the request for $5 million to $10 million. What is the basis for this specific request, and how did you arrive at that particular amount?

Dr. BUNN. Well, this is specifically for the IAEA Office of Nuclear Security. This is something that existed in sort of embryonic form before 9/11, but it really grew substantially after 9/11.

They spend about $20 million a year today. They provide, I think, critical services in providing international peer reviews of nuclear security arrangements, not only physical protection but also control of radiological sources, border radiation detection, and the like, development of international recommendations of standards for different aspects of nuclear security, and also tracking of nuclear smuggling for the entire world community, not just for the U.S. Government. A lot of these things are things that we cannot do as well ourselves because the IAEA has the sort of international legitimacy of being an unbiased international institution.

Another $5 million or so would allow them to significantly increase the pace at which they can meet member state demands for peer reviews of nuclear security and other nuclear security assistance. I think it would make a significant difference in the effectiveness of that operation. This goes into what is now called the nuclear security fund, which is almost entirely voluntary contributions by states. I think ultimately we need to move security into the regular budget of the IAEA so that states do not have to keep coughing up these voluntary contributions.

Senator ALLARD. How would you evaluate their job? Do you think that they have strengthened nuclear security worldwide?

Dr. BUNN. I think they have contributed significantly. I think there are weaknesses. Some of the weaknesses are their fault. Some of the weaknesses are imposed on them. For example, they are constantly struggling with not having enough money and almost all the money they do get is earmarked by the various donor states that provide the money. And so they frequently come up—you know, they send a team out somewhere and they come up with some urgent priority that needs doing and they have not got any money to do it.

Now, as I mentioned, I think they do have a tendency to be a tad on the bureaucratic side and to focus perhaps more on the legal niceties than on getting the job done in some cases. But I think

overall they are doing as well as we can generally expect these international institutions to do, and I think that money would be well spent and well invested.

Senator ALLARD. And you are confident that—the $5 million to $10 million that we would put in there—does it go with strings attached, or is it flexible money?

Dr. BUNN. It depends on what Congress tells the NNSA to do. I am sure that if Congress simply said it needs to go to the IAEA and let NNSA decide how, that NNSA would attach strings. There is no doubt in my mind about that. So I think that is up to Congress to say either give it as money that they can spend on their own priorities or allow NNSA to make sure that they spend it on NNSA priorities.

I personally would prefer that at least a significant portion be available to the office without strings so that when they do encounter these unexpected opportunities to reduce risk, that they will have some money available to do that.

Senator ALLARD. Thank you, Mr. Chairman.

Senator DORGAN. Thank you very much, Senator Allard.

Senator Domenici, did you have any additional inquiry?

Senator DOMENICI. Thank you, Mr. Chairman. If you do not mind, just a couple, I will not take long.

Maybe I could ask Sig this question regarding North Korea. What do you make of the current reports of North Korea's nuclear cooperation with Syria? And then Israel bombed the major facilities. I have been briefed and seen what I am permitted to see that I cannot bring here, but I know Israel did wipe out a major facility that was shown before its being bombed and the evidence indicating that it was a nuclear bomb facility.

What do we do about and what is your thinking about North Korea doing these kinds of things while we are working with them? Would it be credible that they would negotiate something honestly while they are doing this kind of thing with Syria?

Dr. HECKER. My opinion is that the CIA in its revelations a week ago made a very credible case that the facility in Syria was a nuclear reactor. They made a credible case that most likely North Korea built that reactor with Syria. So I personally believe there was a very strong connection between North Korea and Syria. It is a collaboration that had been ongoing at least for the last half a dozen years or so and perhaps planned for the last dozen years or so. And it went on at least until the time that Israel bombed it.

In terms of the immediate risk, of course, it turns out Israel took care of the immediate risk because Syria itself does not appear to have the capabilities to have done much with that, and that is why it, in essence, needed the turnkey operation.

This to me, in terms of our relationship with North Korea, is the most troubling. And my own sense with North Korea has been sort of a two-pronged approach, all of it based on making certain that the actions we take with North Korea actually reduce the risks to us. And that is, first, make sure that they make no more plutonium, and that is where disabling and dismantling the Yongbyon facilities come in. And that has to remain first priority. No

Yongbyon, no more plutonium, no more bombs, and no better bombs. That is key.

The second is no export. The key thing is the export of the plutonium. There cannot be export of plutonium. I personally believe that there was not because North Korea had so little. Again, if they make no more, the chance of exporting plutonium goes down.

However, then the next risk is exporting the nuclear technologies such as building the reactor. And quite frankly, to me what is of much greater concern is that export occurred to Iran rather than Syria. Syria in the end cannot do much with it, but Iran could do much with it.

And so that has to be the next point to press with North Korea in our negotiations. I do not believe that all of that is going to be forthcoming right now in the declaration. I think it is more important to go ahead and eliminate Yongbyon and then make certain that we walk down the path because what Syria has demonstrated is that in spite of the fact that we have been watching so closely—we think our technical national means are so good—they built a whole reactor under both ours and the Israelis' watchful eyes. How did they do it? What does that mean in terms of international proliferation rings? These are very serious issues to all of the questions that you have put on the table. North Korea could actually now help us unravel that, and that is the place where we have to press them. But let us shut down Yongbyon first. That is my view.

Dr. BUNN. Let me just add that in one respect the Bush administration has done a better job than Will Tobey admitted in that the October 3, agreed statement does, in fact, commit the North Koreans not to export any nuclear technology or materials. Now, our ability to verify that, of course, is another question, but there is the commitment in place signed by the North Koreans. And the North Koreans have repeatedly reiterated that commitment, including in Sig's most recent trip. So I think that is very critical. The North Koreans have heard the message that that is a red line for us and they have committed not to cross that red line.

Senator DOMENICI. What is going on that makes North Korea, in your opinion, willing to make any agreements with our world versus theirs? Why do you think they would do this?

Dr. HECKER. I am sorry, Senator.

Senator DOMENICI. Why will they enter into agreements and carry them out with the United States and others? Are we giving them something that they need? Are we going to help them feed their people? Why would they do this?

Dr. HECKER. I am best at evaluating their capabilities, not necessarily their intent. But having been there a number of times, I actually believe that they recognize that their economy is in serious trouble. They have to do something to feed their people. They actually do view, in my opinion, the United States as the key to that. The United States holds the key to international commerce, and even though the Chinese and the South Koreans are helping to feed the North Koreans now, in the end, the North Koreans recognize unless they strike some sort of a deal with the United States, they are not going to be able to get out of the economic hole that they are in. I personally believe that is why they are trying to make the deal with the United States.

Senator DOMENICI. Well, let us hope we remain economically strong enough for their belief in us to be a reality. I am not sure of that.

Senator Feinstein, since you talked about something a moment ago, might I say that on the Los Alamos layoffs, there is a very different flow of those people leaving and what were the people leaving doing—it is much different than Lawrence Livermore. Nonetheless, it is a serious problem, and I would say your willingness to try to do something about it—I will join you. I have talked to the chairman enough about it. I think he would.

The problem is we do not have anyone that understands this problem that is in the business of allocating the money that goes to the various subcommittees. If somebody allocating knew that we cannot take care of the laboratories and the water programs, the Corps of Engineers programs on the money that is being given to us—we have to trade off water programs for the laboratories. God only knows, nobody would ever have thought we would be doing that, but that is the budget we have got. The big, giant Corps of Engineers—and everybody wants that, and that is to be matched up with the most vital science part of the national budget that there is, the national laboratories. It is kind of a crazy thing.

I managed to get by for about 12 years doing it, but it is coming to a head as the squeeze is put on the discretionary domestic programs. We get knocked in the head on that on our side. So do you. So I do not know how to solve it, but I am willing to try with the chairman who knows our allocation must go up or we will have the same problem again.

Senator DORGAN. Well, if I might say, our allocation is a serious problem. As you know, last year we went through—this is very destructive, this process that we are in, where we do not even get appropriations out until December or perhaps January because then you are 4 months into a fiscal year running a laboratory without any notion of what kind of resources are going to come your way.

But the fact is—there is lots of responsibility on all sides for this. We get an executive budget that cuts to the bone domestic discretionary, and our subcommittee cuts $1 billion out of water projects in the Corps and the Bureau in this year. We are not going to do that, but that is what the executive budget does.

Then the President says I want $196 billion in this fiscal year as an emergency for Iraq and Afghanistan, and then we add in the appropriations process for this fiscal year $21 billion on domestic discretionary. The President says I am going to veto all those bills. So we are at a standoff.

Now, Senator Domenici is correct that within the confines of the resources we have available, trying to negotiate with a President that last year said I do not intend to negotiate, it is going to be my way on domestic discretionary—within the construct of that, as Senator Domenici is talking about, what kind of allocation do we get in this subcommittee versus other subcommittees? But frankly, the whole system is broken at this point.

And I just want to make a point that I think that if we continue down this road, we are going to dramatically weaken and injure all of our national laboratories, and I have said before these are national treasures. These are repositories of investment—they are in-

vestments in the future, repositories of vast amount of knowledge and talent. And if we lose that, we will lose a lot more than just a few layoffs or even thousands of layoffs, as the Senator from California indicated. We need to find a way, even outside of the discussion about should there or should there not be an RRW, even outside of those issues, to stabilize the employment levels at our national laboratories so that they can continue to attract our best and brightest and continue to do the work that gives us the innovation for the future. We are going to try to do that.

But boy, I am telling you, I think the entire system is broken. It starts at the White House and continues on through here. I think the President and the Congress have to understand what we are going to lose if we continue down this road.

Senator FEINSTEIN. If I may, Mr. Chairman. I agree with what both of you said, what Senator Domenici said. After listening to Mr. Anastasio talking to the head of the nuclear agency, what they are doing is accommodating the people to the budget, which is dropping dramatically. That also changes the mission.

What we do not know is how the mission of the labs is going to be changed by this, and I think we ought to know it. Now that there is competition and privatization in these labs, how exactly is that mission going to change? I do not want to get 5 years down the pike and find out that something dreadful is really happening at the labs that we did not know about, and this worries me greatly. So I would hope that we can get the actual figures. We can talk with people who know.

Mr. D'Agostino tells me, well, they are going more into nonproliferation. What exactly does that mean? What do they do? Are they selling? What are they selling? So I think we need to know the answers to these questions, and I look forward to working with you.

Senator DORGAN. Let me just say that I consider this a priority, and I think our staffs will work with us to try to determine, within the confines of the rather broken system we are working in at the moment—we need to find a way to strengthen and try to provide some stability for our national laboratories. So that will be a priority for this subcommittee.

As you know, we probably will mark up sometime in late May or early June in a subcommittee, and then go to a full committee markup. And I guess the question this year is going to be will there be negotiations with the White House—if so, when—on domestic discretionary. But we have taken a pretty good whack on the domestic discretionary recommendations in the President's budget. Last year he did the same and said I am not going to negotiate from that point really. Again, there is lots of responsibility on all sides for this. We have to try to get this right.

Dr. Hecker, you wanted to comment?

Dr. HECKER. Yes, Mr. Chairman, Senator Domenici, Senator Feinstein. Senator Feinstein, you raise a question that is very near and dear to my heart. For 34 years, I worried precisely about that and especially the 12 years as director at Los Alamos.

Just to briefly comment. To me it takes three things that we need to sort out. One you have mentioned is the mission. Quite frankly, as Senator Domenici knows, in 1992 when the Soviet

Union collapsed, we had to struggle with that, but we found a mission. We decided what the laboratories needed to do from a national interest. I think the mission can also be redefined, but obviously, somebody has to do it. The mission is still there. So, first, mission.

Second, budget and you have mentioned that. Clearly, the budget is important. I will not need to elaborate on that.

But third no one has mentioned, and it is actually in my opinion the most important, and that is the environment at these laboratories. When we went the direction of contractorization, we made a grievous error of pushing these laboratories in a direction that simply is not right for this country, and we have suffered from that. The whole environment at these laboratories has changed.

Second, over the last, I would say, now 16 years, the regulatory environment at these laboratories has become so risk-averse that we essentially cannot get work done anymore. In 1965, I came to Los Alamos as a young student because it was the best place to go work. Unfortunately, these laboratories today are not the best places to go work anymore, and we need to make them such. And just more money does not do the trick. We have to change the working environment to allow people to get their work done. These places nowadays look more like prisons than they look like university campuses or something in between, which is what we tried to make them. Attract the best, protect the most important. We have lost the sense of all of that. That is one of the reasons why these laboratories are suffering today.

So, Mr. Chairman, when you say the system is broken, it is broken in many different ways, and we should fix. I agree.

Senator DOMENICI. What did you say? When we moved toward what? Privatization you said?

Dr. HECKER. I am sorry.

Dr. BUNN. He said contractorization.

Dr. HECKER. Oh, I am sorry. The contractorization to actually move the system, as Senator Feinstein has pointed out, to limited liability corporations, companies that are for-profit companies where we are paying enormous amounts to have these laboratories run. These laboratories used to be run as a public service for the United States of America. They should not be run for profit. What we do in essence is a semi-government function.

Senator FEINSTEIN. The University of California did this as a public service to the country.

Dr. HECKER. Correct.

Senator FEINSTEIN. And now essentially they are replaced by private companies that charge substantial fees.

Senator DORGAN. At a recent hearing, we developed that point, that there is a substantial increase in costs as well. And I think there is a difference in culture I think is what you are referring to.

CONCLUSION OF HEARING

Let me thank both of you for being here and contributing to the subcommittee.

This hearing is recessed.

[Whereupon, at 11:39 a.m., Wednesday, April 30, the subcom mittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

NONDEPARTMENTAL WITNESSES

[CLERK'S NOTE.—At the direction of the subcommittee chairman, the following statements received by the subcommittee are made part of the hearing record on the Fiscal Year 2009 Energy and Water Development Appropriations Act.]

DEPARTMENT OF DEFENSE—CIVIL

DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS—CIVIL

PREPARED STATEMENT OF THE NATIONAL CORN GROWERS ASSOCIATION (NCGA)

The National Corn Growers Association (NCGA) appreciates the opportunity to share with the subcommittee our Energy and Water Development Appropriations priorities for fiscal year 2009. In general, our appropriations priorities include an overall increase in U.S. Army Corps of Engineers' funding to address the needs of our failing inland waterways system; securing $50 million in the Fiscal Year 2009 Energy and Water Development Appropriations bill for the Upper Mississippi River System (UMRS)—Navigation Ecosystem Sustainability Program (NESP) authorized by H.R. 1495, the Water Resources Development Act 2007, title VIII, secs. 8001–8005; and continued support for the Department of Energy's Biomass Technologies Program.

NCGA's mission is to create and increase opportunities for corn growers. NCGA represents more than 33,000 members and 48 affiliated State organizations and hundreds of thousands of growers who contribute to State checkoff programs.

U.S. ARMY CORPS OF ENGINEERS

Our country's inland navigation system plays a critical role in our Nation's economy, moving more than a billion tons of domestic commerce valued at more than $300 billion. Each year, more than 1 billion bushels of grain (over 60 percent of all grain exports) move to export markets via the inland waterways system. Inland waterways relieve congestion on our already over-crowded highways and railways that run through cities. One jumbo barge has the same capacity as 58 trucks or 15 rail cars. A typical 15-barge tow on our Nation's rivers is equivalent to 870 trucks.

Additionally, navigation offers transportation with unparalleled environmental benefits. Barges operate at 10 percent of the cost of trucks and 40 percent of the cost of trains, while releasing 20 times less nitrous oxide, 9 times less carbon monoxide, 7 times less hydrocarbons, and burning 10 times less high-price fuel.

Unfortunately, investment in the inland waterways system has not kept pace with its needs and is deteriorating. In 2006, more than half of the 240 operational Corps-funded lock chambers in the United States—which handle over 625 million tons of freight each year—are over 50 years old and have exceeded their economic design lives. Many locks currently in use are too small for today's larger tows, susceptible to closures and long delays for repairs and unable to effectively deal with lines and

wait times that result from their obsolescence. In recent years, several high-profile closures have raised reliability concerns among shippers, carriers, the U.S. Army Corps of Engineers, and ultimately consumers who pay increased costs for expensive transportation delays.

Funding (in constant dollars) for Operations and Maintenance (O&M) on America's inland navigation system has remained flat for more than 2 decades. During this period, an increasing amount of routine maintenance on waterways infrastructure has been deferred. This deferred maintenance has become unfunded maintenance, and the aging waterways infrastructure, combined with the growing O&M backlog, has created today's average of 30 unscheduled lock shutdowns per year.

Tight O&M funding and the resultant "fix-as-fail" policy have led to a self-defeating cycle where routine maintenance dollars are now needed for emergency repairs. As critical maintenance needs grow, they become candidates for major rehabilitation—a trend that is not good for the waterways industry or for the Nation.

NCGA is appreciative of the successful efforts made by this subcommittee in recent years to increase the budget for the U.S. Army Corps of Engineers. NCGA strongly supports continuing this trend with a significant increase over last year's funding levels to address the critically needed repairs and delayed construction schedules facing the Corps. It's important to get our inland waterways infrastructure back on track so we can meet the ever-increasing demands of the global marketplace.

NAVIGATION ECOSYSTEM SUSTAINABILITY PROGRAM (NESP)

The Upper Mississippi River System (UMRS) includes the Upper Mississippi River and Illinois Waterway and tributary rivers, with 38 lock and dam sites stretching from Minneapolis, Minnesota, and Chicago, Illinois, to just south of St. Louis, Missouri. The Upper Mississippi has 29 locks and 858 miles of commercially navigable waterway, and the Illinois Waterway has 8 locks and is navigable for 291 miles. Also part of the UMRS is the Missouri River, which has no locks along its 735 navigable miles from Sioux City, Iowa, to St. Louis. There is one lock along the 26 navigable miles of the Kaskaskia River in southern Illinois.

In 1986, Congress declared the UMRS "a nationally significant ecosystem and a nationally significant commercial navigation system." The same waters that transport more than 60 percent of America's corn and soybeans are home to 25 percent of North America's fish species and are globally important as a flyway for 60 percent of North America's bird species. However, both the river transportation system and the river ecosystem are deteriorating. The locks that help tows to navigate the river are antiquated—increasing cost, safety risks and lost market opportunities. And from an ecological perspective, the floodplain is degraded, islands eroded, backwaters filled in and the river's natural flows disrupted.

With enactment of the Water Resources Development Act 2007, Congress created a historic opportunity for the UMRS. Congress recognized the economic and ecological importance of what truly is America's River by giving the U.S. Army Corps of Engineers a new, dual-purpose authority to integrate management of the river's habitats and navigation system in an unprecedented way. Corn growers are asking Congress to invest in the future of the UMRS by funding implementation of this new program.

We request your support in securing $50 million in the Fiscal Year 2009 Energy and Water Development Appropriations bill for the Upper Mississippi River System (UMRS)—Navigation Ecosystem Sustainability Program (NESP). Now is the time to build on the promise of the new authority for NESP by including funding for the program in the Corps' fiscal year 2009 construction general account. Congress has authorized NESP at $2.2 billion for navigation improvements; half of which is funded by the Inland Waterway Trust Fund, and $1.72 billion for ecosystem restoration, with an additional $10 million per year for monitoring. This will permit the Corps to begin implementing specific projects. NESP is a long-term vision, with the current authority providing for the first increment of that vision.

Over approximately the next 15 years, NESP will improve navigation efficiency by constructing new 1,200-foot locks at Locks & Dams 20, 21, 22, 24, and 25 on the Upper Mississippi River, and at LaGrange and Peoria on the Illinois Waterway. The plan also includes small-scale measures such as mooring facilities and switchboats and mitigation for the environmental effects of the lock construction and increased river traffic.

Concurrently, NESP will also work to restore and preserve more than 100,000 acres of habitat in a manner that is entirely compatible with current navigation practices. Restoration projects will range in size and complexity but will focus on restoring system-wide natural processes vital to the river's health. Examples include

mimicking natural flow regimes by drawing down pools in the summer and restoring floodplain habitat in cooperation with willing landowners. Because the UMRS is a vast and ecologically complex system, NESP includes an adaptive management strategy, in which sound science, learning and monitoring guide the most efficient and effective allocation of resources.

We appreciate this subcommittee's help in securing Pre-Construction Engineering and Design in years passed prior to authorization in the 2007 Water Resources Development Act. Congress has provided for $13.5 million in fiscal year 2005, $10 million in fiscal year 2006, $10 million in fiscal year 2007 and $8.85 million in fiscal year 2008. Capability levels for PED were identified as $24 million for each fiscal year to achieve a 3–4 year pre-construction engineering and design phase.

For continued success, U.S. farmers need efficient transportation networks, which is why we have been long-time advocates for improvements to our inland waterway system. Meeting future international demand for corn, soybean, and other grains will be impossible without a modernized river infrastructure.

You have an opportunity to impact economic growth in our Nation. Your help in securing funds for NESP will allow the Nation to achieve the benefits of river infrastructure and ecosystem improvements as soon as possible.

BIOMASS TECHNOLOGIES PROGRAM

The United States needs to displace imported petroleum with domestically produced ethanol. Grain ethanol is the only economically viable solution today to reduce our reliance on foreign sources of energy. In order to achieve energy independence, the United States must capitalize on an abundance of domestic resources. Using starch from corn grain to produce ethanol is a proven, efficient way to reduce oil imports. Ethanol reduces green house gases, continues to spur economic development in rural communities, provides for a high-value co-product and stabilizes farm income. In 2007, strong commodity prices reduced Government spending by $6 billion. Over the next decade, corn grain will continue to meet the growing demands from livestock feed, human food, export sectors, and ethanol fuel.

The current Federal biomass technologies program is focused on long-term cellulose research. Cellulose research will not have any meaningful economic impact for a decade or more. A successful research and development (R&D) portfolio always balances near-, mid- and long-term goals, and biomass research should use a similar strategy.

In the near term, R&D investments in corn grain ethanol production technology could have a strongly positive economic impact while immediately decreasing dependence on imported oil. Examples of R&D investment opportunities include improving production and utilization of animal feed (DDGS), co-production of biobased chemicals, utilization of corn kernel fiber, repowering ethanol facilities with biomass, water utilization, and decreasing natural gas use in ethanol plants. A sufficient supply of affordable ethanol will ensure the markets and infrastructure will be poised for the larger impacts coming in the mid to long-term.

NCGA recommends the subcommittee commit at least 25 percent of the fiscal year 2009 allocation for the biomass technologies program towards near-term research of corn grain. A strong corn ethanol industry is the foundation for an expanding renewable fuels market. Agricultural residues, cobs, and fiber will serve as the bridge technologies to a second generation of renewable fuels.

Thank you for the support and assistance you have provided to corn growers over the years.

PREPARED STATEMENT OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

PROJECT	REQUEST
MURRIETA CREEK FLOOD CONTROL PROJECT: Construction General	$13,000,000
HEACOCK AND CACTUS CHANNELS: Special Authorization under WRDA	28,400,000
FUNDING FOR CERTIFICATION OF CORPS LEVEES: Inspection of Completed Works	3,000,000
SAN JACINTO & UPPER SANTA MARGARITA RIVER WATERSHEDS SPECIAL AREA MANAGEMENT PLAN (SAMP): General Investigations	355,000
SANTA ANA RIVER—MAINSTEM: Construction General	108,600,000

MURRIETA CREEK FLOOD CONTROL, ENVIRONMENTAL RESTORATION AND RECREATION PROJECT

Murrieta Creek continues to pose a severe flood threat to the cities of Murrieta and Temecula. Overflow flooding from the undersized creek with a tributary watershed area of over 220 square miles continues to periodically wreak havoc on the communities. The winter storms in 1993 cost nearly $20 million in damages to the public and private sectors. Almost on a yearly basis, small to moderate storms cause localized damages at numerous locations requiring ongoing repairs. As the area continues to develop, the potential for damages (direct and indirect) continues to increase.

In 1997 the U.S. Army Corps of Engineers initiated studies on the Creek. The final outcome of this endeavor was Congressional authorization in 2000 of the $90 million, multi faceted project known as the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project. This project is being designed and will be constructed in four distinct phases. Phases 1 and 2 include channel improvements through the city of Temecula. Phase 3 involves the construction of a 250-acre detention basin, including the establishment of about 160 acres of new environmental habitat and over 50 acres of recreational facilities. Phase 4 will include channel improvements through the city of Murrieta. Equestrian, bicycle and hiking trails, as well as a continuous vegetated habitat corridor for wildlife are components of the entire 7.5 mile long project.

The Omnibus Appropriations bill for fiscal year 2003 provided $1 million for a new construction start for this critical public safety project and construction activities commenced in the Fall of 2003 on Phase 1. Appropriations for fiscal year 2004 and additional funds allocated allowed the Corps to continue construction on Phase 1, which was completed in December 2004. Phase 2 traverses Old Town Temecula, one of the hardest hit areas during the flooding of 1993. The Corps anticipates having a Phase 2 construction contract ready to award in the Winter of 2008. The District, therefore, respectfully requests the subcommittee's support of a $13 million appropriation in fiscal year 2009 to allow the Corps to complete the Design Documentation Report, and initiate construction on Phase 2 of the long awaited Murrieta Creek Flood Control, Environmental Restoration and Recreation Project.

HEACOCK AND CACTUS CHANNELS PROTECTION OF MARCH AIR RESERVE BASE

Heacock and Cactus Channels are undersized, earthen channels that border the eastern and northern boundary of the March Air Reserve Base (MARB) located adjacent to the city of Moreno Valley, Riverside County, California. Substantial vegetation becomes established within both channels and impedes the conveyance of tributary storm flows to the existing ultimate outlet located downstream. Storm flows overtop Cactus Channel and traverse MARB causing major disruption of the Base's operation, including the fueling of airplanes and the transport of troops and supplies. The record rainfall of 2004/2005 also caused extensive erosion along Heacock Avenue jeopardizing existing utilities within the road right of way and cutting off access to about 700 residences within the city of Moreno Valley.

Under section 205 of the Continuing Authorities Program (CAP), the Corps received $100,000 in fiscal year 2005 and completed an Initial Appraisal Report which determined the feasibility of proceeding with a project to provide flood protection to this sensitive area. With the $546,000 received in fiscal year 2006 the Corps completed a Project Management Plan, executed a Feasibility Cost Sharing Agreement and is nearing completion of the Feasibility Study. However, this study found that MARB would receive approximately 75 percent of the benefits from constructing this project making the use of section 205 funds inappropriate. Therefore, the project will require Special Authorizing Language to approve and an appropriation of $28.4 million to provide flood protection to MARB.

The District requests support from the subcommittee for Special Authorization approving the project and authorizing appropriations of $28.4 million to complete the design and construct the project providing this critical military installation flood protection.

CERTIFICATION OF CORPS CONSTRUCTED LEVEES

As part of the Federal Emergency Management Agency's (FEMA) Map Modernization Program, the District, as well as all other agencies, cities and counties in the Nation are being required to provide certification of the reliability of all levee structures providing flood protection to our citizens. Many of these projects were constructed by the U.S. Army Corps of Engineers and in these cases, FEMA is requesting that the certification be provided by the Corps. Certification involves an exten-

sive amount of geotechnical analysis, including field and lab material testing, slope stability and seepage checks, hydrologic and hydraulic verification, and other costly and time consuming activities, as well as the review of operation and maintenance records. These projects have an established Federal interest. Therefore, a National Policy needs to be established addressing the need for these federally constructed projects to be certified by the Corps and authorizing the Corps to perform the required analysis. Furthermore, the Corps should also be authorized to provide Federal assistance for design and construction costs associated with any necessary rehabilitation, repair or reconstruction of projects that are found not to meet the CFR 65.10 FEMA and/or Risk and Uncertainty analysis criteria. Non-conforming levees put the public at risk and should be a Federal priority. Within our District, there are three Corps constructed levees requiring this Federal certification: Santa Ana River Levees constructed in 1958, Chino Canyon Levee constructed in 1972 and San Jacinto River Levee constructed in 1982.

The District requests support from the subcommittee for the establishment of a National Policy addressing this issue and the authorization and funding needed for the Corps to meet its obligations to the numerous local sponsors of federally constructed levees throughout the country. The Los Angeles District needs an appropriation of $3.0 million for fiscal year 2009 under the Inspection of Completed Works—CA Operations and Maintenance Appropriation 3123 to accomplish the needed certification work.

SAN JACINTO AND UPPER SANTA MARGARITA RIVER WATERSHEDS SPECIAL AREA MANAGEMENT PLAN

In 2001 the Corps began development of a Special Area Management Plan (SAMP) for both the San Jacinto and Upper Santa Margarita Watersheds to address regional conservation and develop plans that protect the environment while allowing for compatible economic development. The final product of the SAMP will be the establishment of an abbreviated or expedited regulatory permitting process by the Corps under section 404 of the Clean Water Act to assist Federal, State and local agencies with their decisionmaking and permitting authority to protect, restore and enhance aquatic resources, while accommodating various types of development activities. This process will increase regulatory efficiency and promote predictability to the regulated public. The plan will also build on the protection of high value resource areas, as envisioned in the MSHCP. The District requests support from the subcommittee for a fiscal year 2009 appropriation of $355,000 to complete the work on the Nation's largest SAMP for the San Jacinto and Upper Santa Margarita Watersheds.

SANTA ANA RIVER—MAINSTEM

The Water Resources Development Act of 1986 (Public Law 99–662) authorized the Santa Ana River-All River project that includes improvements and various mitigation features as set forth in the Chief of Engineers Report to the Secretary of the Army. The Boards of Supervisors of Orange and San Bernardino Counties as well as the Board for the Riverside County Flood Control and Water Conservation District continue to support this critical project as stated in past resolutions to Congress.

For fiscal year 2009, an appropriation of $108.6 million, is necessary to provide funding for Reach 9 of the Santa Ana River immediately downstream of Prado Dam, continue the construction of Prado Dam features and provide mitigation for the construction of Seven Oaks Dam. The District respectfully requests that the subcommittee support an overall $108.6 million appropriation of Federal funding for fiscal year 2009 for the Santa Ana River Mainstem Project.

PREPARED STATEMENTS OF THE SANTA CLARA VALLEY WATER DISTRICT

STATEMENT OF SUPPORT—COYOTE CREEK WATERSHED STUDY

Background.—Coyote Creek drains Santa Clara County's largest watershed, an area of more than 320 square miles encompassing most of the eastern foothills, the city of Milpitas, and portions of the cities of San Jose and Morgan Hill. It flows northward from Anderson Reservoir through more than 40 miles of rural and heavily urbanized areas and empties into south San Francisco Bay.

Prior to construction of Coyote and Anderson Reservoirs, flooding occurred in 1903, 1906, 1909, 1911, 1917, 1922, 1923, 1926, 1927, 1930 and 1931. Since 1950, the operation of the reservoirs has reduced the magnitude of flooding, although flooding is still a threat and did cause damages in 1982, 1983, 1986, 1995, and 1997.

Significant areas of older homes in downtown San Jose and some major transportation corridors remain susceptible to extensive flooding. The federally-supported lower Coyote Creek Project (San Francisco Bay to Montague Expressway), which was completed in 1996, protected homes and businesses from storms which generated record runoff in the northern parts of San Jose and Milpitas.

The proposed Reconnaissance Study would evaluate the reaches upstream of the completed Federal flood protection works on lower Coyote Creek.

Objective of Study.—The objectives of the Reconnaissance Study are to investigate flood damages within the Coyote Creek Watershed; to identify potential alternatives for alleviating those damages which also minimize impacts on fishery and wildlife resources, provide opportunities for ecosystem restoration, provide for recreational opportunities; and to determine whether there is a Federal interest to proceed into the Feasibility Study Phase.

Study Authorization.—In May 2002, the House of Representatives Committee on Transportation and Infrastructure passed a resolution directing the Corps to ". . . review the report of the Chief of Engineers on Coyote and Berryessa Creeks . . . and other pertinent reports, to determine whether modifications of the recommendations contained therein are advisable in the interest of flood damage reduction, environmental restoration and protection, water conservation and supply, recreation, and other allied purposes . . .".

Fiscal Year 2006 Administration Budget Request and Funding.—The Coyote Watershed Study was one of only three "new start" studies proposed for funding nationwide in the administration fiscal year 2006 budget request. Congress did not include funding for the study in the final fiscal year 2006 appropriations bill.

Fiscal Year 2008 Funding.—Congress did not appropriate any funding to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of $100,000 to initiate a multipurpose Reconnaissance Study within the Coyote Creek Watershed.

STATEMENT OF SUPPORT—UPPER PENITENCIA CREEK FLOOD PROTECTION PROJECT

Background.—The Upper Penitencia Creek Watershed is located in northeast Santa Clara County, California, near the southern end of the San Francisco Bay. In the last two decades, the creek has flooded in 1980, 1982, 1983, 1986, 1995, and 1998. The January 1995 flood damaged a commercial nursery, a condominium complex, and a business park. The February 1998 flood also damaged many homes, businesses, and surface streets.

The proposed project on Upper Penitencia Creek, from the Coyote Creek confluence to Dorel Drive, will protect portions of the cities of San Jose and Milpitas. The floodplain is completely urbanized; undeveloped land is limited to a few scattered agricultural parcels and a corridor along Upper Penitencia Creek. Based on an August 2004 U.S. Army Corps of Engineers' (Corps) Economics Analysis, over 5,000 homes and businesses in the cities of San Jose and Milpitas are located in the 1 percent or 100-year flood area. Flood damages were estimated at $455 million. Benefit to cost ratios for the nine project alternatives range from 2:1 to 3.1:1.

Study Synopsis.—Under authority of the Watershed Protection and Flood Prevention Act (Public Law 83–566), the Natural Resources Conservation Service (formerly the Soil Conservation Service) completed an economic feasibility study (watershed plan) for constructing flood damage reduction facilities on Upper Penitencia Creek. Following the 1990 U.S. Department of Agriculture Farm bill, the Natural Resources Conservation Service watershed plan stalled due to the very high ratio of potential urban development flood damage compared to agricultural damage in the project area.

In January 1993, the Santa Clara Valley Water District (District) requested the Corps proceed with a reconnaissance study in the 1994 fiscal year while the Natural Resources Conservation Service plan was on hold. Funds were appropriated by Congress for fiscal year 1995 and the Corps started the reconnaissance study in October 1994. The reconnaissance report was completed in July 1995, with the recommendation to proceed with the feasibility study phase. The feasibility study, initiated in February 1998, is currently scheduled for completion in 2009.

Advance Construction.—To accelerate project implementation, the District submitted a section 104 application to the Corps for approval to construct a portion of the project. The application was approved in December 2000. The advance construction is for a 2,600-foot long section of bypass channel between Coyote Creek and King Road. However, due to funding constraints at the District and concerns raised by regulatory agencies, the design was stopped and turned over to the Corps to complete.

Fiscal Year 2008 Funding.—Congress appropriated $229,000 to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of $171,000, in addition to the $191,000 in the administration's fiscal year 2009 budget request, for a total of $362,000 for the Upper Penitencia Creek Flood Protection Project to continue the Feasibility Study.

STATEMENT OF SUPPORT—SAN FRANCISQUITO CREEK FLOOD DAMAGE REDUCTION AND ECOSYSTEM RESTORATION PROJECT

Background.—The San Francisquito Creek watershed comprises 45 square miles and 70 miles of creek system. The creek mainstem flows through five cities and two counties, from Searsville Lake, belonging to Stanford University, to the San Francisco Bay at the boundary of East Palo Alto and Palo Alto. Here it forms the boundary between Santa Clara and San Mateo counties, California and separates the cities of Palo Alto from East Palo Alto and Menlo Park. The upper watershed tributaries are within the boundaries of Portola Valley and Woodside townships. The creek flows through residential and commercial properties, a biological preserve, and Stanford University campus. It interfaces with regional and State transportation systems by flowing under two freeways and the regional commuter rail system. San Francisquito Creek is one of the last natural continuous riparian corridors on the San Francisco Peninsula and home to one of the last remaining viable steelhead trout runs. The riparian habitat and urban setting offer unique opportunities for a multi objective flood protection and ecosystem restoration project.

Flooding History.—The creeks mainstem has a flooding frequency of approximately once in 11 years. It is estimated that over $155 million in damages could occur in Santa Clara and San Mateo counties from a 1-percent flood, affecting 4,850 home and businesses. Significant areas of Palo Alto flooded in December 1955, inundating about 1,200 acres of commercial and residential property and about 70 acres of agricultural land. April 1958 storms caused a levee failure downstream of Highway 101, flooding Palo Alto Airport, the city landfill, and the golf course up to 4 feet deep. Overflow in 1982 caused extensive damage to private and public property. The flood of record occurred on February 3, 1998, when overflow from numerous locations caused severe, record consequences with more than $28 million in damages. More than 1,100 homes were flooded in Palo Alto, 500 people were evacuated in East Palo Alto, and the major commute and transportation artery, Highway 101, was closed.

Status.—Active citizenry are anxious to avoid a repeat of February 1998 flood. Numerous watershed based studies have been conducted by the Corps, the Santa Clara Valley Water District, Stanford University, and the San Mateo County Flood Control District. A grassroots, consensus-based organization, called the San Francisquito Watershed Council, has united stakeholders including local and State agencies, citizens, flood victims, developers, and environmental activists for over 10 years. The San Francisquito Creek Joint Powers Authority was formed in 1999 to coordinate creek activities with five member agencies and two associate members. The Authority Board has agreed to be the local sponsor for a Corps project and received congressional authorization for a Corps reconnaissance study in May 2002. The Reconnaissance Study was completed in March 2005 and the Feasibility Study was initiated in November 2005.

Fiscal Year 2008 Funding.—Congress did not appropriate any funding to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested the congressional committee support an appropriation add-on of $700,000 to continue the Feasibility Study.

STATEMENT OF SUPPORT—COYOTE/BERRYESSA CREEK PROJECT, BERRYESSA CREEK PROJECT ELEMENT

Background.—The Berryessa Creek Watershed is located in northeast Santa Clara County, California, near the southern end of the San Francisco Bay. A major tributary of Coyote Creek, Berryessa Creek drains 22 square miles in the city of Milpitas and a portion of San Jose.

On average, Berryessa Creek floods once every 4 years. The most recent flood in 1998 resulted in significant damage to homes and automobiles. The proposed project on Berryessa Creek, from Calaveras Boulevard to upstream of Old Piedmont Road, will protect portions of the cities of San Jose and Milpitas. The flood plain is largely urbanized with a mix of residential and commercial development. Based on the U.S. Army Corps of Engineers (Corps) 2005 report, a 1-percent or 100-year flood could

potentially result in damages exceeding $179 million. Benefit-to-cost ratios for the six project alternatives being evaluated range from 2:1 to 7.3:1.

Study Synopsis.—In January 1981, the Santa Clara Valley Water District (District) applied for Federal assistance for flood protection projects under section 205 of the 1948 Flood Control Act. The Water Resources Development Act of 1990 authorized construction on the Berryessa Creek Flood Protection Project as part of a combined Coyote/Berryessa Creek Project to protect portions of the cities of Milpitas and San Jose.

The Coyote Creek element of the project was completed in 1996. The Berryessa Creek Project element proposed in the Corps' 1987 feasibility report consisted primarily of a trapezoidal concrete lining. This was not acceptable to the local community. The Corps and the District are currently preparing a General Reevaluation Report which involves reformulating a project which is more acceptable to the local community and more environmentally sensitive. Project features will include setback levees and floodwalls to preserve sensitive areas (minimizing the use of concrete), appropriate aquatic and riparian habitat restoration and fish passage, and sediment control structures to limit turbidity and protect water quality. The project will also accommodate the city of Milpitas' adopted trail master plan. Estimated total costs of the General Reevaluation Report work are $6.5 million, and should be completed in 2009.

Fiscal Year 2008 Funding.—Congress appropriated $1.147 million to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—Based on the continuing threat of significant flood damage from Berryessa Creek and the need to continue with the General Reevaluation Report, it is requested that the congressional committee support an appropriation add-on of $650,000, in addition to the $950,000 in the administration's fiscal year 2009 budget request, for a total of $1.6 million for the Berryessa Creek Flood Protection Project element of the Coyote/Berryessa Creek Project.

STATEMENT OF SUPPORT—SOUTH SAN FRANCISCO BAY SHORELINE STUDY

Background.—Congressional passage of the Water Resources Development Act of 1976, originally authorized the San Francisco Bay Shoreline Study, and Santa Clara Valley Water District (District) was one of the project sponsors. In 1990, the U.S. Army Corps of Engineers (Corps) concluded that levee failure potential was low because the existing non-Federal, non-engineered levees, which were routinely maintained by Leslie Salt Company (subsequently Cargill Salt) to protect their industrial interests, had historically withstood overtopping without failure. As a result, the project was suspended until adequate economic benefits could be demonstrated.

Since the project's suspension in 1990, many changes have occurred in the South Bay. The State and Federal acquisition of approximately 15,000 acres of South Bay salt ponds was completed in early March 2003. The proposed restoration of these ponds to tidal marsh will significantly alter the hydrologic regime and levee maintenance activities, which were assumed to be constant in the Corps' 1990 study. In addition to the proposed restoration project, considerable development has occurred in the project area. Many major corporations are now located within Silicon Valley's Golden Triangle, lying within and adjacent to the tidal flood zone. Damages from a 1-percent high tide are anticipated to far exceed the $34.5 million estimated in 1981, disrupting business operations, infrastructure, and residences. Also, historical land subsidence of up to 6 feet near Alviso, as well as the structural uncertainty of existing salt pond levees, increases the potential for tidal flooding in Santa Clara County.

In July 2002, Congress authorized a review of the Final 1992 Letter Report for the San Francisco Bay Shoreline Study. The final fiscal year 2004 appropriation for the Corps included funding for a new start Reconnaissance Study.

Project Synopsis.—At present, large areas of Santa Clara, Alameda and San Mateo Counties would be impacted by flooding during a 1-percent high tide. The proposed restoration of the South San Francisco Bay salt ponds will result in the largest restored wetland on the west coast of the United States, and also significantly alter the hydrologic regime adjacent to South Bay urban areas. The success of the proposed restoration is therefore dependent upon adequate tidal flood protection, and so this project provides an opportunity for multi-objective watershed planning in partnership with the California Coastal Conservancy, the lead agency on the restoration project. Project objectives include: restoration and enhancement of a diverse array of habitats, especially several special status species; tidal flood protection; and provision of wildlife-oriented public access. A Corps Reconnaissance Study

was completed in September 2004 and the Feasibility Study was initiated in September 2005.

Fiscal Year 2008 Funding.—Congress appropriated $785,000 to the project in fiscal year 2008.

Fiscal Year 2009 Funding Request.—It is requested that the congressional committee support an appropriation add-on of $2.8 million to continue the Feasibility Study to evaluate integrated flood protection and environmental restoration.

STATEMENT OF SUPPORT—LLAGAS CREEK PROJECT

Background.—The Llagas Creek Watershed is located in southern Santa Clara County, California, serving the communities of Gilroy, Morgan Hill and San Martin. Historically, Llagas Creek has flooded in 1937, 1955, 1958, 1962, 1963, 1969, 1982, 1986, 1996, 1997, 1998, 2002, and 2008. The 1997, 1998, and 2002 floods damaged many homes, businesses, and a recreational vehicle park located in areas of Morgan Hill and San Martin. These are areas where flood protection is proposed. Overall, the proposed project will protect the floodplain from a 1 percent flood affecting more than 1,100 residential buildings, 500 commercial buildings, and 1,300 acres of agricultural land.

Project Synopsis.—Under authority of the Watershed Protection and Flood Prevention Act (Public Law 566), the Natural Resources Conservation Service completed an economic feasibility study in 1982 for constructing flood damage reduction facilities on Llagas Creek. The Natural Resources Conservation Service completed construction of the last segment of the channel for Lower Llagas Creek in 1994, providing protection to the project area in Gilroy. The U.S. Army Corps of Engineers (Corps) is currently updating the 1982 environmental assessment work and the engineering design for the project areas in Morgan Hill and San Martin. The engineering design is being updated to protect and improve creek water quality and to preserve and enhance the creek's habitat, fish, and wildlife while satisfying current environmental and regulatory requirement. Significant issues include the presence of additional endangered species including red-legged frog and steelhead, listing of the area as probable critical habitat for steelhead, and more extensive riparian habitat than were considered in 1982.

Until 1996, the Llagas Creek Project was funded through the traditional Public Law 566 Federal project funding agreement with the Natural Resources Conservation Service paying for channel improvements and the District paying local costs including utility relocation, bridge construction, and right of way acquisition. Due to the steady decrease in annual appropriations for the Public Law 566 construction program since 1990, the Llagas Creek Project had not received adequate funding to complete the Public Law 566 project. To remedy this situation, the District worked with congressional representatives to transfer the construction authority from the Department of Agriculture to the Corps under the Water Resources Development Act of 1999 (section 501). Since the transfer of responsibility to the Corps, the District has been working with the Corps to complete the project. In November 2007, Congress passed the Water Resources Development Act of 2007 (Public Law 110–114, section 3022) revising the estimated total project cost for the remaining reaches of the project to $105 million with a Federal share of $65 million and a local share of $40 million. The bill language also directs the Corps to complete the construction of the project.

Fiscal Year 2008 Funding.—Congress did not appropriate any funding to the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—Based upon the high risk of flood damage from Llagas Creek, it is requested that the congressional committee support an appropriation add-on of $1.8 million in fiscal year 2009 for planning, design, and environmental updates for the Llagas Creek Project.

STATEMENT OF SUPPORT—GUADALUPE RIVER PROJECT

Background.—The Guadalupe River is a major waterway flowing through a highly developed area of San Jose, in Santa Clara County, California. A major flood would damage homes and businesses in the heart of Silicon Valley. Historically, the river has flooded downtown San Jose and the community of Alviso. According to the U.S. Army Corps of Engineers (Corps) 2000 Final General Reevaluation & Environmental Report for Proposed Project Modifications, estimated damages from a 1 percent flood in the urban center of San Jose are over $576 million. The Guadalupe River overflowed in February 1986, January 1995, and March 1995, damaging homes and businesses in the St. John and Pleasant Street areas of downtown San Jose. In March 1995, heavy rains resulted in breakouts along the river that flooded approximately 300 homes and business.

Project Synopsis.—In 1971, the local community requested that the Corps reactivate its earlier study. Since 1972, substantial technical and financial assistance have been provided by the local community through the Santa Clara Valley Water District in an effort to accelerate the project's completion. To date, more than $85.8 million in local funds have been spent on planning, design, land purchases, and construction in the Corps' project reach.

The Guadalupe River Project received authorization for construction under the Water Resources Development Act of 1986; the General Design Memorandum was completed in 1992, the local cooperative agreement was executed in March 1992, the General Design Memorandum was revised in 1993, construction of the first phase of the project was completed in August 1994, construction of the second phase was completed in August 1996. Project construction was temporarily halted due to environmental concerns.

To achieve a successful, long-term resolution to the issues of flood protection, environmental mitigation, avoidance of environmental effects, and project monitoring and maintenance costs, a multi-agency "Guadalupe Flood Control Project Collaborative" was created in 1997. A key outcome of the collaborative process was the signing of the Dispute Resolution Memorandum in 1998, which modified the project to resolve major mitigation issues and allowed the project to proceed. The Energy and Water Development Appropriations Act of 2002 was signed into law on November 12, 2001. This authorized the modified Guadalupe River Project at a total cost of $226.8 million. Subsequent to the authorization, the project cost has been raised to $251 million. Construction of the last phase of flood protection was completed December 2004 and a completion celebration held in January 2005. The remaining construction consists of railroad bridge replacements and mitigation plantings. The overall construction of the project including the river park and the recreation elements is scheduled for completion in 2008.

Fiscal Year 2008 Funding.—Congress appropriated $1.783 million for the project in fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of $10 million to continue construction of the final phase of the Guadalupe River Flood Protection Project.

STATEMENT OF SUPPORT—UPPER GUADALUPE RIVER PROJECT

Background.—The Guadalupe River is one of two major waterways flowing through a highly urbanized area of Santa Clara County, California, the heart of Silicon Valley. Historically, the river has flooded the central district and southern areas of San Jose. According to the U.S. Army Corps of Engineers (Corps) 1998 feasibility study, severe flooding would result from a 100-year flooding event and potentially cause $280 million in damages.

The probability of a large flood occurring before implementation of flood prevention measures is high. The upper Guadalupe River overflowed in March 1982, January 1983, February 1986, January 1995, March 1995, and February 1998, causing damage to several residences and businesses in the Alma Avenue and Willow Street areas. The 1995 floods in January and March, as well as in February 1998, closed Highway 87 and the parallel light-rail line, a major commute artery.

Project Synopsis.—In 1971, the Santa Clara Valley Water District (District) requested the Corps reactivate an earlier study of the Guadalupe River. From 1971 to 1980, the Corps established the economic feasibility and Federal interest in the Guadalupe River only between Interstate 880 and Interstate 280. Following the 1982 and 1983 floods, the District requested that the Corps reopen its study of the upper Guadalupe River upstream of Interstate 280. The Corps completed a reconnaissance study in November 1989, which established an economically justifiable solution for flood protection in this reach. The report recommended proceeding to the feasibility study phase, which began in 1990 and was completed in 1998. Preconstruction Engineering and Design commenced in 1999 and currently several reaches are ready for construction.

The Upper Guadalupe River Flood Protection Project was first authorized for Federal construction in the Water Resources Development Act of 1999 (section 101). This authorization was for a project cost of $140 million with an unfavorable cost-sharing formula. In November 2007, Congress passed the Water Resources Development Act of 2007 (Public Law 110–114, section 3037) for an estimated revised project cost of $256 million with a Federal share of $136.7 million and local share of $119.3 million.

The project cooperation agreement was signed on July 21, 2007, and construction is planned to commence in July 2008.

Fiscal Year 2008 Funding.—Congress appropriated $439,000 to the project in the fiscal year 2008.

Fiscal Year 2009 Funding Recommendation.—It is requested that the congressional committee support an appropriation add-on of $12.5 million in fiscal year 2009 to continue construction on the Upper Guadalupe River Flood Protection Project.

PREPARED STATEMENT OF THE CITY OF LOS ANGELES BOARD OF HARBOR COMMISSIONERS

Chairman Dorgan and members of the subcommittee, thank you for the opportunity to submit testimony in support of full funding of the Channel Deepening Project at the Port of Los Angeles/Los Angeles Harbor, the largest and busiest container seaport in the United States and tenth largest in the world. Our testimony speaks in support of an fiscal year 2009 appropriation of $1.33 million for the final Federal share that will complete construction of the Channel Deepening Project. Proposed funding for the Channel Deepening Project was not included in the President's fiscal year 2009 budget. Construction of our Federal deep-draft navigation channels and ship berths is approximately 85 percent complete. Your full appropriation of the requested $1.33 million will enable the Army Corps of Engineers to finish construction of the remainder of the Project; the Corps has stated that it has the capability to fully obligate and spend this amount in fiscal year 2009. Dredging for the project began in early 2003 with construction originally scheduled for completion in 2006.

The Port of Los Angeles is America's busiest seaport with record volumes of cargo moving through the 7,500-acre harbor. Its strong performance is attributed to a solid U.S. economy and the recovering Asian economies with a renewed manufacturing demand for American exports. The Port itself is a major reason for the remarkable cargo volumes. Its world-class facilities and infrastructure maximize the "one-stop shopping" concept of cargo transportation and delivery favored by most shipping lines. Ocean carriers can send the majority of their west coast-bound cargo to Los Angeles with full confidence in the Port's modern cargo terminals and efficient train/truck intermodal network. The Channel Deepening Project is a critical Federal navigation improvement project, and is the underpinning of the ongoing confidence that shipping lines have in the Port of Los Angeles.

In the fiscal year 2006 Energy and Water Development Appropriations Act, Congress authorized an increase in the total project cost to $222 million from $194 million, representing a Federal share of $60.7 million and a local share of $161.3 million in accordance with the Army Corps of Engineers' revision. This revision accounts for credits for in-kind services provided by the Port and other required project modifications, including adjustments for construction contract changes, adjustments to the disposal costs for the dredged material, and project administration costs. The cost-share amounts for the Channel Deepening Project is currently under review, as well as a Supplemental EIS/EIR that will evaluate and determine the best alternative for increased disposal capacity. Under consideration for placement of the remaining dredge material are the formation of additional lands for future Port development and environmental enhancements through the creation of improved submerged marine habitats. Upon completion of both reviews, the new cost-sharing amounts and the additional costs for disposal at the recommended site(s) will be established. The need for a Supplemental EIS/EIR has moved project completion to fiscal year 2009.

PORT NAVIGATION DEMANDS

The evolving international shipping industry prompted a collaborative effort by the Port of Los Angeles and the Corps of Engineers to implement the Channel Deepening Project in the early 1980s. With this project, the Port will deepen its main Federal channel and tributary channels by 8 feet, from −45 to −53 feet Mean Lower Low Water (MLLW), to accommodate the industry's shift to larger container vessels. The first of these deeper-draft ships began calling at the Port of Los Angeles in August of 2004, carrying 8,000 20-foot equivalent units of containers (TEUs) and drafting at −50 feet. Carriers are continuing to order these larger, post-Panamax vessels that range in size from 7,500 TEUs to 10,000 TEUs. These vessels are now in service in the international shipping trade and will continue to be delivered to shipping lines at a steady pace for the foreseeable future, which means that ports unable to accommodate the bigger ships will be left out of the surge in trade if they are unable to accommodate these vessels.

As we have testified before, cargo throughput for the San Pedro Bay port complex, comprising the Ports of Los Angels and Long Beach—and the Port of Los Angeles in particular—has a tremendous impact on the U.S. economy. We at the Port of Los Angeles cannot overemphasize this fact. The ability of the Port to meet the spiraling demands of the steady growth in international trade is dependent upon the speedy construction of sufficiently deep navigation channels to accommodate the new containerships. These new ships provide greater efficiencies in cargo transportation, carrying one-third more cargo than most of the current fleet, and making more product inventory of imported goods available to American consumers at lower prices. In addition, exports from the United States have become more competitive in foreign markets. However, for American seaports to keep up, they must immediately make the necessary infrastructure improvements that will enable them to participate in this rapidly changing global trading arena.

Mr. Chairman, as we have said before, these state-of-the-art container ships represent the new competitive requirements for international container shipping efficiencies in the 21st century, as evidenced by the increased volume of international commerce. As such, we ask your subcommittee to fully appropriate the $1.33 million for fiscal year 2009 that will enable the Army Corps of Engineers to complete construction of the Channel Deepening Project in fiscal year 2009.

ECONOMIC BENEFITS

The Port of Los Angeles is one of the world's largest trade gateways, and the scope of its economic contributions to the Southern California regional economy—and to the U.S. economy—is critically important. Currently, nearly 45 percent of containerized cargo entering the United States is handled at the San Pedro Bay port complex with the Port of Los Angeles, alone, handling a record 8.5 million TEUs just last year. This represents significant continued growth for any American seaport. The national economics of trade through the Port of Los Angeles is significant, touching every Congressional district in the country. Some 190 million metric revenue tons of cargo, valued at more than $238 billion, were handled at the Port in 2007, with $223 billion in trade benefiting the national economy based on the $5.1 billion it generated in State and local tax revenues.

Locally, the Port is connected, directly or indirectly, with tens of billions of dollars in industry sales each year in Southern California. Those sales translate into hundreds of thousands of local jobs representing billions in wages, salaries, and tax revenues. Regional benefits from Port of Los Angeles trade include:

—1.1 million jobs in California;
—3.3 million permanent, well-paying jobs in the United States;
—$89.2 billion in California trade value;
—$223 billion in U.S. trade value;
—$5.1 billion in State tax revenue; and
—$21.5 billion in Federal tax revenue.

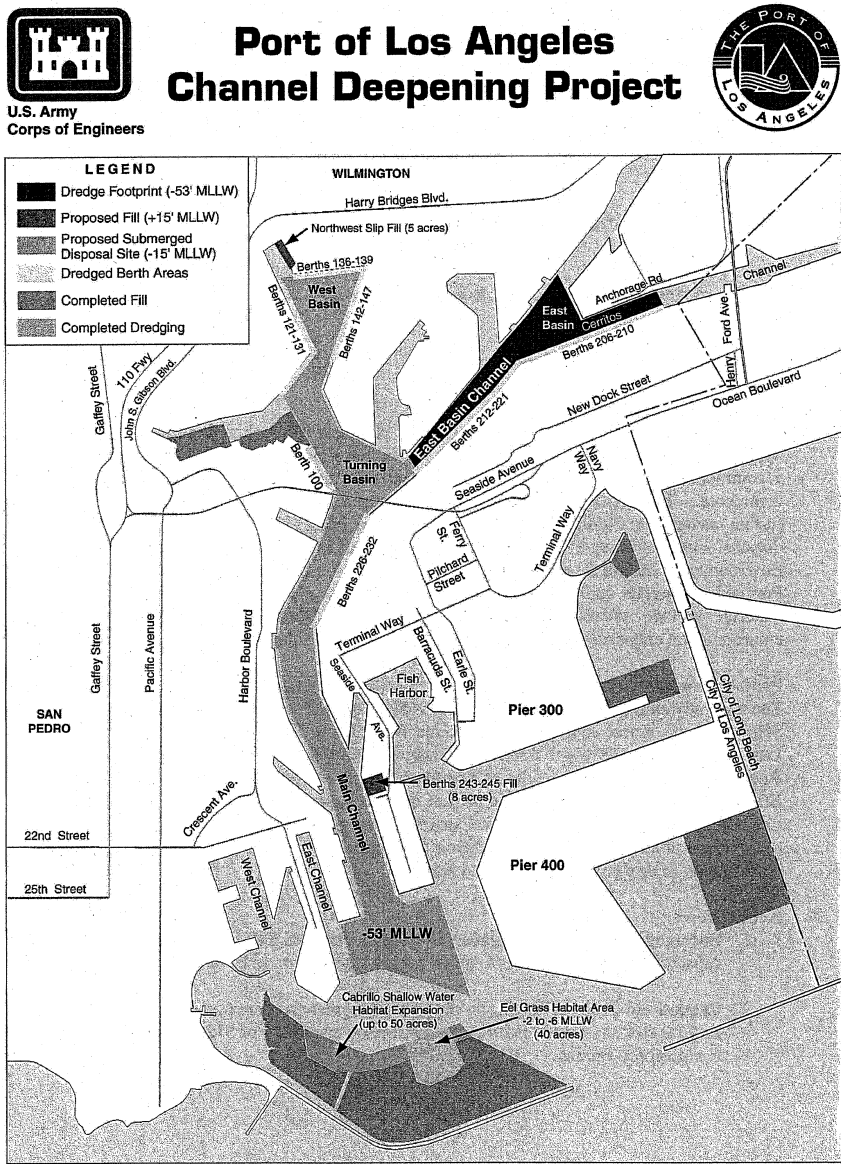
This economic impact is a direct result of international waterborne trade flowing through the Port of Los Angeles. Clearly, the Channel Deepening Project is a commercial, Federal navigation project of tremendous national economic significance, and one that will yield exponential economic and environmental returns to the United States annually. Furthermore, the U.S. Customs Service reports that more than $12 million a day in customs duties are taken from the Port. The Los Angeles Customs District leads the Nation in total duties collected for maritime activities, collecting more than $6 billion in 2005 alone. The return on the Federal investment at the Port of Los Angeles is real and quantifiable, and we expect it to continue to surpass the cost-benefit ratio—as determined by the Army Corps of Engineers' project Feasibility Study—many times over.

In closing, Federal investment in the Channel Deepening Project will ensure that the Port of Los Angeles, the Nation's busiest container seaport, remains at the forefront of the new international trade network well into this century. The Channel Deepening Project marks the second phase of the 2020 Infrastructure Development Plan that began with the Pier 400 Deep-Draft Navigation and Landfill Project. The Port of Los Angeles is moving forward with the 2020 Plan designed to meet the extraordinary infrastructure demands placed on it in the face of the continued high volume of international trade.

Chairman Dorgan, the Port of Los Angeles respectfully urges your subcommittee to appropriate the full $1.33 million request for fiscal year 2009 that will enable the Army Corps of Engineers to complete construction of the Channel Deepening Project in fiscal year 2009.

Thank you, Mr. Chairman, for the opportunity to submit this testimony for continued Congressional support of the Channel Deepening Project at the Port of Los An-

geles. The Port has long valued the support of your subcommittee and its appreciation of the role the Port of Los Angeles plays in this country's economic strength and vitality.



DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

PREPARED STATEMENT OF THE GARRISON DIVERSION CONSERVANCY DISTRICT

Mr. Chairman, members of the subcommittee, my name is Dave Koland; I serve as the general manager of the Garrison Diversion Conservancy District. This is a request for a $102 million appropriation for the Pick-Sloan Missouri Basin Program/Garrison Diversion Unit, Bureau of Reclamation, Water and Related Resources, Department of the Interior. The mission of Garrison Diversion is to provide a reliable, high quality and affordable water supply to the areas of need in North Dakota. Over 77 percent of our State residents live within the boundaries of the district.

The President's fiscal year 2009 budget request was pitifully inadequate in meeting the commitments the Federal Government has made to North Dakota. In return for accepting a permanent flood on 500,000 acres of prime North Dakota river valley, the Federal Government promised the State and tribes that they would be compensated as the dams were built. The dams were completed over 50 years ago and still we wait for the promised compensation. At the rate of payment the President's budget proposes, the Federal Government will not even stay current with the indexing applied by law on their commitment to North Dakota.

The Municipal Rural & Industrial (MR&I) program was started in 1986 after the Garrison Diversion Unit (GDU) was reformulated from a million-acre irrigation project into a multipurpose project with emphasis on the development and delivery of municipal and rural water supplies. The statewide MR&I program has focused on providing grant funds for water systems that provide water service to previously unserved areas of the State. The State has followed a policy of developing a network of regional water systems throughout the State.

NORTH DAKOTA'S SUCCESS STORY

Rural water systems are being constructed using a unique blend of local expertise, State financing, rural development loans and MR&I grant funds to provide an affordable rate structure; and the expertise of the Bureau of Reclamation (BOR) to deal with design and environmental issues. The projects are successful because they are driven by a local need to solve a water quantity or quality problem. The solution to the local problem is devised by the community being affected by the problem. The early, local buy-in helps propel the project through the tortuous pre-construction stages.

The desperate need for clean, safe water is evidenced by the willingness of North Dakota's rural residents to pay water rates well above the rates EPA considers affordable. The EPA Economic Guidance Workbook states that rates greater than 1.5 percent of the median household income (MHI) are not only unaffordable, but also "may be unreasonable".

The average monthly bill on a rural water system for 6,000 gallons of water is currently $59.21. The water rates in rural North Dakota would soar to astronomical levels without the 75 percent grant dollars provided by the MR&I program. For instance, current rates would have to average a truly unaffordable $134.19/month or a whopping 3.8 percent of the MHI. Rates would have ranged as high as $190.80/month or a prohibitive 5.3 percent of MHI without the assistance of the MR&I program.

BUDGET IMPACTS ON GARRISON DIVERSION UNIT

Let me begin by reviewing the various elements within the current budget request and then discuss the impacts that the current level of funding will have on the program.

The President's budget request for fiscal year 2009 is $22.11 million. This year, Garrison Diversion Conservancy District is asking Congress to appropriate a total of $102 million for the GDU. Attachment 1 is a breakdown of the elements in Garrison Diversion's request. To discuss this in more detail, I must first explain that the GDU budget consists of several different program items. For ease of discussion, I would like to simplify the breakdown into three major categories. The first I would call the base operations portion of the budget request. This amount is nominally $18 million annually. However, as more Indian MR&I projects are completed, the operation and maintenance costs for these projects will increase and create a need that will need to be addressed.

The second category of the budget is the MR&I program. This consists of both Indian and non-Indian funding. The Dakota Water Resources Act of 2000 authorized

an additional $200 million for each of these MR&I programs. It is our intent that each program reaches the conclusion of the funding authorization at the same time. We believe this is only fair and have worked with the tribes toward this goal.

The MR&I program consists of a number of projects that are independent of one another. They are generally in the $20 million category. Some are, of course, smaller and others somewhat larger; one that is considerably larger at $150 million is the Northwest Area Water Supply Project (NAWS). The first phase of that project is under construction. Several other projects have been approved for future funding and numerous projects on the reservations are ready to begin construction. These requests will all compete with one another for funding. It will be a delicate challenge to balance these projects. Nevertheless, we believe that once a project is started, it needs to be pursued vigorously to completion. If it is not, we simply run the cost up and increase the risk of incompatibility among the working parts.

The third category of the budget is the Red River Valley Water Supply Project (RRVWSP) construction phase. The Dakota Water Resources Act of 2000 authorized $200 million for the construction of facilities to meet the water quality and quantity needs of the Red River Valley communities. Over 42 percent of North Dakota's citizens rely on the drought-prone Red River of the North as their primary or sole source of water. It is my belief that the final plans and authorizations could be expected in approximately 2 to 3 years. This will create a need for greater construction funding.

This major project, once started, should also be pursued vigorously to completion. The reasons are the same as for the NAWS project and relate to good engineering and construction management. Although difficult to predict at this time, it is reasonable to plan that the RRVWSP features, once started, should be completed in approximately 3 years. This creates the need for additional funding of $30 million/year starting in fiscal year 2011.

Using these two projects as examples frames the argument for a steadily increasing budget. There is a need to accelerate the MR&I program now to assure the timely completion of the NAWS project and then to accommodate the need for additional construction funds when the RRVWSP construction is underway.

It is simply good management to blend these needs to avoid drastic hills and valleys in the budget requests. By accelerating the construction of NAWS and tribal projects which are ready for construction during the next few years, some of the pressure will be off when the RRVWSP construction funding is needed. A smoother, more efficient construction funding program over time will be the result.

It began with a $67 million budget in fiscal year 2008 and needs to gradually build to about $200 million when the RRVWSP construction could be in full swing (fiscal year 2011). Mr. Chairman, this is why we have supported a budget resolution that recognizes that a robust increase in the budget allocation is needed for the Bureau of Reclamation, Water and Related Resources Account in fiscal year 2009.

The Bureau of Reclamation, Rural Development, Garrison Diversion Conservancy District, North Dakota State Water Commission and local rural water districts have formed a formidable alliance to deal with the lack of a high quality, reliable water source throughout much of North Dakota. This cost-effective partnership of local control, state-wide guidance and Federal support has provided safe, clean, potable water to hundreds of communities and thousands of homes across North Dakota.

ATTACHMENT 1.—GARRISON DIVERSION UNIT (GDU)

Justification for $102 million appropriation fiscal year 2009

North Dakota's Municipal, Rural and Industrial (MR&I) water supply program funds construction projects State-wide under the joint administration of the Garrison Diversion Conservancy District (GDCD) and the State Water Commission (SWC).

Northwest Area Water Supply Project (NAWS) is under construction after 18 years of study and diplomatic delay. Construction costs are estimated to be $150 million.

Indian MR&I programs on four reservations are also under construction. Tribal and State leaders have agreed to split the MR&I allocation on a 50/50 basis.

The SWC has advanced the MR&I program $21 million to allow construction to continue on several critical projects. One project is the $85 million South Central Regional Water District system currently under construction.

[In millions of dollars]

	Amount
OPERATION AND MAINTENANCE OF INDIAN MR&I SYSTEMS AND JAMESTOWN DAM (Provides for the O&M of the Tribal water systems and the Jamestown Dam.)	5.61
BREAKDOWN OF $96.39 MILLION CONSTRUCTION REQUEST:	
Operation and Maintenance of existing GDU system (Provides for the O&M of the Snake Creek Pumping Plant, McClusky and New Rockford Canals.)	5.24
Wildlife Mitigation & Natural Resources Trust (Provides for O&M of Arrowwood, Audubon, Kraft Slough, Lonetree and Canalside Lands.)	3.96
Red River Valley Water Supply (Provides for the work on the RRVWSP.)	0.22
Indian and non-Indian MR&I (Provides funding for the State and tribal MR&I programs. Funding is split 50/50 between the two programs.)	84.00
Oakes Test Area and Miscellaneous (Provides for the O&M of the Oakes Test Area, Recreation Facilities, work for 28K unidentified acres.)	1.09
Standing Rock Irrigation (Provides for development on Standing Rock Reservation.)	1.88
Total for Construction	96.39
Grand Total	102.00

PREPARED STATEMENT OF THE IRRIGATION AND ELECTRICAL DISTRICTS ASSOCIATION OF ARIZONA

The Irrigation and Electrical Districts Association of Arizona (IEDA) is pleased to present written testimony regarding the fiscal year 2009 proposed budgets for the Bureau of Reclamation (Reclamation) and the Western Area Power Administration (Western).

IEDA is an Arizona nonprofit association whose 25 members and associate members receive water from the Colorado River directly or through the facilities of the Central Arizona Project (CAP) and purchase hydropower from Federal facilities on the Colorado River either directly from Western or, in the case of the Boulder Canyon Project, from the Arizona Power Authority, the State agency that markets Arizona's share of power from Hoover Dam. IEDA was founded in 1962 and continues to represent water and power interests of Arizona political subdivisions and their consumers.

BUREAU OF RECLAMATION

IEDA has reviewed the testimony submitted by Susan Bitter Smith, the President of the Board of Directors of the Central Arizona Water Conservation District (CAWCD), the Arizona three-county special district charged with operation of the CAP. We support that testimony and urge the subcommittee to actively consider the suggestions made by President Smith. We are especially mindful that the Yuma Desalting Plant continues to remain underfunded and therefore not able to conduct the water conservation, water quality and water supply mission for which it was designed. The Yuma Desalting Plant is an integral element of the problem solving mechanisms being put in place for the Colorado River and especially the Lower Colorado River. Problem solving on the Lower Colorado River will be substantially impaired as long as the plant remains idle.

We also wish to call to the subcommittee's attention the issue concerning increased security costs at Reclamation facilities post-9/11. Legislation is pending before Congress addressing that issue and a budget approved for Reclamation for fiscal year 2009 should reflect the possibility that this legislation will become law and affect Reclamation operations in the next fiscal year.

WESTERN AREA POWER ADMINISTRATION

IEDA has reviewed the testimony submitted by Western's administrator, Tim Meeks. We note that both this subcommittee and the Senate Energy and Natural Resources Committee Water and Power Subcommittee have a concern, as did Administrator Meeks, over the $74 million shortfall in construction funding proposed for fiscal year 2009. We believe this shortfall is irresponsible. Western has over 15,000 miles of transmission line for which it is responsible. It has on the order of 14,000 megawatts of generation being considered for construction that would depend on that Federal network. The existing transmission facilities cannot handle all of these proposals yet the region is projected, by all utilities operating in the region,

to be short of available generation in the 10-year planning window utilities, including Western, use.

Moreover, the $1,881,000 proposed for appropriation in this category cannot come even close to keeping existing transmission construction going. Repairs and replacements will have to be postponed and, considerable hardships to local utilities that depend on the Federal network are bound to occur. In Western's Desert Southwest Region, our region, over $20 million in work necessary just to maintain system reliability will have to be postponed.

We would be the first to support additional customer financing of Federal facilities and expenses through the Contributed Funds Act authority under Reclamation law that is available to Western. However, programs utilizing non-Federal capital formation require years to develop. One such program being proposed by the Arizona Power Authority in a partnership with Western has been stuck in bureaucratic red tape at the Department of Energy for over 2 years. There is no way that Western customers can develop contracts, have them reviewed, gain approval of these contracts from Western and their governing bodies, find financing on Wall Street and have monies available for the next fiscal year. It is just impossible.

There are impediments to using existing Federal laws in facilitating non-Federal financing of Federal facilities and repairs to Federal facilities and Congress should examine them. But dropping this bomb on us 9 months before the beginning of the fiscal year, when there just is not the time necessary to develop alternative capital formation, is bad public policy and should not be countenanced. We urge the subcommittee to restore a reasonable amount of construction funding to Western so it can continue to do its job in keeping its transmission systems functioning and completing the tasks that it has in the pipeline that are critical to its customers throughout the West.

CONCLUSION

Thank you for the opportunity to submit this written testimony. If we can provide any additional information or be of any other service to the subcommittee, please do not hesitate to get in touch with us.

PREPARED STATEMENT OF THE OGLALA SIOUX RURAL WATER SUPPLY SYSTEM, WEST RIVER/LYMAN JONES RURAL WATER SYSTEM, ROSEBUD RURAL WATER SYSTEM, AND THE LOWER BRULE RURAL WATER SYSTEM

MNI WICONI PROJECT

Fiscal Year 2009 Request

The Mni Wiconi Project beneficiaries respectfully request appropriations of $38.378 million for construction ($28.196 million) and operation and maintenance (OMR) activities ($10.182 million) for fiscal year 2009:

[In millions of dollars]

	Fiscal Year 2009 Request
Construction	28.196
OMR	10.182
Total	38.378

Construction Funds

Construction funds would be utilized as follows:

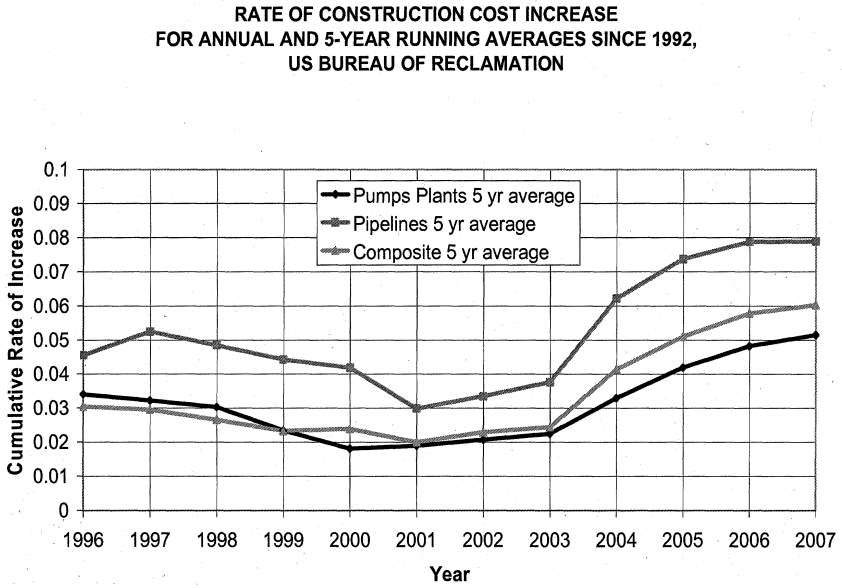
Project Area	Amount
Oglala Sioux Rural Water Supply System:	
Core	$1,115,000
Distribution	14,775,000
West River/Lyman-Jones RWS	5,133,000
Rosebud RWS	7,173,000
Total	28,196,000

As shown in the table below, the project will be 81 percent complete at the end of fiscal year 2008. Construction funds remaining to be spent after fiscal year 2008

will total $87.691 million within the current authorization (in October 2007 dollars). Extension of the project authorization from fiscal year 2008 through fiscal year 2013 was accomplished by Public Law 110–161. Additional administrative and overhead costs of extending the project, additional construction costs, and accelerated inflation over the next 5 years are expected to increase project costs to $137.167 million after fiscal year 2008.

Total Federal Construction Funding (Oct. 2007 dollars)	$451,707,000
Estimated Federal Spent Through Fiscal Year 2008	$364,016,000
Percent Spent through Fiscal Year 2008	80.59
Amount Remaining After 2008:	
Total Authorized (Oct. 2007 dollars)	$87,691,000
Overhead Adjustment for Extension to Fiscal Year 2013 and Other	$109,851,000
Adjustment for Annual Inflation	$137,167,000
Completion Fiscal Year (Statutory Fiscal Year 2013; Public Law 110–161)	2013
Years to Complete	5
Average Annual Required for Finish	$27,433,000

Cost indexing over the last 5 years has averaged 7.89 percent for pipelines. Pipelines are the principal components yet to be completed (see chart below). Assuming an average 7.89 percent inflation in construction costs in the remaining 5 years to complete the project, average funding of $27.433 million is required. The President's budget of $16.24 million is grossly inadequate, departs significantly from recent budgets and threatens an undetermined delay in completing the project by 2013, the new date established by Congress in Public Law 110–161 last year.



Oglala Sioux Rural Water Supply System (OSRWSS)

Core System

The funding request will provide $1,115,000 for the OSRWSS core system. These funds will complete the project's transmission system that serves all sub-projects managed by separate entities, including the Pine Ridge Indian Reservation, Rosebud Indian Reservation, Lower Brule Indian Reservation and the 8-county service area of West River/Lyman-Jones. Funds will be used to connect the northern portion with the southern portion of the transmission system and permit water delivery in either direction to accommodate a shutdown in the western part of the water transmission system.

The completion of the OSRWSS core system is an historic milestone and permits greater focus in the remaining years of the project authorization on completion of the distribution systems.

Distribution System

The Pine Ridge Indian Reservation has not received water from the OSRWSS core system prior to fiscal year 2008. Over 40 percent of the project's population resides on the Pine Ridge Indian Reservation. The Reservation public has awaited delivery of project water from the Missouri River since 1994. Project funds in fiscal year 2009 will permit the completion of the on-Reservation transmission system between the connection with the OSRWSS core system (see discussion above) and the community of Kyle in the central portion of the Pine Ridge Indian Reservation. Delivery of Missouri River water at this location will allow distribution to OSRWSS project pipelines built earlier that serve the communities of Kyle, Sharps Corner, Rocky Ford, Red Shirt, Manderson, Evergreen and Porcupine and the large number of rural homes between the communities along these pipelines.

The fiscal year 2009 request also funds additional on-Reservation transmission system that will advance the delivery of Missouri River water toward the largest community on the Reservation, Pine Ridge Village. Connection to Pine Ridge Village is scheduled in fiscal year 2010. The request will connect the transmission system from Porcupine Butte to the community of Wounded Knee and serve rural homes south of Manderson. The request will fund an additional transmission system beyond Pine Ridge Village toward the community of Oglala and will connect with OSRWSS pipelines built in the early years of the project.

As set forth above, the focus on the Pine Ridge Indian Reservation in fiscal year 2009 is to construct the transmission system that serves as the "backbone" of the project on the Reservation. This distribution system is now reliant upon groundwater exclusively. Groundwater will be retained where adequate and safe. Missouri River water will serve as a backup to groundwater supplies and as the sole supply in areas where groundwater is deficient.

The Oglala Sioux Tribe is supportive of the funding request of other sponsors.

West River/Lyman-Jones Rural Water System

Priority projects for the WR/LJ system include the Powell Area Project, service to new members within the system and distribution system storage. The Powell area, from Midland to Philip and from the Bad River to the Elbon service area, continues to be impacted by drought conditions that have persisted since 2001. Powell area users have patiently waited as the OSRWSS North Core pipeline was constructed through their area. With its completion their project area has a supply source from which distribution lines can be constructed.

Projects in the Reliance area and Eastern Mellette County were constructed with emphasis on pipeline. Needed storage structures were deferred until additional funds were made available. Water use has increased each year since completion of these projects. Providing storage within those service areas increases system capability to meet peak demands and improves system reliability.

The WR/LJ system receives new requests for service in completed project areas as stock ponds and wells go dry and as people move into those areas. Further additions are required as existing members request added connections to serve livestock in other locations. These additions are a demonstration of the need for this important project.

Rosebud Rural Water System (Sicangu Mni Wiconi)

In fiscal year 2009 the Rosebud Sioux Tribe will complete the necessary infrastructure to supply surface water to portions of Todd County, which will reduce the need for summertime water restrictions that have resulted from overextending the interim groundwater supply. Work began on this series of projects in the summer of 2007 and the primary pipeline and pump stations will be completed in the summer of 2008. The receiving reservoir at the end of this pipeline is partially funded with fiscal year 2008 funds as is the large diameter pipeline that will connect the town of Mission and eastern Todd County to the surface water supply. However, both of these projects require fiscal year 2009 funding for completion.

Two additional projects are also scheduled for 2009. Phase I of the Old Rosebud project will replace corroded iron pipelines in the older portion of the Rosebud community with modern plastic pipe. This project is designed and ready to bid; however, to reduce costs and improve effectiveness, it is being bid and managed in conjunction with a Bureau of Indian Affairs street replacement project and an Indian Health Service sewer replacement project. Rural Development is also assisting with funding for the sewer work. By completing water, sewer and street improvements at the same time, the cost of excavation and reclamation for the water portion of

the work is significantly reduced. Upgrading water and sewer lines concurrently with the paving project also prolongs the useful life of the new streets because the new pavement will not need to be disturbed (and then patched) to repair water main breaks.

The other major project scheduled for 2009 will serve the rapidly growing Sicangu Village area. The existing wells and aquifer in this area are not capable of supplying the growing demands. A pipeline will connect the community to the existing well field several miles south of the town of Mission. Adequate capacity will be available in that well field after the Mission area is connected to the surface water supply.

Other projects include a new well for the well field near St. Francis and the ongoing service line and connections installed by the tribal construction crew. The new well near St. Francis is needed because two of the existing wells currently run 24 hours a day during periods of peak demand in summer months. The third existing well does not have sufficient capacity to allow either of the two primary wells to recover. The St. Francis well field also supplies the Spring Creek and Grass Mountain areas.

Operation, Maintenance and Replacement Budget

The sponsors have and will continue to work with Reclamation to ensure that their budgets are adequate to properly operate, maintain and replace (OMR) respective portions of the core and distribution systems. The sponsors will also continue to manage OMR expenses in a manner ensuring that the limited funds can best be balanced between construction and OMR. The project has been treating and delivering more water each year from the OSRWSS Water Treatment Plant near Fort Pierre. Completion of significant core and distribution pipelines has resulted in more deliveries to more communities and rural users. The need for sufficient funds to properly operate and maintain the functioning system throughout the project has grown as the project has now reached 73 percent completion. The OMR budget must be adequate to keep pace with the system that is placed in operation. The administration's request for fiscal year 2009 is $9.374 million less than the administration's fiscal year 2008 request of $9.526 million despite the acknowledged increasing need for OMR funds.

The supporting documentation for the Great Plains Region budget request prioritizes the OMR of the Tribal features of Mni Wiconi. However, it should be noted that the tribal features of Mni Wiconi do not participate in Reclamation's Replacement, Additions and Extraordinary (RAX) program for which $9.8 million has been requested by Reclamation for their non-tribal projects in the Great Plains Region. The tribal systems also have RAX needs.

The Mni Wiconi Project tribal beneficiaries (as listed below) respectfully request appropriations for OMR in fiscal year 2009 in the amount of $10,182,000:

Project Area	OMR Amount
Oglala Sioux Rural Water Supply System:	
Core	$2,376,000
Distribution	2,808,000
Lower Brule	1,485,000
Rosebud RWS	2,121,000
Reclamation	1,392,000
Total	10,182,000

DEPARTMENT OF ENERGY

Prepared Statement of the National Congress of American Indians

On behalf of the National Congress of American Indians, we are pleased to present testimony on the administration's fiscal year 2009 budget request for transportation energy and water development programs. We look forward to working with this subcommittee to ensure that the critical programs and initiatives are funded at levels that will ensure their long term effectiveness.

TRIBAL ENERGY ACCESS AND PRODUCTION

The lack of access to energy resources and to participation in the energy market is still a persistent problem among Indian communities. According to the U.S. Census Bureau, 14.2 percent of reservation homes lack access to electricity, compared

to the national average of less than 2 percent.[1] When provided with innovative energy solutions, tribes are embracing them. For example, 350 Navajo Nation members recently began renting renewable energy units, which provide them with energy for the first time. Using wind technologies, members can power their televisions and a few lights. These improvements, while humble, can drastically improve the quality of life for Indian people.

TRIBAL WATER ACCESS AND RIGHTS

Water resources are, perhaps, the single most important natural resource that is at risk for tribes. Climate change and population growth forecasts place a large burden on rivers and reservoirs, especially in the west, and tribes play a key role in future management of these bodies of water. Tribes usually have priority water rights, but typically have not exercised their full rights. As water demands grow, more tribes will need to exercise their rights and work on developing water infrastructure for their communities. The current posture of requiring offsets in other Department of Interior programs to fund water settlements and projects is potentially harmful to tribal programs, and other sources must be utilized.

Specific Tribal Appropriations Requests; Energy & Water—Department of Energy

Title V—Indian Tribal Energy Development and Self-Determination Act Grants.—The Energy Policy Act of 2005 (Public Law 109–058) included Title V—Indian Tribal Energy Development and Self-Determination Act of 2005, which authorized a competitive grant in the amount of $20 million from fiscal year 2006 to 2016 to assist Indian tribes in energy education, research and development, planning and management needs; and to provide a loan guarantee program to any Indian tribes for energy development. These initiatives have yet to be funded and again are not included in the President's request budget for the Department of Energy's fiscal year 2009.

—NCAI recommends that the title V grants to Indian tribes be fully funded in the amount of $20 million.

Weatherization Assistance Programs.—The President proposed a significant decrease in funding for Indian programs in the Department of Energy. The administration proposes the elimination of the Weatherization Assistance Programs that provides weatherization assistance grants to Indian tribes for low-income and rural homes, and the training and technical assistance.

—NCAI recommends that $22.7 million be made available in fiscal year 2009 for the Weatherization Assistance Programs, the same amount appropriated for fiscal year 2008.

Office of Indian Energy Policy and Programs.—The President requested a substantial decrease for tribal energy activities for fiscal year 2009, which would be funded at $1 million compared with $5.9 million in fiscal year 2008. The President also proposes no resources for the Office of Indian Energy Policy and Programs, which was authorized under the Energy Policy Act of 2005 but has never been funded. The Energy Policy Act of 2005 authorized this office to implement tribal energy initiatives and funding opportunities for Indian energy development and tribes have been fighting for even the most basic funding each year.

—NCAI recommends that level funding of $5.9 million be made available for fiscal year 2009 for the Office of Indian Energy Policy and Programs (OIEPP).

Renewable Energy Production Incentives.—Another program proposed for termination in the fiscal year 2009 President's budget is the Renewable Energy Production Incentive (REPI), which provides financial incentive payments to publicly owned utilities, not-for-profit electric cooperatives, and tribal governments and native corporations that own and operate qualifying facilities generating renewable energy. The justification for the elimination of REPI by the administration is the importance of this program has diminished over time due to reduced cost and competitiveness of renewable energy technology.

—NCAI recommends that $8.5 million be made available for the renewable energy and conservation programs and activities for fiscal year 2009.

Bureau of Reclamation (Department of Interior)

General—Tribal Water Projects and Settlements.—The Bureau of Reclamation (BOR) has a significant role in shaping the future of tribal water resources. Water rights settlements are often funded through BOR, as well as negotiated and implemented. However, the process is cumbersome and very tenuous as funding is often difficult to obtain. There are nearly 25 settlements nearing implementation that will

[1] Energy Information Administration, Energy Use and Renewable Energy Development Potential on Indian Lands, 2000.

need funding, and the current position of pushing it further down the timeline only increases the price. The budget committee needs to raise the ceiling.

—NCAI recommends that the Bureau of Reclamation prioritize funds for Indian water projects and water rights settlements.

Reclamation Fund.—Tribes passed a resolution at the 2007 Annual NCAI Conference (No. DEN 07–069) that identifies the Reclamation Fund (Fund) as an appropriate vehicle for funding tribal water rights settlements. The Fund could be utilized as the primary source for funding settlements, which is desperately needed. The Fund was established in 1902 to fund water projects in the 17 western States, including on tribal lands. The Fund continues to have a growing balance, over $7 billion estimated in fiscal year 2007, with mineral development providing most of the increase.

—NCAI recommends that the BOR Reclamation Fund be utilized as a substantial source for tribal water projects and settlements.

Army Corps of Engineers (Department of Defense)

Army Corps of Engineer projects can provide substantial opportunities for water infrastructure development in Indian Country. Specifically, the Water Resources Development Act authorizes municipal water supply and wastewater treatment projects. These projects are crucial for tribes, and funding needs to be increased to tribal projects. In the earlier part of this century when Congress invested heavily in Corps projects and WPA projects, Indian Country was often overlooked. Therefore, our infrastructure, particularly water infrastructure has usually never had even the most basic investment.

—NCAI recommends a minimum of 10 percent of the civil works projects that provide environmental infrastructure be set aside for tribal specific projects.

PREPARED STATEMENT OF THE CONSORTIUM FOR FOSSIL FUEL SCIENCE (CFFS)

PRODUCTION OF TRANSPORTATION FUELS FROM COAL PLUS BIOMASS WITH REDUCED CARBON DIOXIDE EMISSIONS

Chairman Dorgan and members of the subcommittee, we request $2,000,000 in funding for a congressionally directed project in the budget of the Department of Energy in the Fuels Program of the Office of Fossil Energy, to continue a program of research to produce transportation fuels from coal plus biomass. This program, which was recently initiated with a $750,000 contract from the U.S. Department of Energy in fiscal year 2008, will focus on the conversion of coal plus waste biomass into ultra-clean transportation fuels by gasification and Fischer-Tropsch synthesis. This approach has the potential to minimize the amount of carbon dioxide emitted by the fuel conversion process to less than that produced by the production of similar transportation fuels from petroleum. Additionally, combustion of the biomass component of the carbon during fuel utilization in vehicles or planes will be carbon dioxide neutral.

Overview

Traditional petroleum-derived fuels will continue to dominate transportation by vehicles and planes for at least the next 20 years. The United States currently imports over 10 million barrels of oil per day at a cost exceeding $470 billion/year, most of it from unstable regions of the world. Not only is this the biggest item in the U.S. trade deficit, it is also a serious threat to our national security. Increasing global demand, coupled with an expected peaking in the world oil supply, will undoubtedly cause shortages and markedly increased prices, possibly deepening the current economic recession and leading to more severe recessions in the future.

It is therefore essential that we begin to produce transportation fuels from our own national resources, particularly our most abundant energy resource, coal. It is equally essential, however, that we do so without harming the environment. The Consortium for Fossil Fuel Science (CFFS), a research center of the University of Kentucky, has formed an integrated team of fossil fuel scientists from five universities (University of Kentucky, West Virginia University, Auburn University, University of Utah, and University of Pittsburgh) to conduct a basic research program focused on producing Fischer-Tropsch fuels using mixtures of coal and biomass as the feedstock. We believe that costs can be reduced, a superior transportation fuel can be produced, and carbon dioxide emissions can be minimized through such research.

The CFFS has extensive experience and broad expertise in research on the conversion of coal into clean liquid transportation fuels and the conversion of coal into hydrogen. We have made significant breakthroughs in such areas as:

—Catalysis of coal conversion reactions.
—C1 chemistry processes, including Fischer-Tropsch (F–T) synthesis, to produce transportation fuels from coal-derived syngas.
—Conversion of coal and waste materials, including plastic, rubber, and cellulose (biomass) into high value oil products.
—Development of novel processes to produce hydrogen from fossil fuels.
—Environmental research focused on a number of pollutants derived from coal (fine particulate matter (PM), toxic trace metals (arsenic, chromium, mercury, etc.) and SO_X).

We are now focusing on a research program to develop processes that use biomass as a co-feed with coal for the production of clean transportation fuels with reduced carbon emissions. In this program, lignocellulosic waste materials will be used because they are not food feedstocks. Wood wastes and agricultural wastes (sawdust, bark, corn stover, etc.) will be emphasized because they reflect the lumber, paper, and farming industries in the CFFS States.

Goals

Some of the research goals of the CFFS coal + biomass program are summarized below.

—A pilot scale (3–30 lbs/hr) gasifier is under construction that will be used to gasify coal + biomass feeds. It will be coupled with a supercritical fluid (SCF) F–T synthesis reactor.
—Biomass feedstocks (lignin, cellulose, hemicellulose, etc.) will be reformed in supercritical water (SCW) to produce hydrogen for F–T synthesis and fuel upgrading with no net carbon dioxide emissions.
—Iron-alloy nanoparticle catalysts will be used to dehydrogenate gaseous alkanes produced by F–T synthesis, yielding pure hydrogen to recycle to the coal + biomass syngas stream, raising its hydrogen content to avoid carbon dioxide emissions from the water-gas shift reaction.
—A laboratory-scale fluid-bed gasifier will be designed and built to convert coal + biomass into syngas with an adjustable composition. Potassium and calcium will be tested as catalysts.
—Novel catalysts (dual function catalysts, metallic nanoparticles on carbon nanotube supports, xerogels, etc.) will be developed for F–T synthesis using syngas typical of coal + biomass.
—Systems engineering modeling will be used to optimize fuels production from coal + biomass with regard to both economics and carbon dioxide emissions.

Summary

We request your support for $2,000,000 in funding for this program from the Fossil Energy budget for fiscal year 2009. This funding will be shared between the CFFS universities to support the second year of a 3-year research program for the production of liquid transportation fuels from coal and biomass. The CFFS will provide $500,000 in cost-sharing to support this important research on a topic that is critical to both our States and our Nation.

PREPARED STATEMENT OF THE NATIONAL RESEARCH CENTER FOR COAL AND ENERGY, WEST VIRGINIA UNIVERSITY

FOSSIL ENERGY RESEARCH AND DEVELOPMENT PROGRAMS

Summary

The National Research Center for Coal and Energy submits this testimony in support of the Fossil Energy program and recommends the following modifications to the administration's budget request:

—Carbon Capture and Storage (+$6 million for the Focus Area for Carbon Sequestration Science)
—Fuels Program (+$20 million for continuation of the coal, synthetic natural gas, and coal-biomass liquid fuels programs)
—Advanced Research (+$10 million to initiate a Focus Area for Materials Science and +$5 million for the Focus Area for Computational Energy Science)
—Innovations for Existing Plants (+$10 million for criteria pollutants and water programs)
—Oil and Natural Gas Programs (+$30 million to restore programs for small producers)

We recommend a dual program strategy to Congress which includes supporting fundamental research for developing new concepts and also supporting larger scale projects to prove out and hasten the deployment of advanced technologies. A robust

coal, oil, and natural gas research program is necessary if we are to meet our national energy needs.

Introduction

Coal will continue to play a leading role in electrical power generation in the United States well into the future. Transforming coal into liquid fuels, synthetic natural gas, and/or chemicals can help to reduce petroleum imports, bring associated positive effects on our international balance of payments, and preserve jobs in this country. Concerns about the effect of greenhouse gases on global climate will require reducing emissions of CO_2 from all fossil fuel use. The successful deployment of cost-effective carbon capture and storage (CCS) technologies will ensure that America can continue to use its abundant domestic fossil fuel resources into the future. Given the projected global use of coal and other fossil fuels, leadership by the United States to implement low carbon emission technologies will set a positive example for the rest of the world. Deployment of U.S. owned low-carbon technologies would be an economic stimulus for developing new products that can be sold in global markets.

Advanced low carbon fossil energy technologies will enable the world community to meet pressing environmental challenges driven by growing economies as both established and emerging nations are faced with diminishing resources. We recommend strong congressional support for fossil energy research, development, and technology deployment. We also call the subcommittee's attention to the critical shortage of energy technologists at all levels. We urge your support in particular for basic research in fossil energy that supports academic programs under which we can both develop breakthrough discoveries and also educate our future workforce of scientists and engineers to meet the challenges which face the energy sector.

Carbon Capture and Storage

We recommend strong support for carbon storage research for injecting CO_2 into geologic formations. Given the variety of potential sinks, multiple projects are needed to prove out technologies such as injection into saline aquifers, depleted oil and natural gas reservoirs, and coal seams. States like West Virginia offer possibilities for demonstrating and deploying capture and storage technologies while offering opportunities for our State's coal resources to help meet electrical demands of the East Coast. We recommend congressional support for a diverse portfolio of investments in the National Energy Technology Laboratory (NETL) as the national center for carbon management research. NETL should also expand its programs on developing pre-and post-combustion CO_2 capture technology. Continued support for the collaborative research program with NETL and the Zero Emissions Technology Center is also recommended. Another promising area of research is to explore ways to utilize CO_2 in processes which do not require storage but result in useful products. In addition to supporting the base administration request, we recommend restoring the Focus Area for Carbon Sequestration Science to its fiscal year 2007 level of $13 million (+$6 million to administration request).

Fuels Program

The administration request for fuels research includes only $10 million for the development of hydrogen from coal. This program contributes to developing a national hydrogen economy. However, the administration program should also support projects which address the deployment of hydrogen technologies and the associated critical infrastructure issues. We need to demonstrate to the general public that hydrogen (from coal) is both economically viable and safe.

We are also concerned that little attention is paid to developing transportation fuels, synthetic natural gas, and/or chemicals from alternative energy sources such as coal and coal-biomass blends. We recommend adding $20 million for continuation of the fuels programs added by Congress in fiscal year 2008. These funds would permit investments in fuels research to support programs such as the Consortium for Fossil Fuel Science and the Center for Advanced Separation Technology. These fundamental research programs educate coal chemistry and coal materials technologists who will be needed in the energy industry of the future as our aging scientists and engineers from the Synfuels Corporation era complete their careers. Other worthwhile investments which should be supported from these funds include the program conducted by the United States and China under Annex II of the Fossil Energy Collaborative Research Protocol to study the development of large scale coal liquefaction/carbon sequestration plants in China. Of the increased funding recommended, $1 million should be designated to continue the China program. Modest investments in the China program pay back big dividends in access to commercial-scale results at a fraction of the cost of building such plants in the United States.

We support the position that CCS must be integrated with the fuel production aspects of coal conversion technologies. Fundamental programs of research conducted with the additional funds recommended would develop new technologies that are cost effective with respect to both fuels production and CO_2 capture. Computational modeling, especially for polygeneration systems, should be an integral part of the work conducted under these programs.

Advanced Research

Materials Research.—Advanced materials are needed in a variety of applications such as ultra supercritical power plants, high temperature gas-fired and hydrogen-fired turbines, sensor technology, catalysts for fuel conversion, high temperature materials for fuel cells, and new processes for carbon capture. We recommend the addition of $10 million to the Advanced Research account for the creation of a Focus Area for Materials Research at NETL to develop advanced materials for energy applications.

Focus Area for Computational Energy Sciences.—Advanced computing capability enabled by newer, high speed computers and developments in computing science permit modeling of energy systems in scale ranges from molecular interactions to integrated operation of complex power plants. Given the high cost of testing and building large scale energy systems, computational modeling offers inexpensive advantages to design energy systems which will/must be deployed in the future. We are disappointed that the administration has again neglected this important area of research and recommend additional funding of $5 million for this account for fiscal year 2009.

Innovations for Existing Plants Program

We support the request of the administration to provide increased funding to the Innovations for Existing Plants (IEP) program for CCS technologies. We are concerned however, that the administration request neglects other important areas such as particulate control, air toxics, combustion byproduct utilization, and research in technologies which minimize the use of water in energy systems. Continued research is needed in these areas in view of the new CAMR ruling calling for more stringent studies on mercury emissions. National concerns have arisen about the scarcity of water in many regions where electric power demands are increasing. We recommend an additional $10 million for the IEP program for these applications.

Oil and Natural Gas Programs

The administration request zeros out funding for both the Oil and Natural Gas programs again this year. The core oil and natural gas programs under Fossil Energy are specifically authorized in Public Law 109–58 (EPAct 2005). This authorization includes programs such as the Stripper Well Consortium, the Petroleum Technology Transfer Council, and the Enhanced Oil Recovery in Marginal Fields programs. All three of these programs are of major interest to areas such as Appalachia where small producers do not have sufficient funding or expertise to conduct research to recover the valuable resources remaining in the ground. These programs also support research which educates our geologists and petroleum engineers needed in the future to produce our existing resources and to manage our carbon storage programs for CO_2. We recommend restoration of the Oil and Natural Gas program at NETL to a level of $30 million, which is considerably less than Congress provided in earlier times when we were not facing national economic challenges such as $118 per barrel oil and $4 dollar per gallon gasoline.

Thank you for considering our testimony.

NOTE.—Specific recommendations for the Consortium for Fossil Fuel Science ($2 million) were made in testimony submitted by Gerald Huffman. Roe-Hoan Yoon submitted testimony requesting support for the Center for Advanced Separations Technology ($3 million).

PREPARED STATEMENT OF THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE)

The American Council for an Energy-Efficient Economy is an independent, nonprofit organization dedicated to advancing energy efficiency to increase economic prosperity, enhance national security, and improve environmental quality. Founded in 1980, we are a leading source of unbiased information and policy analysis on energy efficiency.

DOE's fiscal year 2009 budget request reflects a continuing decline in support for important energy efficiency programs at a time when expanded support for energy efficiency is needed more than ever to protect national energy security, save Amer-

ican jobs, control rising consumer bills, and stem air pollution and greenhouse gas emissions. For fiscal year 2009, the administration proposes to cut $204 million (29 percent) relative to the fiscal year 2008 appropriation. In order to better address many of America's energy needs, we recommend that the subcommittee increase funding for 11 especially high-priority programs for a total of $302 million above the administration's request but only $71 million above the fiscal year 2008 appropriation. These programs include several of DOE's most successful programs as well as a few new programs authorized in the Energy Independence and Security Act of 2007 (EISA). Specific recommendations are described in the sections below.

BUILDINGS TECHNOLOGIES

Commercial Building Initiative.—CBI is a major new initiative established in EISA. The goal of the initiative is for all new commercial buildings to use zero energy on net by 2030 (i.e. they produce as much energy as they use) and all existing buildings to meet the same goal by 2050. These are very large savings that can have many positive impacts on the U.S. economy and environment. CBI combines research, development, and deployment, and will be run by DOE with input from an industry consortium. We recommend that funding of at least $20 million be appropriated for this important new program, an increase of $7 million relative to the Commercial Buildings Integration budget in DOE's request.

Lighting and Appliance Standards.—DOE standards produce the greatest energy savings of any DOE program. DOE's analysis estimates that 12 standards to date have saved consumers about $25 billion, from a Federal investment of less than $10 million a year. DOE is under court order to complete many rulemakings that are years behind schedule, and also needs additional funding to address requirements added by EISA. The DOE request does not appear to address the new EISA requirements which include several new rulemakings, as well as new mandates to review and update existing test procedures and standards every 6 to 8 years. In order to address both old and new requirements, we recommend funding of $24 million for the standards program, an increase of $4 million relative to the fiscal year 2009 budget request but an increase of only $2 million relative to the fiscal year 2008 appropriation. DOE should be permitted to spend a portion of this increase on staffing, as more DOE staff are needed to supervise increased contractor budgets made possible by the fiscal year 2008 budget.

Building Codes, Energy Star, and Residential Building Integration.—These are three of the most important programs at DOE and all three received significant funding increases in the fiscal year 2009 request. We support these increases.

—Many States are interested in revising their building codes as part of efforts to save energy and address climate change. The DOE codes program is an important source of funding for these efforts. DOE is also supporting efforts by ASHRAE to reduce permitted energy use in its model commercial building code by 30 percent.

—The Energy Star program is probably the administration's most effective climate change response program. Increased funding will allow DOE to update existing specifications, expand the program to several new products, and actively promote these specifications in regions without significant State or utility programs.

—The Residential Building Integration program is the home of the Building America program, a successful partnership with private firms that is developing and promoting cost-effective design approaches for reducing energy use of new homes by 40 percent or more.

INDUSTRIAL TECHNOLOGIES

The 2009 request would cut the Industrial Technologies Program by $2.3 million, relative to fiscal year 2008, but much larger cuts in several very important programs are hidden in the budget details as is discussed below. The overall program activities are divided into two broad groupings: industry specific and cross cutting. We have identified several priorities in each of these areas.

Industrial Assessment Centers.—The IAC is part of the cross-cutting program budget. The IAC program helps small and medium industries identify and implement energy saving measures, while also helping to train the next generation of industrial energy engineers. The program operates centers at 31 universities nationwide and produces several hundred trained engineers annually while helping to reduce industrial energy use in small- and medium-sized facilities. This is one of DOE's most effective programs, and is presently saving more than $1 billion per year (including measures implemented in earlier years). The program should be substantially expanded in order to meet future needs for trained energy engineers—

there is presently a shortage of skilled energy efficiency engineers. We recommend that the program be restored to fiscal year 2006 funding levels of $6.435 million in fiscal year 2009.

Industries of the Future (Specific).—This program does cost-shared research with industry at major research institutions. The program focuses on key, energy-intensive manufacturing industries such as steel, aluminum, wood products, glass and metal casting. The most recent National Academy review found this to be among the most successful of Federal R&D efforts.[1] In spite of this success, the program has seen its budget drop from $63 million in fiscal year 2002 to $11 million in fiscal year 2008. DOE is proposing $11.4 million in fiscal year 2009, which may appear to be level funding, but in reality represents a further cut since most of the research funding is multi-year, and funding from earlier years is now no longer being replaced and the pipeline is running dry. In EISA, Congress authorized an expanded Energy-Intensive Industries program (sec. 452), with an emphasis on industry-specific research in energy-intensive industries. This provision specifically authorized the successful industry-focused program format that has proven effective because it responds to the targeted needs of individual industries rather than to the more general and less focused topics covered under the cross-cutting program. To start implementing this new provision, we recommend fiscal year 2009 funding of at least $24.2 million (which was the appropriation in fiscal year 2006), an increase of $12.8 million relative to the budget request.

Distributed Energy (DE).—Over the past decade these efforts have played a key role in the development of high-efficiency clean technologies like combined heat and power (CHP) and technologies to recycle waste energy. Over the past few years these efforts have been shuffled between EERE and the Office of Electricity, and the program has received no funding for the past year. For fiscal year 2008, Congress provided $14.5 million, but DOE's fiscal year 2009 request is for only $1.5 million. The program is now part of the cross-cutting effort in the Industry program. We recommend the DE activities be funded at an overall level of no less than $20 million, an increase of $5.5 million relative to the fiscal year 2008 appropriation.

Industries of the Future (Cross-Cutting).—The remainder of the industrial program budget request falls within the category of cross-cutting programs. This includes the Industrial Assessment Centers and the Distributed Generation program discussed above. In addition, this program includes Best Practices and cross-cutting R&D, each of which we discus below.

—*Best Practices.*—The OMB request proposes to increase the best practices area from $8.8 to $15.5 million, though this represents only a partial restoration of funding that was $19.8 million in fiscal year 2007. This increased funding will allow the expansion of the successful Save Energy Now program, one of the most successful energy savings programs undertaken at the Federal level (e.g. savings underway of approximately $288 million since program inception in 2006). We recommend that the program be funded at the requested level of $15.5 million.

—*Cross Cutting RD&D.*—These activities are primarily for R&D on technologies that benefit many industrial sectors, such as work on sensors and controls. In addition, DOE is now proposing a number of new efforts in energy-intensive process R&D, feed stock flexibility and nanomanufacturing, and expanding the industry focus to include datacenters and food processing. While these are potentially worthy areas of efforts, DOE is essentially proposing to fund these efforts by further cuts to the successful industry-specific IOF efforts. In addition, EPA has already been running a datacenter program for several years, and a new DOE effort is potentially duplicative. If budgets are tight, funding for these cross-cutting RD&D can be reduced to fiscal year 2008 levels in order to free up funds for our higher priorities discussed above.

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[1] In 2005 the National Research Council reviewed DOE's Industrial Technology Program in their report Decreasing Energy Intensity in Manufacturing. The study characterized the program (at that point) as being "well-managed and effective." In particular they indicated that the "program's scope and depth of analysis and reporting are impressive. The ITP significantly leverages its resources through a large and growing number of partnerships with industry, industry associations, and academic institutions." Unfortunately, funding has been dramatically reduced since this evaluation, and a subsequent National Research Council report on DOE R&D, Prospective Evaluation of Applied Energy Research and Development at DOE (Phase Two) (2007), noted with respect to Chemical Industry research activities "the budget decreased to $9 million in fiscal year 2005 and $7 million in fiscal year 2006. There is a clearly apparent contradiction between the ambitious goals of the program and the dwindling resources available to pursue them."

VEHICLE TECHNOLOGIES

Despite the nominal increase of $8 million in the Vehicle Technologies Program budget, proposed funding for this work has actually declined because elements of the Hydrogen Technology budget have been moved into Vehicle Technologies. In fiscal year 2008, Vehicle and Hydrogen Technologies together received $424.1 million. The fiscal year 2009 request cuts these combined budgets by $56.7 million. The proposed transferal, elimination or postponement of certain activities in the Hydrogen Technology Program appears reasonable in many cases, and in particular begins to rectify disproportionate allocations in prior years to hydrogen and fuel cells relative to other vehicle and fuel technologies. However, given the great opportunities and needs at present in the area of vehicle efficiency and greenhouse gas reduction, it is imprudent to simply eliminate funds from this program, rather than transferring some of the funds to underfunded areas in Vehicle Technologies. In the fiscal year 2009, DOE proposes to cut a variety of important vehicle programs: Hybrid Electric Systems declines by $5.8 million (6 percent, net of the Technology Validation activity transferred from the Hydrogen Technology Program), Technology Integration by $2.2 million (13 percent), Advanced Combustion loses $11 million (25 percent), Materials Technology loses $2.7 million (7 percent), and Fuels Technology loses $1.7 million (10 percent), relative to fiscal year 2008 appropriations. Also, funding for the 21st Century Truck Partnership declines in the budget proposal, for a total 40 percent reduction since fiscal year 2007. We recommend that some of these cuts be restored by adding $37 million to the fiscal year 2009 request, which is still a cut of about $20 million relative to the combined fiscal year 2008 Vehicle and Hydrogen budgets.

Hybrid Electric Systems.—The proposed reduction in the Vehicle and Systems Simulation and Testing activity relates in part to heavy vehicle systems optimization R&D, which warrants greater attention. We recommend that $7.1 million be restored to Vehicle and Systems Simulation and Testing, bringing funding for this activity back to $28.2 million. Furthermore, energy storage efforts need to be accelerated. We recommend that the Energy Storage R&D activity be funded at $59.5 million, an increase of $10 million above the proposed budget.

Advanced Combustion Engine R&D.—The explanation offered for the proposed cut, namely that resources should go to "R&D that has a higher potential for oil savings" is not persuasive given the considerable remaining opportunities in this area for both light- and heavy-duty engines. We recommend that Combustion and Emissions Control be funded at $38.8 million, restoring $10 million to this activity.

Materials Technology.—Reaching DOE's stated goal of a 50 percent reduction in the weight of body and chassis for a passenger vehicle will require a sustained effort, including continued exploration of "high-risk concepts", as referenced in DOE's budget explanation. We recommend funding of $30 million for Lightweight Materials Technology, which restores $2.9 million cut in the budget and adds a further $7.7 million.

OTHER PRIORITIES

Weatherization Assistance Program.—This program has steadily improved, and according to the last nationwide evaluation of the program, is reducing energy use in participating homes by about 20 percent. DOE has proposed to eliminate this program, in order to save money. With the economy heading into a recession, this is a particularly bad time to cut our country's safety net. We recommend funding this program at least at the fiscal year 2008 level of $227 million.

Energy Information Administration Energy Consumption Surveys.—EIA's Energy Consumption surveys are an important resource for energy analysis and energy program planning. These three surveys (residential, commercial and manufacturing) are widely used and provide important information for accurate forecasting and planning. Unfortunately, due to declining funding, sample sizes are smaller (making regional data less precise) and the surveys are now every 4 years, instead of the every 3 years called for in the Energy Policy Act of 1992. In fiscal year 2008, the consumption surveys have a $3.6 million budget. We recommend that $2 million be added to the EIA request in order to return to the every 3 year schedule, increase sample sizes and speed up processing of surveys so they can be released more quickly.

PREPARED STATEMENT OF THE NEXT GENERATION NUCLEAR PLANT WORKING GROUP

The United States must successfully compete in today's global marketplace to provide opportunities for all of its citizens and future generations. Two of the major

issues affecting our competitiveness are the lack of energy security and our major contributions to the global greenhouse gas (GHG) inventory. The first issue is economic and costs the U.S. taxpayers several billion USD daily. Additionally, innumerable jobs in industries that depend on reasonably priced and abundant fossil feedstock continue to move offshore. The second is more subtle. Our GHG emissions cost us in terms of international reputation and accelerate the adverse effects of global climate change. We must become much more efficient in our use of energy, but this step is not sufficient to address the critical issues to keep our economy strong. We must aggressively pursue technological solutions that provide energy for all sectors of our economy in an environmentally responsible manner. One of the technologies that can address both of these critical issues utilizes a proven energy source, nuclear fission, for a broad range of applications beyond its traditional role of generating electricity.

The Next Generation Nuclear Plant (NGNP) Project provides the basis for the commercialization of this technology in the form of a new generation of advanced, passively safe, modular nuclear plants that use High Temperature Gas-Cooled Reactor (HTGR) technology. This technology offers enhanced safety plus improved reliability, higher efficiency (requiring less fuel and cooling water), proliferation resistance, security and waste management capabilities. Further, at current and projected natural gas prices and costs for CO_2 management, the HTGR will be competitive for a broad range of applications, including:

—High efficiency electricity generation for small to medium markets, particularly if suitable for cogeneration with water desalination or dry cooling;
—High quality steam for use in heavy oil recovery, including tar sands, or the broad range of process steam/cogeneration based industries;
—High temperature process heat for industrial chemical and petrochemical facilities, preserving natural gas for feedstock; and
—High temperature process heat for hydrogen production and cogeneration for the petrochemical and refinery industries plus the clean conversion of coal to liquid and gaseous fuels or the direct use of hydrogen transportation fuel in the future.

Advanced HTGR plants can help improve U.S. industrial competitiveness, promote the utilization of indigenous coal and uranium, and eventually, our oil shale resources. Their use will extend domestic oil and gas resources and preserve them for feedstock for products that would otherwise be unattainable, thereby reducing costs and risks associated with imported oil and natural gas.

The NGNP Project is essential to demonstrate the commercial potential of the HTGR and support timely NRC Design Certification and commercialization. An industry based Consortium is being created to support the public/private partnership with the Department of Energy to focus the development and deployment of the NGNP and help provide the infrastructure for follow-on commercialization. A cost/risk sharing model between the U.S. Government and industry will assure a new commercialization phase for nuclear energy for production of process heat and cogeneration without carbon emissions—at the lowest costs and risks for the U.S. taxpayers.

With a balanced approach to risk management and timeliness to attract end-user support, the recommended NGNP Project schedule targets startup of the demonstration plant in the 2018–2019 timeframe. Near-term priorities in support of this date follow:

—Establish reference design and baseline costs
—Advance licensing strategy and pre-application program with the NRC
—Advance critical-path enabling technology development and testing
—Establish Public-Private Partnership and costs/risks sharing concept
—Establish Project plan, vendor team and international cooperation frameworks

During the past year significant technical progress and milestones have been achieved in the following key areas of the NGNP Project: preliminary design evaluations for the competing concepts, including trade-off studies to resolve critical issues and establish technology development needs; licensing strategy development, technology development including fuel manufacturing process development and testing; and, bounding cost estimates.

For fiscal year 2009, the NGNP Alliance recommends a NGNP Project budget of $210 million (versus the DOE budget of $59.5 million) plus a $28 million budget for the related Nuclear Hydrogen Initiative (versus the DOE budget of $16 million). The working group also recommends a budget of $10 million for NRC licensing and required R&D activities related to the NGNP Project. A licensing framework and a process appropriate for the enhanced safety features of the HTGR is essential and is a critical path to the deployment of the NGNP Project.

PREPARED STATEMENT OF THE NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY AND THE NEW YORK STATE DIVISION OF HOUSING AND COMMUNITY RENEWAL

The New York State Energy Research and Development Authority (NYSERDA) and the New York State Division of Housing and Community Renewal (NYSDHCR) welcome the opportunity to present this testimony to the Subcommittee on Energy and Water Development, and look forward to working with the subcommittee to ensure the most appropriate and effective Federal funding of essential programs and operations. This testimony will address proposed funding of two Department of Energy programs which are issues of concern to NYSERDA, namely funding for the West Valley Demonstration Project (West Valley, Project), identified for funding from the Non-Defense Environmental Cleanup Program at $57 million, and the State Energy Program (SEP), identified for funding at $59 million. In addition, this testimony addresses one program of particular importance to NYSDHCR, the Weatherization Assistance Program (WAP), funding for which was cut completely in the President's proposed fiscal year 2009 budget proposal. NYSDHCR asks that funding for this program be restored to at least fiscal year 2008 levels of $243 million.

WEST VALLEY

The State of New York and NYSERDA are extremely concerned about the proposed cut in Federal funding to the West Valley Demonstration Project, a radioactive waste cleanup project located near Buffalo, New York. The President's budget for fiscal year 2009 would provide only $57 million for activities of the Department of Energy at West Valley. The State strongly urges full funding of the West Valley Demonstration Project at the level of $95 million.

Federal funding had been more than $100 million as recently as 2004, but had been reduced to $75 million in recent years. The proposed cuts will result in lengthening the term of the cleanup and ultimately only increase the total project costs. Moreover, as will be discussed below, important risk reduction work that has been agreed upon between the State and Federal governments will not be funded in 2009 and as many as 50 trained workers will have to be laid off.

The Federal funding responsibility for this project was established in 1980, when Congress passed the West Valley Demonstration Project Act, Public Law 96–368. The West Valley Demonstration Project Act directed the U.S. Department of Energy to carry out a high-level radioactive waste (HLW) management demonstration project at the Western New York Nuclear Service Center in West Valley, New York. The WVDP Act directs the Department of Energy to:

—Solidify the 600,000+ gallons of liquid high-level radioactive waste.
—Develop containers for permanent disposal of the solidified HLW.
—Transport the solidified HLW to a Federal repository for permanent disposal.
—Decontaminate and decommission:
  —the tanks and other facilities in which the HLW were stored,
  —the facilities used in carrying out solidification, and
  —the material and hardware used in connection with the Project.
—Dispose of the low-level radioactive waste and transuranic waste produced in conducting the Project.

The West Valley Demonstration Project Act requires the Secretary of Energy to enter into an agreement with New York State for carrying out the Project. Under the requirements of the act, New York State pays 10 percent of the Project costs and the Federal Government pays 90 percent, making New York the only State that has contributed to the cleanup of HLW. New York State has provided approximately $242 million toward completion of the Project to date.

Decontamination and decommissioning of the West Valley site is necessary to protect public health and safety. The Department of Energy has solidified the bulk of the liquid high-level nuclear waste that was stored in underground tanks. A total of 275 HLW glass-filled canisters are in storage at West Valley awaiting disposal at the Federal repository. However, much cleanup work remains to be done on the site's contaminated facilities and property, including the decommissioning of the four underground HLW storage tanks, the Main Plant Process Building, an unlined lagoon system, a radioactive groundwater contamination plume, and a radioactive waste disposal area. The Department of Energy must also dispose of the low-level waste, the transuranic waste, and the vitrified High-Level Waste.

Until recently, progress on significant aspects of the West Valley cleanup had stalled. The Department of Energy ceased efforts to contain a radioactive groundwater plume and refused to take steps to halt the spread of liquids leaking from a radioactive waste disposal area under its control. The Environmental Impact

Statement that is essential for decisions on the future of the cleanup was also stalled. In the past year, there have been some substantial and encouraging changes at West Valley. Agreements have been reached on steps to control the groundwater plume and disposal area leaks, and the involved Federal and State agencies have agreed on an approach to complete the Environmental Impact Statement.

Unfortunately, this progress is threatened by the lack of adequate funding. For fiscal year 2009, Federal funding at about $95 million is necessary to continue decontamination work on the highly radioactive Main Plant Process Building, remove liquid from the underground high-level radioactive waste tanks, mitigate radioactive groundwater contamination that is spreading toward the Project boundary, and ship waste for offsite disposal. In the absence of this level of funding, important work to reduce risk from radioactive materials at the site will not get done this year and up to 50 members of the highly trained workforce at the site will have to be laid off. For each year that work is delayed, the time until completion and the total cost of the Project are increased.

For the reasons stated above, New York State and NYSERDA request a restoration of funding for West Valley to $95 million to permit the important work at the Project to continue at an optimal pace.

STATE ENERGY PROGRAM

The State of New York and NYSERDA are concerned about the proposed level of Federal funding for the State Energy Program, at $59 million, and request that a funding level of $75 million for fiscal year 2009 is provided to support this essential program. This funding level request is made in support of the request of the Coalition of Northeastern Governors (CONEG), which is also submitted to the subcommittee. The $75 million level will help to restore a funding level for SEP which has experienced significant cuts in program budgets in the past. As noted in both the CONEG testimony, and by the Department of Energy itself, every Federal dollar invested by the SEP returns $7.23 in energy cost savings. In addition, every Federal dollar invested by the SEP also leverages $10.71 in State, local and private resources, providing significant additional economic benefit.

In New York, SEP program dollars are used by NYSERDA to support the deployment of various energy efficiency programs and services. NYSERDA leverages SEP funds with the State ratepayer-supported System Benefits Charge and other private sector funds. Most importantly, SEP provides essential funding for programs which reach across the spectrum of fuel sectors, helps to fill program gaps, and expands the reach of critical energy efficiency activities to customer sectors which may otherwise be limited from full program participation. In addition to reducing overall energy use in New York, the SEP supports activities that improve productivity, stimulate private investment, retain and create jobs, displace petroleum use, reduce electric peak load, and improve air quality, among other benefits.

Activities supported by SEP dollars include:

—NYSERDA's award-winning Flexible Technical Assistance Program, which provides onsite energy engineering services through competitively retained energy service providers.

—Multifamily Residential energy efficiency program which provides energy audits, evaluations and access to loan fund dollars which reduces the cost to building owners to implement energy efficient technologies.

—Agricultural Initiatives.

—Green Building Projects.

—Alternative Fuel Vehicles and Alternative Fuel Infrastructure.

—Industrial Improvements.

—Expansion of the Home Energy Assistance Program heating oil purchasing program, providing participating low-income energy consumers with discounts on heating oil purchases.

Obtaining an optimal level of SEP funding will help to ensure the continuation of these critical program activities.

For the reasons stated above, New York State and NYSERDA request a restoration of funding for SEP to $75 million to permit the important energy efficiency programs in New York to continue and expand at a pace needed to meet energy consumer needs.

WEATHERIZATION ASSISTANCE PROGRAM

The Weatherization Assistance Program (WAP) improves the energy efficiency of low-income homes every year, helping to reduce the home energy bills of the Nation's most vulnerable citizens by 25 percent or more. The New York State Division of Housing and Community Renewal (NYSDHCR) is very concerned about President

Bush's decision to eliminate funding for the program for fiscal year 2009. If the President's cut is sustained, the State program will lose $21.8 million. The State of New York relies on this funding to help assist its low-income families. With oil prices at record levels, and cuts to LIHEAP proposed, these cuts would be devastating to low-income families and seniors in New York. Currently, we have waiting lists for this assistance in excess of 18 months. NYSDHCR asks that Congress work toward funding this program at its fully authorized level.

In conclusion, and as stated herein, NYSERDA and NYSDHCR respectfully requests that the Senate provide, for fiscal year 2009, $95 million for West Valley, $75 million for SEP, and at least $243 million for WAP. NYSERDA and NYSDHCR look forward to working with the subcommittee to ensure that these program funding levels are provided to ensure that essential energy projects are maintained.

PREPARED STATEMENT OF THE BIOMASS ENERGY RESEARCH ASSOCIATION

SUMMARY

This testimony pertains to the fiscal year 2009 appropriations for biomass energy research, development, and demonstration (RD&D) conducted by the Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE), Biomass Program. This RD&D is funded by the Energy and Water Development bill and performed under the heading of Energy Supply and Conservation, Energy Efficiency and Renewable Energy.

BERA recommends a total appropriation of $275 million in fiscal year 2009 under Biomass and Biorefinery Systems R&D (Energy Supply and Energy Conservation), exclusive of earmarks. This is an increase of about $50 million over the Department of Energy request for fiscal year 2009 for this programmatic area.

We feel this increase is necessary to meet goals for production of fuels from cellulosic biomass as stipulated under the Energy Independence and Security Act (EISA) of 2007. While the proposed DOE Bioenergy budget is an increase of $27 million over the administration's fiscal year 2008 proposed budget, it reflects a decrease of $49 million from the DOE Biomass Program's authorized level of (sec. 932) $274 million, and reducing funds available for important Integrated Biorefinery Demonstration Projects (sec. 932(d)). Technology demonstrations reduce technical and economic risk and accelerate the potential for private investment. They are critical for reaching goals for biofuels production for 2022 and beyond.

Specific lines items for the DOE biomass RD&D budget are as follows:

—$20 million for Feedstock Infrastructure development (regional partnerships, harvesting and storage technology)

—$35 million for Biochemical Conversion Platform Technology (conversion of agricultural residues, wood, forest residues and perennial crops to various fuels)

—$35 million for Thermochemical Conversion Platform Technology (conversion of plants, oil crops, energy crops, wood and forest resources to oils, long chain hydrocarbons, or other fuels/intermediates)

—$175 million for Integrated Biorefinery Technologies demonstrations

—$10 million for Utilization of Platform Outputs: Bioproducts (chemicals and materials as co-products)

BACKGROUND

On behalf of BERA's members, we would like to thank you, Mr. Chairman, for the opportunity to present the recommendations of BERA's Board of Directors for the high-priority programs that we strongly urge be continued or started. BERA is a non-profit association based in the Washington, DC area. It was founded in 1982 by researchers and private organizations conducting biomass research. Our objectives are to promote education and research on the economic production of energy and fuels from freshly harvested and waste biomass, and to serve as a source of information on biomass RD&D policies and programs. BERA does not solicit or accept Federal funding.

There is a growing realization in our country that we need to diversify our energy supply, develop technologies to utilize indigenous and renewable resources, reduce reliance on imported oil, and mitigate the impacts of energy on climate. Economic growth is fueling increasing energy demand worldwide and placing considerable pressure on already burdened energy supplies and the environment. The import of oil and other fuels into the United States is growing steadily and shows no sign of abating. Industry and consumers alike are faced with rapidly rising and volatile costs for fossil fuels, especially petroleum and natural gas. A diversified, sustainable

energy supply is critical to meeting our energy challenges and maintaining a healthy economy with a competitive edge in global markets.

Biomass is the single renewable resource with the ability to directly replace liquid transportation fuels. It can also be used as a feedstock to supplement the production of chemicals, plastics, and other materials that are now produced from crude oil. In addition, gasification of biomass produces a syngas that can be utilized to supplement the natural gas supply and electricity from fossil fuels. Production of power from biomass co-products for use in biorefinery processes greatly reduces the life cycle carbon footprint of biofuels. Fuels, chemicals, and power are already being produced from biomass, but on a small scale compared to the potential markets. While biomass will not solve all our energy challenges, it can certainly contribute to the diversity of our supply, and do so in a sustainable way, while minimizing impacts to the environment or climate.

The Energy Policy Act of 2005 created various incentives for diversifying our energy supply via the use of biofuels. In addition, the Energy Independence and Security Act (EISA) of 2007 put forth a mandate to increase use of alternative fuels for transportation, with a substantial portion to come from cellulosic biomass. To meet the ambitious goals of EISA will require aggressive support for RD&D to move technology forward and reduce technical and economic risk. Incentives are also needed to accelerate commercialization and deployment.

BERA RECOMMENDATIONS FOR U.S. DOE BIOMASS RD&D

BERA's recommendations support a balanced program of RD&D, including projects to develop and demonstrate advanced biochemical and thermochemical biomass conversion processes, a diverse slate of liquid transportation fuels, and co-production of fuels, chemicals, and power in integrated biorefineries. Our overarching recommendations are to:

—Invest in demonstration of technology (as progress is made) to reduce risk (e.g., through loan guarantees, cost-shared projects, other mechanisms) and encourage private sector investment and commercialization.

—Explore a variety of fuels beyond ethanol, including green diesel, green gasoline, jet fuels, algae diesel, pyrolysis oils, mixed alcohols, and others. Include fuels that can be easily integrated into existing infrastructure, and revolutionary fuels or feedstocks (algae). This will diversify options for different transport markets that depend heavily on petroleum.

—Fund a variety of conversion technologies, both biochemical and thermochemical.

—Integrate sustainability throughout RD&D to promote the use of biomass technologies that improve environmental performance and minimize impacts to land, water and air.

BERA's recommendations for funding for DOE biomass RD&D are shown in Table 1 and outlined below. Note that recommended budgets for demonstration projects do not include industry cost-share, which should be 50 percent or more.

TABLE 1.—BIOMASS/BIOREFINERY SYSTEMS R&D, ENERGY SUPPLY & CONSERVATION, EERE

[In millions of dollars]

Program Area	Description of RD&D	R&D	Demonstration	Total
Feedstock Infrastructure	Regional feedstock partnerships, joint development of storage and harvesting technology.	15.0	5.0	20.0
Biochemical Conversion Platform R&D.	Conversion of cellulosic biomass—agricultural residues, wood/forest residues, perennial grasses.	20.0	15.0	35.0
Thermochemical Conversion Platform R&D.	Conversion of wood/forest residues to pyrolysis oils or syngas.	20.0	15.0	35.0
Platform Outputs: Integrated Biorefineries.	Developing/validating biochemical and thermochemical conversion technologies in integrated biorefineries (e.g., 932 projects) and small scale biorefineries.	10.0	165.0	175.0
Platform Outputs: Bioproducts.	Co-production of chemicals and other products from biochemical and thermochemical output streams.	5.0	5.0	10.0
TOTAL		70.0	205.0	275.0

Feedstock Infrastructure.—Continue support for regional feedstock partnerships to ensure the optimal and sustainable production of feedstocks to meet demand on a regional basis. The Departments of Energy and Agriculture, in partnership with the Sun Grant Initiative universities and the members of the National Biomass State and Regional Partnership, established the Regional Biomass Energy Feedstock Partnership. Funding should be continued for these important partnerships, as they will help ensure that cost competitive biomass feedstocks are widely available in sufficient quantity and at an acceptable market cost. Increase funding for cost-shared activities with USDA on critical harvesting, storage and transport technologies to ensure a feedstock delivery infrastructure is available to meet the larger demand.

Platform Outputs: Support Development/Demonstration of Integrated Biorefineries.—Activities should address promising biochemical and thermochemical processes in integrated biorefineries producing fuels, high-value products where possible, and potentially heat and power to meet processing demands. A diversity of technologies and feedstocks should be considered, as well as new fuel options (green diesel, jet fuel, algae, etc.). The object is to improve process efficiency and reduce cost, taking into consideration design, financing, permitting, environmental controls, waste processing, and sustained operations; feedstock acquisition, transport, storage, and delivery; and storage and delivery of products to market.

Conversion: Fund Both Biochemical and Thermochemical Conversion Platforms as Foundations for Integrated Biorefineries.—The biochemical and thermochemical platforms are both important and could provide viable technologies for production of fuels and chemicals. BERA urges that both be funded to accelerate the development and demonstration of large-scale, synergistic integrated biorefinery systems. BERA urges that biochemical conversion research be funded at the amounts shown in Table 1, and that thermochemical conversion R&D for biomass gasification, pyrolysis, and synthesis of alternate liquid fuels be given equal priority. Both should focus on the use of cellulosic biomass, waste biomass, or novel concepts for feedstocks.

Platform Outputs: Invest in R&D to Develop Bioproducts That Enhance the Economic Viability of the Integrated Biorefinery.—BERA urges that funding be provided for R&D to enable economic production of commodity organic and high value chemicals as co-products in biorefineries. Biomass-derived fuels and chemicals combined would increase the product slate and provide greater opportunity for reducing fossil fuels consumption, while increasing the economic viability of the biorefinery. BERA urges that this effort include research on sugar intermediates, but that it be expanded to include direct conversion of other intermediates (such as those derived from gasification and pyrolysis) to fuels and commodity organic chemicals.

Reduce or Eliminate Earmarks.—The level of earmarks in the last few years has limited new initiatives and led to premature reductions of scheduled programs by EERE. BERA respectfully asks the subcommittee to carefully consider the impacts of all earmarks on EERE's biomass energy RD&D.

PREPARED STATEMENT OF THE CENTER FOR ADVANCED SEPARATION TECHNOLOGIES

Chairman Dorgan and Ranking Member Domenici, and members of the subcommittee, I represent the Center for Advanced Separation Technologies (CAST), which is a consortium of seven universities. I appreciate the opportunity to submit this testimony requesting that your subcommittee add $3 million to the 2008 Fuels Program budget, Fossil Energy Research and Development, U.S. Department of Energy, for advanced separations research. Research in Advanced Separations Technology Development is authorized by the Energy Policy Act of 2005, title IX, subtitle F, sec. 962. I am joined in this statement by my colleagues from the consortium: Richard A. Bajura, West Virginia University; Peter H. Knudsen, Montana Tech of the University of Montana; Rick Q. Honaker, University of Kentucky; Jan D. Miller, University of Utah; Ibrahim H. Gundiler, New Mexico Tech; and Maurice C. Fuerstenau, University of Nevada-Reno.

FUNDING REQUEST FOR CENTER FOR ADVANCED SEPARATION TECHNOLOGIES

CAST was formed initially as a partnership between Virginia Tech and West Virginia University in 2001 to address the needs of the U.S. coal industry. In 2002, five other universities (University of Kentucky, Montana Tech, University of Utah, University of Nevada-Reno, and New Mexico Tech) joined to form a consortium, with Virginia Tech as the lead institution. The objective of the consortium is to develop Advanced Separation Technologies that can be used to produce cleaner fuels from domestic resources with minimal environmental impact.

PROPOSED WORK

The United States faces an energy crisis created by an imbalance between domestic supply and demand. While the United States makes up only 4.6 percent of the world's population, it consumes 24 percent of the world's energy resources, 25 percent of the oil, and 44 percent of the motor gasoline, while its domestic energy production lags behind. As a result, the United States imported 30 percent of its energy needs in 2006, a number expected to grow in the future. On the other hand, the United States is fortunate to have large amounts of untapped energy resources within its borders, which include 271 billion tons of recoverable coal, 2.6 trillion barrels of oil in the form of oil shale, and 20 billion barrels of oil in oil sands. In addition, the United States has 200,000 trillion cubic feet (Tcf) of methane deposited in the form of hydrates in ocean floors and permafrost. The amount of energy deposited as methane hydrates far exceeds the amounts of all fossil energy resources combined. The advanced separation technologies developed by CAST will be useful for developing these resources in an environmentally acceptable manner and help the United States achieve its energy independence.

A major concern in developing these domestic resources is the greenhouse gases (GHG) emitted from the utilization of fossil energies, which account for 85 percent of the total energy consumed in the United States. Therefore, the country is seeking to increase energy efficiencies and develop renewable energies. However, the renewable energies account for only 7 percent of the total, including hydroelectric power (2.9 percent), bio-fuels (0.8 percent) and others. Recognizing that the crux of the energy crisis lies in the shortages of transportation fuel liquids, the country is striving to increase the production of bio-fuels. In 2005, the United States produced about 4 billion gallons; however, the United States consumed 180 billion gallons of gasoline and diesel fuel combined in the same year. Thus, ethanol accounts for only a small percentage of the transportation fuel need. According to a publication by the National Academies, the energy from biomass will likely increase by 60 percent, and those from wind, solar and other renewable resources are likely to nearly triple by 2030. But the net effect of all these activities will probably raise the total renewables from 7 percent of the total energy consumed in the United States to about 8 percent in 2030. Thus, the United States will have to rely on fossil energy resources for the foreseeable future.

On the other hand, the scientific debate on global warming seems to be over, and the country is prepared to reduce CO_2 emissions by legislation. But Congress recognizes that the United States cannot stop global warming single-handedly. Developing countries, such as China and India, should also participate in limiting their own CO_2 emissions. If the United States reduced the emissions unilaterally, the cost of producing American goods would increase relative to those manufactured in countries without emission limits, resulting in the relocation of U.S. industry and manufacturing jobs.

It is projected that developing countries will account for more than three-quarters of the increase in global CO_2 emissions between 2005 and 2030, and these countries' overall shares in world emissions are expected to rise from 40 percent in 2005 to nearly 55 percent by 2030. In 2006, China and India alone produced 3.1 billion tons of coal, representing 46.2 percent of the world production, while the United States produced 1.16 billion tons of coal accounting for 19.3 percent of the world production. In the near term, the major focus of these countries is on economic development and reducing poverty. Therefore, it would be desirable for the United States to develop affordable clean coal technologies (CCT) that can be used in these countries.

A serious problem in China and India is that much of the coal is burned as mined without cleaning, causing low thermal efficiencies. The thermal efficiencies for power generation are 29 percent in these two countries as compared to 38 percent in the United States. By improving the quality of coal used for power generation, China can increase the efficiency to 33 percent and reduce CO_2 emissions by 20 percent. Currently, only 12 percent of the coal burned in China for electricity generation is cleaned coal. Thus, increased use of advanced coal cleaning technologies, representing the most affordable CCTs, should help China reduce CO_2 emissions substantially. According to a recent IEA report, India could reduce CO_2 emissions by 55 percent using state-of-the-art technologies relating to coal quality, boiler/generator design, instrumentation and control, and high voltage distribution systems. Unfortunately, much of the coals burned in India for power generation are of low quality, assaying 35–42 percent ash.

It is, therefore, an objective of CAST research to develop advanced technologies that can be used to separate various impurities such as ash, sulfur, and mercury from coal so that they can be burned more cleanly and efficiently. The Chinese Gov-

ernment considers pre-combustion coal cleaning an important element in their strategy to increase energy supply and improve energy transportation systems, as stressed in their plan to implement CCTs. Recently, India passed a law requiring coals to be cleaned if they are to be transported more than 1,000 km.

SUMMARY OF ACCOMPLISHMENT

Thanks to your support, CAST has become the world leader in developing advanced separation technologies for the coal industry. Many of the solid-solid and solid-liquid separation technologies developed by CAST are marketed commercially worldwide under license agreements. For example, the Microcel flotation technology is used to remove ash, sulfur, mercury, and other impurities from coal in the United States, Australia, and China. In addition, an advanced fine coal dewatering technology has been tested successfully in full-scale tests, and is marketed commercially. More recently, another fine coal dewatering technology has been tested successfully at pilot-scale and is expected to be commercialized before the end of this year. With the commercialization of these advanced separation technologies, the U.S. coal industry will no longer have to discard fine coal due to the lack of appropriate separation technologies. These new technologies will help coal companies produce cleaner solid fuels without causing environment damage.

The advanced separation technologies developed at CAST will soon be implemented in India. As part of the Asia-Pacific Partnership on Clean Development and Climate (APP) program, the U.S. Department of State (DoS) provided major funding for CAST through a competitive solicitation process to implement advanced separation technologies in India. Also, CAST has submitted a proposal to Coal India Limited (CIL), which produces 86 percent of the coal in the country, to implement the advanced fine coal beneficiation technologies developed by CAST in a demonstration plant.

Some of the advanced separation technologies developed for cleaning coal have cross-cutting applications. For example, the methods of separating fine particles are used for producing potash (KCl) from previously unminable resources in New Mexico. For another, methods of separating coarse particles are used for producing phosphate fertilizers in Florida.

NEW INTITIATIVES

Coal is the most abundant energy resource the United States has, and it is difficult to displace it with renewable energy resources in a relatively short timeframe. Therefore, it is imperative to develop methods of utilizing coal with minimal CO_2 emissions. To meet this objective, it is proposed to develop advanced gas-gas separation methods which will have crosscutting applications for many ongoing programs such as Carbon Capture and Sequestration (CCS), Innovation of Existing Plants, Gasification, and Hydrogen from Coal.

During the course of studying the basic sciences involved in a solid-solid separation process (i.e., froth flotation), CAST has developed a new understanding of the behavior of hydrophobic species in water. Based on both experimental and theoretical studies, it has been found that hydrophobic surfaces attract each other via hydrophobic force, which originates from the tendency for water molecules to reorganize themselves around hydrophobic entities. These studies have lead to an improved understanding of how ice (or hydrate) is formed around hydrophobic molecules (e.g., methane on ocean floors), and why different gases (e.g., CO_2, nitrogen, and hydrogen) form hydrates under different conditions, which in turn provide a basis for separating one type of gas from another.

It is, therefore, proposed to separate different types of gases from each other by forming hydrates selectively. At present, cryogenic distillation is the only commercially viable method of separating oxygen and nitrogen, and this new method can potentially reduce the cost of producing oxygen substantially. The same method can also be used to separate other gases. For example, CO_2 and nitrogen present in combustion gases can be readily separated from each other as shown by thermodynamic calculations and in experiment. It is also found that the kinetics of hydrate formation and, hence, the separation process can be improved in the presence of appropriate additives. The gas-gas separation process based on selective hydrate formation can have higher capacity and lower cost than the methods of using membranes. The new gas-gas separation method can also be used for producing ultra-pure hydrogen for fuel cell applications, which is a major objective of the Fuels Program.

The proposed research can also lead to the development of efficient methods of extracting hydrates from permafrost and ocean floors, while, at the same time, allowing CO_2 to be sequestered in place. The Blake Ridge deposit off the Carolina shores alone has 1,300 Tcf of methane, which is about six-times larger than the

amount of the conventional natural gas resource in the United States. Thus, the proposed work offers a new approach for separating gases for CCS and for the production of clean fuels such as methane and hydrogen from coal.

FUNDING REQUEST

It is requested that $3 million of research funding for CAST be added to the fiscal year 2009 Fuels Program budget, Fossil Energy R&D, the U.S. Department of Energy. Continued funding will allow CAST to develop advanced technologies that can be used to exploit domestic energy resources and help developing countries reduce their CO_2 emissions. In addition, the new gas-gas separations technologies to be developed at CAST will have crosscutting applications for a wide spectrum of the Fossil Energy R&D programs.

PREPARED STATEMENT OF THE NATIONAL MINING ASSOCIATION (NMA)

NMA RECOMMENDATIONS

Department of Energy (DOE)

$156 million for the FutureGen project at Mattoon, Illinois; $382.7 million for base coal research and development programs; $200 million for the Clean Coal Power Initiative (CCPI); $38.5 billion for the loan guarantee office to support deployment of advanced coal technologies; and $7.5 million for DOE's participation in the Asia-Pacific Partnership on Clean Development and Climate.

U.S. Army Corps of Engineers

Civil Works Program.—$180 million for the Regulatory Program. See the table below for NMA's list of priority lock and dam projects and recommendations for levels of funding required for their completion. NMA opposes the Corps' proposed concept of a new inland waterways "lockage fee/tax" to fund improvements to the Nation's inland waterways system.

BACKGROUND

Office of Fossil Energy

NMA strongly supports: $156 million for the FutureGen project at Mattoon, Illinois and opposes the administration's proposal to cancel the project and use the funding for smaller carbon, capture and sequestration projects. In addition, NMA supports the $382.7 million in the administration's budget request for base coal research and development programs. However, NMA recommends that CCPI be funded at a level of $200 million, which would enable DOE to conduct a third solicitation targeting advanced technology systems that capture carbon dioxide for sequestration.

While the NMA applauds the administration's commitment to accelerating research, development and deployment of technologies that will allow the management of carbon emissions at coal-fueled power plants, the NMA questions the efficacy of DOE's proposal to cancel the FutureGen project as originally configured. Tremendous progress has been made since the FutureGen project was announced in 2003 and the NMA urges the subcommittee to reject the administration's proposal and to fund the FutureGen project as originally configured with the $156 million requested.

Technological advancements achieved in the base coal research and demonstration programs such as gasification, advanced turbines, and carbon sequestration, provide the component technologies that will ultimately be integrated into the FutureGen project as currently configured. NMA believes these programs should be funded at a level of at least the President's request of $382.7 million. In addition, the advanced turbine program should be funded at $55 million instead of the requested level of $28 million. The increase in funding for these and other programs will ensure the FutureGen project meets the intended goals outlined in the DOE's 2004 report to Congress, "FutureGen, Integrated Sequestration and Hydrogen Research Intiative—Energy Independence through Carbon Sequestration and Hydrogen from Coal."

The Coal Utilization Research Council and the Electric Power Research Institute estimate that by 2025, combustion and gasification-based power generation options can be available commercially—with the ability to capture and sequester CO_2—at a cost of electricity comparable to the cost of new power generation (with CO_2 capture) today. This includes the current work on FutureGen. In order to achieve this

goal, a Federal investment of $10 billion through 2025 is necessary while the industry investment is expected to be $7 billion over that same time.

In addition, NMA recommends $3 million of funding for the Center for Advanced Separation Technologies (CAST), which is a consortium of seven universities lead by Virginia Tech. CAST has developed many advanced technologies that are used in industry to produce cleaner fuels in an environmentally acceptable manner, while some of them have crosscutting applications in the minerals industry. Further development of advanced separation technologies will help encourage developing countries, such as China and India, to deploy affordable clean coal technologies (ACCT) and reduce CO_2 emissions. Research in Advanced Separations is mandated by the 2005 Energy Policy Act, section 962.

Asia-Pacific Partnership on Clean Development and Climate (APP)

NMA supports the administration's total request of $52 million for this partnership and specifically, the request of $7.5 million to fund the DOE's participation.

The APP will spur development of cutting edge technologies and practices that support economic growth while reducing emissions, including greenhouse gas emissions. It will result in expansion of market opportunities for U.S. mining and equipment companies and other U.S. businesses.

The APP, involving the United States, Australia, Canada, China, India, Japan and South Korea, is important for a number of reasons:

—*It Will Result in Real Emissions Reductions.*—With the participation by China and India, APP is the only international agreement addressing rapid emissions growth in the developing world, which is forecast to surpass emissions of industrialized nations in 2010. APP is a voluntary, technology-based approach to emissions reduction geared towards future economic growth and energy security and will be more effective than unrealistic mandates or treaties.

—*It Builds on Methane-to-Markets and Other Successful Programs That Reduce Greenhouse Gas Emissions.*—The U.S. coal industry has captured and re-used 308 billion cubic feet of coal mine methane—the equivalent of removing 40 million automobiles per year from the roads. APP, working with the EPA's Methane-to-Markets program will use U.S. experience and expertise to accelerate large-scale capture and recycling of methane in China and India.

—*It Helps Preserve Coal as an Important Energy Source.*—The United States, China, India and Japan will be at the center of a significant rise in population, economic activity and energy use in the next 50 years. Coal is essential to sustaining America's competitiveness and vitality in a changing world, as it is in China and India. APP supports improvements in efficiency in both coal mining and use through the acceleration of clean coal technologies, industrial technology strategic planning and energy efficiency best practices.

—It creates new markets for U.S. companies in the emerging economies of China and India.

U.S. Army Corps of Engineers

Regulatory Program.—NMA supports the administration's request of $180 million for administering the Corps' Clean Water Act (CWA), section 404 permit program and for implementing the Memorandum of Understanding (MOU).

The Corps' Regulatory Branch plays a key role in the U.S. economy since the Corps currently authorizes approximately $200 billion of economic activity through its regulatory program annually. NMA recommends that a portion of the Corps' regulatory program funding be used for implementing the MOU issued on February 10, 2005, by the Corps, the U.S. Office of Surface Mining (OSM), EPA and the U.S. Fish and Wildlife Service. The MOU encourages a coordinated review and processing of surface coal mining applications requiring CWA section 404 permits.

The ability to plan and finance mining operations depends on the ability to obtain CWA section 404 permits issued by the Corps within a predictable timeframe. In this regard, the NMA appreciates the subcommittee including language in the fiscal year 2008 Omnibus appropriations bill directing the Corps to work with OSM to develop a more efficient process for expediting permit decisions associated with surface coal mining operations; in addition to directing the Corps to dedicate sufficient personnel and financial resources needed to support an efficient permit review process.

Civil Works Programs.—The NMA understands the Corps intends to provide Congress with a legislative proposal to replace the diesel fuel tax that has been in place since 1986, with a "lockage fee/tax" that would more than double the taxes paid by the towing industry. The coal industry ships approximately 185 million short tons of coal annually on the inland waterways systems. Therefore, the increase in this tax will ultimately be borne by the consumers of coal-fired electricity. NMA opposes such a tax increase and urges Congress to reject this proposal and instead maintain

the current diesel fuel tax and change the Inland Waterways Trust Fund cost-sharing formula from 50/50 to 75/25 (Federal/non-Federal) to ensure predictable, consistent, and adequate funding for key inland waterways infrastructure projects. Below is a table indicating NMA's fiscal year 2009 priority navigation projects.

NMA FISCAL YEAR 2009 PRIORITY NAVIGATION PROJECTS

Construction	Fiscal Year 2008 Enacted	Fiscal Year 2009 Request	NMA Recommendations
Robert C. Byrd Lock and Dams Ohio River, OH/WV	$905,000	$1,000,000	$1,000,000
Kentucky River Lock Addition, Tennessee River, KY	51,168,000	22,330,000	34,500,000
Marmet Lock and Dam, Kanawha River, WV	29,520,000	9,000,000	9,000,000
McAlpine Locks and Dams, Ohio River, IN/KY	44,280,000	6,270,000	6,270,000
Locks and Dams 2, 3, 4, Monongahela River, PA	69,175,000	40,806,000	40,806,000
J.T. Myers Locks and Dams, Ohio River, IN/KY	984,000	.....	14,624,000
Olmsted Locks and Dams, Ohio River, IL/KY	102,336,000	114,000,000	114,000,000
Emsworth Dam, Ohio River, PA	42,312,000	25,800,000	25,800,000
Greenup Lock and Dam, Ohio River, KY/OH	.....	.....	12,100,000

The National Mining Association (NMA) represents producers of over 80 percent of the coal mined in the United States. Coal continues to be the most reliable and affordable domestic fuel used to generate over 50 percent of the Nation's electricity. NMA members also include producers of uranium—the basis for 20 percent of U.S. electricity supply. NMA represents producers of metals and minerals that are critical to a modern economy and our national security. Finally, NMA includes manufacturers of processing equipment, mining machinery and supplies, transporters, and engineering, consulting, and financial institutions serving the mining industry.

PREPARED STATEMENT OF THE GAS TECHNOLOGY INSTITUTE

INCREASE THE COMBUSTION BUDGET TO $4.2 MILLION IN THE FISCAL YEAR 2009 ENERGY AND WATER APPROPRIATIONS BILL FOR DOE, EERE

Dear Chairman Dorgan and Senator Domenici, we write today because we are concerned about the Department of Energy budget request for the Industrial Technologies Program within the Energy Efficiency and Renewable Energy budget. In particular, we are disappointed to see the essential elimination of the Combustion program within the Crosscutting Industries of the Future area.

The combustion focus at the Department has been on development of next generation boiler technology, applicable to a variety of industrial processes, that is both much more efficient and environmentally friendly than existing technology. The Gas Technology Institute, Cleaver Brooks, a boiler manufacturer, and a number of gas utilities have been working with the DOE, California Air Resources Board, California Energy Commission, South Coast Air Quality Management District, and others to develop next generation "Super Boiler" technology.

Developing a clean, efficient natural gas steam boiler will be a boon to the U.S. economy. Increasing energy costs and stringent local emissions standards are two reasons why America's industrial facilities are re-locating overseas. With 31 percent of industrial energy used for steam generation, widespread adoption of Super Boiler technology can significantly reduce costs and emissions.

The Super Boiler system is 94 percent efficient compared to current technologies which are around 80 percent efficient. This increase in efficiency will provide a 15–20 percent fuel savings, corresponding to a 15–20 percent reduction in greenhouse gas emissions, and a 90 percent reduction in NO_X emissions. Technological development efforts for the coming year include fuel flexibility and the use of alternative fuels for the boiler, scale up, extensive testing and improvements to the heat recovery system that will both further boost efficiency and reduce emissions.

We urge you to fund the DOE Combustion budget at $4.2 million in the fiscal year 2009 Energy and Water Appropriations bill for the Department of Energy, Energy Efficiency and Renewable Energy (Industrial Technologies Program, Industries of the Future Crosscutting) for continued development and deployment on Super Boiler technology.

Thank you for considering this request.

PREPARED STATEMENT OF THE ALLIANCE FOR MATERIALS MANUFACTURING EXCELLENCE (AMMEX)

The Alliance for Materials Manufacturing Excellence (AMMEX) welcomes this opportunity to provide its input to the subcommittee on the proposed budget for fiscal year 2009 for the Industrial Technologies Program (ITP) at the Department of Energy. AMMEX organizations include the basic materials manufacturing sector (aluminum, chemicals, forest products, glass, metal casting, steel) in the U.S. economy along with several stakeholders in materials manufacturing, such as the Northeast-Midwest Institute, the National Association of State Energy Officials and the American Council for an Energy-Efficient Economy. We are writing to urge Congress to restore funding to the ITP to the level of $125 million and to restore the structure of the program to one that emphasizes new process development in all six materials industries as opposed to cross-cutting research.

This request would align the program with the authorized funding levels and intent of both section 452 (Energy Intensive Industries Program) of the Energy Independence and Security Act of 2007, which was signed into law on December 19, 2007, as well as the Energy Efficiency and Renewable Energy Act of 2007, which passed the House unanimously on October 22, 2007.

U.S. materials manufacturing continues to face challenges resulting from increased cost and decreased availability of traditional energy supply resources. These challenges have stimulated innovation in the materials manufacturing sector in order to create significant energy improvements and to diversify the energy supplies. While the innovations of the past have brought the materials manufacturing sector a long way, the sector cannot go further without new innovations. In order to do this, the materials manufacturing processes must be transformed, i.e. new processes and new innovations must be developed which will use much less energy and which will be able to utilize diverse forms of energy.

The member organizations of AMMEX have been partners with the Department of Energy's Industrial Technology Program since its inception. ITP is a true public-private partnership. DOE and materials manufacturers jointly fund cutting-edge research that addresses the needs of the Nation and materials manufacturers. All projects have the shared goals of reducing energy consumption, reducing environmental impact, increasing competitive advantage of U.S. materials manufacturers, and enhancing our national security. The program is unique because we select only projects with "dual benefits"—a public benefit such as reduced emissions or petroleum use, justifying the Federal funding; and an industry benefit such as a more efficient process, justifying the industrial funding. Substantial energy reductions have occurred as shown below.

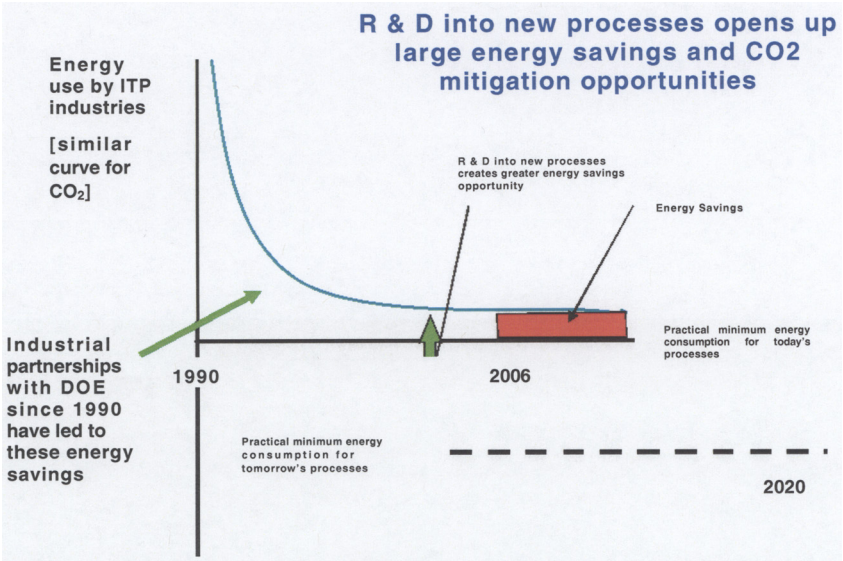


FIGURE 1.—*Materials Manufacturers have greatly reduced energy use since 1990 because of their co-investment with DOE*

To accomplish these goals, the Federal Government and industry will need to embark upon a co-funded effort to broaden and accelerate inherently high-risk research, development, and deployment of new materials manufacturing processes that utilize diverse energy sources. This effort will also allow the materials manufacturing sector to lessen dependence on natural gas and oil resources and conventional electricity sources—thus benefiting consumers through contribution to a stable energy market.

Furthermore, it is critical to recognize the important contributions of ITP to efforts to combat climate change. The development of new technology is an extremely important facet to dealing with climate change. Most, if not all AMMEX industries have voluntarily reduced energy intensity by 25 percent since 1990 in partnerships with DOE and only very small gains in energy use are still possible for today's processes [red area in above chart].

Most of the legislative options being considered to reduce CO_2 and other greenhouse gases employ a target of at least a 50 percent reduction in CO_2 emissions by 2050 over a 2000 baseline. It is important to acknowledge that achieving such a goal with today's manufacturing processes will be very challenging. Thus, we are confronted with the ideal opportunity for ITP and AMMEX industries—collaboration to accelerate the development and deployment of new, transformational technologies to help our country reach its CO_2 mitigation goals. We would argue there is not a more appropriate public-private partnership than one focused on our environment. It is the method of choice employed by our competitors in Europe and Asia.

The infrastructure already exists to create such a program—only a slight re-focusing of the ITP program and a return to historical budget levels is all that is needed for the Federal Government and materials industries to embark upon a co-funded effort to broaden and accelerate inherently high-risk research, development, and deployment of new materials manufacturing processes that utilize diverse energy sources.

Consequently, our request for funding in fiscal year 2009 for ITP entails two parts:

—A return to a total program level of $125 million, bringing the funding amount closer to the level authorized in the Energy Independence and Security Act of 2007.

—A re-structuring of the program so as to return to the structure that was so successful from 1990–2003—a balanced portfolio of industry-specific research from the point of view of research impact, i.e., that 50 percent or more of the funding

go to industry specific new process development [where the energy savings potential in industry is highest].

AMMEX members have identified their top new process development concepts [not in priority order] which would be pursued at the funding levels and structure defined above:

Aluminum

—Improved, energy-efficient burners and furnaces for aluminum melting
—Improved energy efficiency and recovery rates for recycling technologies

Chemicals

—Development of alternative feedstocks for the chemical industry to reduce dependence on petroleum and natural gas derived feedstocks
—Nano-manufacturing scale-up methodologies for key unit operations: synthesis, separation, purification, stabilization, and assembly
—Development of low-energy, low-capital membrane or hybrid separations technology

Glass

—Complete development and deployment to multiple industries of Submerged Combustion Melter
—Waste Heat Recovery and Use as Electrical or Chemical Energy
—Low Residence Time Glass Refining Technologies

Forest Products

—Advanced water removal and high efficiency pulping
—Gasification of Spent Pulping Liquors and Biomass Residuals

Metal Casting

—Simulation of Dimensional Changes and Hot Tears
—Engineered Coatings for Aluminum Pressure Dies
—Developing a lightweight production cast aluminum metal matrix composite alloy

Steel

—Ironmaking by Molten Oxide Electrolysis
—Ironmaking by Flash Smelting using Hydrogen
—Demonstration of the Paired Straight Hearth Furnace Process

The United States also faces serious shortages in the science and engineering manpower that is needed to keep America's competitive edge in world markets through technology innovation and timely application. From the President's recent State of the Union Addresses to recent legislation passed by Congress, the Nation is awakening to the need for a re-energizing of our commitment to technology education. Our proposal to the subcommittee is an effort to both rebuild America's materials manufacturing industries and meet shared national energy and environmental goals.

On behalf of the AMMEX coalition, we thank you for the opportunity to submit this statement. We look forward to continuing to work with the subcommittee as you move forward on the fiscal year 2009 appropriations legislation for the Department of Energy.

PREPARED STATEMENT OF THE AMERICAN FOREST AND PAPER ASSOCIATION

AGENDA 2020 TECHNOLOGY ALLIANCE

The Agenda 2020 Technology Alliance, a Special Project of the American Forest & Paper Association (AF&PA) welcomes this opportunity to provide the subcommittee with our views on the industry's key public-private partnerships within the Office of Energy Efficiency and Renewable Energy (EERE) and to urge increased funding to adequately address industry's challenges in fiscal year 2009. The EERE Industrial Technologies Program (ITP) and Office of Biomass Programs (OBP) provide vital funding for research, development, and demonstration (RD&D) of technologies that dramatically reduce the forest products industry's energy intensity and transforms our industry into producers of carbon-neutral biofuels—thus addressing strategic national needs associated with energy efficiency, energy security, diversified energy supply, and environmental performance. We recommend increasing the industry specific funding for the forest products industry in ITP to $6 million. We support the President's request for $225 million for Biomass and Biorefinery Systems R&D in OBP and ask that the subcommittee work to maintain eligibility of

forest biorefineries in these programs and keep the appropriations unencumbered to allow for full funding of competitive biomass systems and biorefinery RD&D grants.

The Agenda 2020 Technology Alliance is an industry-led partnership with government and academia that holds the promise of reinventing the forest products industry through innovation in processes, materials and markets. The collaborative, precompetitive research, development, and deployment supported through Agenda 2020 provide the foundation for new technology-driven business models that will enable our industry to address market demands for materials from renewable sources, while also contributing solutions to strategic national needs including energy reduction and sustainability. The technology approaches developed through Agenda 2020 are aligned to provide solutions to the competitive challenges faced by the U.S. forest products industry, which accounts for approximately 6 percent of the total U.S. manufacturing output, employs more than a million people, and ranks among the top 10 manufacturing employers in 42 states with an estimated payroll exceeding $50 billion.

As is the case with many U.S. manufacturing industries, we face serious domestic and international challenges. Since early 1997, more than 145 pulp and paper mills have closed in the United States, contributing to a loss of 86,000 jobs, or 40 percent of our workforce. An additional 80,000 jobs have been lost in the wood products industry since 1997. New capacity growth is now taking place in other countries, where forestry, labor, and environmental practices may not be as responsible as those in the United States. Several drivers have heightened the need to develop new energy efficiency technologies: the recent volatility of energy markets, especially for natural gas; renewed national focus on climate change and environmental performance; and aging process infrastructure. Global competition, coupled with massive industry restructuring due to financial performance pressures from Wall Street, continue to hinder the ability of U.S. companies to make new investments. Each year without new investments, new technologies and new revenue streams, we lose ground to our overseas competitors.

Currently, energy is the third largest manufacturing cost for the forest and paper industry at 18 percent for pulp and paper mills—up from 12 percent just several years ago. For some of our mills, the cost of energy is about to eclipse employee compensation.

Since 1994, the forest products industry has been one of DOE's "Industries of the Future," partnering with ITP through the Agenda 2020 Technology Alliance in RD&D that has yielded successful advances towards our national energy and environmental goals. Agenda 2020 stands as an example of successful industry-government collaboration to develop technologies that hold the promise of reinventing industry, while providing real solutions for strategic national energy needs. Every Federal $1 spent on ITP saves $7.06 in annual energy costs and 1.3 million in annual source BTUs (2004 estimates). As recently as 2003, the ITP/Agenda 2020 portfolio included a total shared DOE and industry investment of almost $48 million, with nearly 55 percent coming from direct project cost shares by industry.

Today, after several years of continuous and substantial cuts, the ITP/Agenda 2020 budget has been reduced by over 80 percent since fiscal year 2002. This undermines our progress in achieving crucial energy efficiencies at a time when energy and response to climate change are major factors in the survival of the U.S. forest products industry. Projects rescoped or cut in recent years due to budget shortfalls resulted in a lost energy savings potential of 5 trillion BTUs/yr. Recent reductions make us unable to pursue projects in key priority areas such as advanced water removal and high efficiency pulping, which represents a lost savings potential of 100–200 trillion BTUs/yr. In fiscal year 2009, a further funding reduction is proposed and emphasis shifted from industry specific funding. Unfortunately, the types of technologies that cross all industries are not those from which we can achieve the maximum savings for energy and environmental emissions. Furthermore, the proposed funding of $1.448 million is barely sufficient to fund ongoing projects, let alone address the high priority R&D needs specific to the forest products industry that have been jointly identified by industry with the DOE.

This comes at a crucial time when the forest products industry, like many energy-intensive industries, is facing unprecedented pressures due to the rising costs of energy and potential climate change mandates. Although we are nearly 60 percent self-sufficient (using biomass), it is imperative that we seek solutions as diverse as fuel switching, finding new energy sources, and options for reducing energy consumption. Thus we are in greater need than ever for the technology-based energy efficiency solutions that could be provided through our Agenda 2020 partnership with ITP. AF&PA's recommended ITP funding for forest products research ($6 million) would help our industry partially recover its capacity to develop and deploy vital energy efficiency technologies. Restoring Agenda 2020 funding to pre-fiscal

year 2005 levels will not only help the competitive position of American industry, but will also serve national strategic goals for reduced dependence on foreign oil.

Second, the Integrated Forest Products Biorefinery (IFPB) is a key Agenda 2020 technology platform and a top technical and economic priority for our industry. The objective is to develop and deploy core technologies that can be integrated into existing processing infrastructure, which would be transformed into geographically distributed production centers of renewable "green" bioenergy and bioproducts. This can be done while co-producing existing product lines, creating higher skilled and better paying jobs, strengthening rural communities, and opening new domestic and international markets for U.S. forest products companies.

The IFPB technology has the potential to integrate agricultural wastes, agricultural producers, forest landowners, agricultural landowners, forest product producers, and the petrochemical industry to produce clean renewable bio-fuels to support our local economies and the Nation. Widespread application of this technology would not only reduce the environmental impact of burning fossil fuels, it would also increase the viability of agricultural, forest products, and other industries that use waste heat. It will create new high paying jobs, both direct and indirect, increasing tax revenue. From an energy perspective, the IFPB has the benefit of making the forest products industry even more energy self-sufficient, serving the DOE strategic goal of reduced energy intensity in industry by reducing fossil energy consumption. In addition, the IFPB would permit the industry to become a producer of renewable, carbon-positive bioenergy and biofuels, contributing to DOE strategic goals to dramatically reduce dependence on foreign oil and to create a new domestic bioindustry.

In light of these realities, AF&PA and Agenda 2020 also support the administration's announced $225 million budget initiative in fiscal year 2009 for biorefinery research and demonstration in OBP. This initiative provides much needed funding to advance core enabling IFPB technologies, as well as providing major capital cost-share for commercial scale biorefinery demonstration. The forest products industry is an ideal partner to develop and commercialize integrated biorefineries. We have much of the infrastructure and expertise—wood harvesting, transportation and storage, manufacturing and conversion infrastructure, waste handling and recovery—needed to achieve the goals of integrated biorefineries. By and large, they are located in rural communities where they can help realize important synergies between agricultural and forest-based feedstocks.

Recent estimates from Princeton University show significant potential for net environmental benefits of IFPBs, inclusive of offsetting other fossil fuel consumption in the mill. The industrywide potential is to reduce nearly 100 million tons of carbon emissions annually from IFPBs. The study also estimates the cumulative value of savings due to reduced CO_2, SO_2, and NO_X emissions is $6 million to $40 billion. A core enabling technology for part of the IFPB is black liquor gasification (BLG), which converts the by-product of the chemical pulping process into a synthetic gas. The synthetic gas can subsequently be burned to directly produce clean, efficient energy, or converted to other fuels such as hydrogen, renewable transportation fuels, and/or other high value chemicals. If fully developed and commercialized, a biorefinery based on BLG can produce up to 10 billion gallons of other renewable transportation fuels, and as much as 20,000 MW of biomass power.

However, private/public investments in RD&D are critical to bring IFPB technologies into full commercial use. Co-investment for RD&D can help mitigate the technical risks (especially integration with capital-intensive, legacy infrastructure) of early adopters of emerging IFPB technologies. Risk mitigation is an important factor in achieving the benefits of IFPBs, especially for integrating biorefinery technologies with existing manufacturing infrastructure. Federal support through research funding and other investments, such as loan guarantees and tax credits, is critical.

In order to achieve the promise of IFPB technologies for the industry and for the Nation, we need greater stability and availability of funds provided through the OBP budget. We urge the subcommittee to preserve the proposed $225 million funding of the Biomass and Biorefinery Systems R&D program, so that there will be sufficient appropriations to fund biorefinery demonstration and commercialization projects. We also urge the subcommittee to ensure that forest-based materials are eligible for this and future biorefinery research and demonstration funding. Forest-based materials can sustainably produce enough biofuels to displace up to 10 percent of the country's petroleum production. They are a vital feedstock for achieving reduced dependence on foreign oil and facilitating bioindustries domestically and should be included in programs for biomass and biorefinery RD&D.

The Agenda 2020 Technology Alliance appreciate the subcommittee's interest in ensuring sustained and adequate funding for RD&D partnerships and look forward to working with you to advance industry and national interests.

PREPARED STATEMENT OF THE VISION2020 TECHNOLOGY PARTNERSHIP, GLASS MANUFACTURING INDUSTRIAL COUNCIL, COPPER DEVELOPMENT ASSOCIATION, INTERNATIONAL COPPER ASSOCIATION, HYDRAULIC INSTITUTE, PUMP SYSTEMS MATTER, AND THE VANADIUM PRODUCERS & RECLAIMERS ASSOCIATION

Mr. Chairman, we respectfully request that the subcommittee grant restoration of appropriations funding in the fiscal year 2009 Department of Energy Appropriations bill to match the $190 million authorized for the Industrial Technology Program (ITP) within the Energy Efficiency and Renewable Energy Act of 2007.

The submitting coalition represents a broad range of energy intensive sectors including chemical and chemical allied industries, the copper industry including mining, producer and fabricating companies, organizations focused on hydraulic and pump system technology, the domestic glass industry sectors including flat, container, fiber and specialty glass and the domestic vanadium producers and reclaiming companies. We believe that the Industrial Technologies Program is critical to boost Federal and corporate R&D investments into novel applications that will help move our industries towards higher energy efficiency.

Environmental quality, economic vitality and national security are all at risk due to the inability of the United States to effectively conserve energy as the country continues to grow and expand the national standard of living. Energy conservation is now a national goal. While renewable energy processes are one part of the solution, undertaking energy efficiency is as necessary as ever before. Both President Bush and the Congress have recognized that technology is the key to both energy efficiency and renewable energy.

In the United States, industry accounts for over one-third of all energy consumption. Of that, the majority is consumed by several heavy industries including chemical, glass and metals production, aluminum, mining, petroleum refining, forest and paper products, and supporting industries. These groups all consume high amounts of energy per unit of production, making them a prime target for energy efficiency efforts. In addition, the rising cost of energy has the potential to put these industries at a competitive disadvantage with other nations.

While the President and Congress have continually supported industrial energy efficiency efforts, the funding provided has not matched the problem. Funding has dropped from $175 million in fiscal year 2000 to $57 million in fiscal year 2007. The House Committee on Science and Technology noted on September 25, 2007 that "these funding levels reflect a dramatic shift in priorities away from industrial efficiency R&D." Fortunately, Congress recognizes the need to increase funding levels through its own authorization of $190 million in fiscal year 2008 for the Industrial Technology Program.

The Industrial Technology Program (ITP) is a competitive, public-private partnership program which works to utilize research and development in cutting edge, high-value cost sharing methods to improve the energy efficiency of America's industrial sector. The ITP operates through coordinated research and development, validation, and dissemination of energy-efficiency technologies and operating practices. ITP projects have already won dozens of "R&D 100 Awards" and have generated over 150 patents on exciting new technologies. Dual use benefits for both public and industrial uses are required by the ITP. Nearly 200 technologies have reached the commercial market assisting over 13,000 U.S. manufacturing plants and leading to $23 billion worth of energy savings.

All programs which are awarded competitive funding must meet the shared goal of reducing energy consumption, reducing environmental impacts and increasing the competitive advantage of U.S. material manufacturers. In addition, while cross-cutting technologies are valuable, the application of ITP technologies to individual industries is critical and needs to be strengthened with additional funding. It is in this application at the factory level where the vast majority of the actual energy savings and environmental protection will be recognized.

In order to fully recognize the potential benefits of the ITP, it is imperative that Congress fully fund the ITP at the level of $190 million. This is the level seen as necessary by the authorizing committees with jurisdiction and rightly so, given the environmental benefits, national security needs for energy independence, and economic productivity gains which can be realized in energy efficiency efforts aimed at the U.S. industrial sector. A national imperative focused on the ITP will help get us there.

PREPARED STATEMENT OF THE AMERICAN GEOLOGICAL INSTITUTE

To the chairman and members of the subcommittee, thank you for this opportunity to provide the American Geological Institute's perspective on fiscal year 2009 appropriations for geoscience programs within the subcommittee's jurisdiction. The President's budget request for Department of Energy (DOE) research programs provides no funding for oil and gas research and development (R&D), eliminates mandated direct spending of $50 million for unconventional onshore and ultra deep water offshore natural gas R&D, includes a decimating cut to hydropower R&D and does not fulfill some of the geothermal and carbon sequestration R&D funding authorized in the Energy Independence and Security Act of 2007.

Given the interest of the administration and Congress to reduce the Nation's foreign oil dependence, reduce prices on fossil fuels and mitigate carbon emissions from fossil fuels, it seems like an inopportune time to eliminate or under fund programs that could help with these objectives. We hope that Congress will support wise investments for all energy resource programs and carbon sequestration R&D. AGI applauds the requested 18 percent increase for the largest supporter of physical science research in the United States, DOE's Office of Science, and encourages the subcommittee's full support for this increase. We applaud the request of $30 million for geothermal R&D and an increase of about $35 million for carbon sequestration R&D, both of which partially fulfill the Energy Act of 2007. We ask for the subcommittee's continued support for oil and gas, unconventional natural gas, geothermal, hydropower and carbon sequestration R&D so the Nation can develop a diverse portfolio of energy resources while enhancing carbon mitigation strategies to secure clean, affordable and secure energy supplies for now and the future.

AGI is a nonprofit federation of 44 geoscientific and professional associations that represent more than 100,000 geologists, geophysicists, and other earth scientists. The institute serves as a voice for shared interests in our profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role that the geosciences play in society's use of resources and interaction with the environment.

DOE OFFICE OF SCIENCE

The DOE Office of Science is the single largest supporter of basic research in the physical sciences in the United States, providing more than 40 percent of total funding for this vital area of national importance. The Office of Science manages fundamental research programs in basic energy sciences, biological and environmental sciences, and computational science and, under the President's budget request, would grow by about 15 percent from about $3.9 billion last year to $4.7 billion. AGI asks that you support this much needed increase.

Within the Office of Science, the Basic Energy Sciences (BES) program supports fundamental research in focused areas of the natural sciences in order to expand the scientific foundations for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use. BES also discovers knowledge and develops tools to strengthen national security.

The Basic Energy Sciences (BES) would remain the largest program in the office with an increase of 24 percent from $1.27 billion in fiscal year 2008 to $1.57 billion in fiscal year 2009 in the President's request. Within the BES, Chemical Sciences, Geosciences and Biosciences would receive a $75 million increase over their fiscal year 2008 budget for a total of $297 million. The Geoscience program provides peer-reviewed grants to universities and DOE national laboratories for fundamental Earth science research in geochemistry, hydrology, rock mechanics, and geophysical imaging. The $7.5 million increase specifically for the Geoscience research program is focused on solid earth geophysics and geochemistry to understand the stability and transformation of deep carbon sequestration, nanoscale geochemistry, chemical imaging, experimental and theoretical studies of complex subsurface fluids and mid-scale instrumentation.

The President's request for the Office of Science only partially fulfills the carbon sequestration R&D and large-scale demonstration project, which was authorized to receive $240 million in fiscal year 2009 and the carbon sequestration university-based R&D which was authorized to receive $10 million in fiscal year 2009. An additional $30 million is requested for carbon sequestration R&D and demonstration within the Office of Fossil Energy to partially satisfy the wise investments called for in the Energy Act of 2007. AGI requests that funding for carbon sequestration R&D in the Office of Science and the Office of Fossil Energy be increased to fulfill the intent of the Energy Act of 2007.

DOE ENERGY EFFICIENCY AND RENEWABLE ENERGY

Within DOE Energy Efficiency and Renewable Energy, the President's fiscal year 2009 budget request would cut funding by 27 percent or $467 million. We are concerned about the cuts to alternative energy R&D programs, in particular the reduction of more than 70 percent (a cut of almost $7 million) for hydropower R&D which would decimate the program. A balanced portfolio of R&D across many promising energy resources should be maintained with steady funding to help ensure energy supplies in a changing world.

AGI applauds the $30 million requested for geothermal R&D and greatly appreciates previous support from Congress for this key alternative energy resource. The geothermal research program within the Renewable Energy account, which funds Earth science research in materials, geofluids, geochemistry, geophysics, rock properties, reservoir modeling, and seismic mapping, would receive an increase of 51 percent from fiscal year 2008 enacted levels only one year after the administration slated the program for termination. The new funds for geothermal satisfy in part an authorization in the Energy Independence and Security Act of 2007, which calls for $90 million for geothermal R&D in fiscal year 2009.

DOE FOSSIL ENERGY RESEARCH AND DEVELOPMENT

AGI urges you to take a critical look at the Department of Energy's Fossil Energy Research and Development (R&D) portfolio as you prepare to craft the fiscal year 2009 Energy and Water Development Appropriations bill. Over the past 8 years, Members of Congress have strongly emphasized the need for a responsible, diversified and comprehensive energy policy for the Nation. The growing global competition for fossil fuels has led to a repeated and concerted request by Congress to ensure the Nation's energy security. On February 28, 2007 this subcommittee held a hearing on the "10-Year Energy Research and Development Outlook" in which the Energy Information Administrator Guy Caruso noted the Nation's need for fossil fuels over the next 30 years and the other expert witnesses noted the critical need to continue R&D on fossil fuels and all other energy resources. The President's proposal, which provides no funding for oil and gas R&D, is short sighted and inconsistent with congressional concerns and expert testimony presented to your subcommittee. No funding for oil and gas R&D will hinder our ability to achieve energy stability and security.

The research dollars spent by Fossil Energy R&D go primarily to universities, State geological surveys and research consortia to address critical issues like enhanced recovery from known fields and unconventional sources that are the future of our natural gas supply. This money does not go into corporate coffers, but it helps American businesses remain competitive by giving them a technological edge over foreign companies. All major advances in oil and gas production can be tied to research and technology. AGI strongly encourages the subcommittee to ensure a balanced and diversified energy research portfolio that does not ignore the Nation's primary sources of energy, fossil fuels, for at least the next 30 years.

Today's domestic industry has independent producers at its core. With fewer and fewer major producing companies and their concentration on adding more expensive reserves from outside of the contiguous United States, it is the smaller independent producers developing new technologies concentrated on our domestic resources. However, without Federal contributions to basic research that drives innovation, small producers cannot develop new technologies as fast, or as well, as they do today. The program has produced many key successes among the typical short-term (1 to 5 years) projects usually chosen by the DOE. And even failed projects have proven beneficial, because they've often resulted in redirection of effort toward more practical exploration and production solutions.

In 2003, at the request of the Interior Appropriations Subcommittee, the National Academies released a report entitled Energy Research at DOE: Was It Worth It? Energy Efficiency and Fossil Energy Research 1978 to 2000. This report found that Fossil Energy R&D was beneficial because the industry snapped up the new technologies created by the R&D program, developed other technologies that were waiting for market forces to bring about conditions favorable to commercializing them and otherwise made new discoveries. In real dollars from 1986–2000 the Government invested $4.5 billion into Fossil Energy R&D. During that time, realized economic benefits totaled $7.4 billion. This program is not only paying for itself, it has brought in $2.9 billion in revenue.

Unfortunately, despite this success, the President's fiscal year 2009 budget request continues the alarming reduction of energy R&D funding by eliminating all funding for our primary energy resources, oil and gas. Federal funding for renewable, fossil and nuclear R&D has decreased dramatically from $5.5 billion in 1978

to $793 million in 2005 according to a Government Accountability Office (GAO) report entitled Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs. Such significant under-investment in energy R&D over many decades hinders progress on cost-effective and environmentally-sound exploration and extraction of raw energy resources and clean and efficient development, production and use of energy products.

The Federal investment in energy R&D is particularly important when it comes to longer-range research with diversified benefits. In today's competitive markets, the private sector focuses dwindling research dollars on shorter-term results in highly applied areas such as technical services. In this context, DOE's support of fossil energy research, where the focus is truly on research, is very significant in magnitude and impact compared to that done in the private sector, where the focus is mainly on development. Without more emphasis on research, we risk losing our technological edge in the highly competitive global market place.

Perhaps one of the most promising areas of R&D for domestic oil supplies are in the ultra deep waters where drilling is allowed in the Gulf of Mexico. The Energy Policy Act of 2005, set aside $50 million annually from collected offshore royalties for ultra deep water and other unconventional oil and gas R&D to support clean and efficient exploration and extraction in the Gulf. The President's budget request would repeal this program and provide no funding for ultra deep water and other unconventional oil and gas R&D. AGI asks that you consider R&D spending or other incentives to encourage the private sector to invest in clean and efficient technological advances to enhance our unconventional fossil fuel supply in offshore regions where drilling is allowed and significant infrastructure already exists.

The research funded by DOE leads to new technologies that improve the efficiency and productivity of the domestic energy industry. Continued research on fossil energy is critical to America's future and should be a key component of any national energy strategy. The societal benefits of fossil energy R&D extend to such areas as economic and national security, job creation, capital investment, and reduction of the trade deficit. The Nation will remain dependent on petroleum as its principal transportation fuel for the foreseeable future and natural gas is growing in importance. It is critical that domestic production not be allowed to prematurely decline at a time when tremendous advances are being made in improving the technology with which these resources are extracted. The recent spike in oil and natural gas prices is a reminder of the need to retain a vibrant domestic industry in the face of uncertain sources overseas. Technological advances are necessary to maintaining our resource base and ensuring this country's future energy security.

Thank you for the opportunity to present this testimony to the subcommittee.

PREPARED STATEMENT OF THE AMERICAN SOCIETY OF AGRONOMY, CROP SCIENCE SOCIETY OF AMERICA, AND THE SOIL SCIENCE SOCIETY OF AMERICA

Dear Chairman Dorgan, Ranking Member Domenici and members of the subcommittee, the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA–CSSA–SSSA) are pleased to submit the following funding recommendations for the Department of Energy for fiscal year 2009. For the Office of Science, ASA–CSSA–SSSA recommend a funding level of $4.722 billion, an 18 percent increase over fiscal year 2008 ($3.973 billion). For the Office of Energy Efficiency and Renewable Energy, we recommend a funding level of $1.843 billion, a 7 percent increase over fiscal year 2008. We recommend a funding level of $6.094 billion, a 7 percent increase, for the Office of Environmental Management. Specifics for each of these and other budget areas follow below.

With more than 25,000 members and practicing professionals, ASA–CSSA–SSSA are the largest life science professional societies in the United States dedicated to the agronomic, crop and soil sciences. ASA–CSSA–SSSA play a major role in promoting progress in these sciences through the publication of quality journals and books, convening meetings and workshops, developing educational, training, and public information programs, providing scientific advice to inform public policy, and promoting ethical conduct among practitioners of agronomy and crop and soil sciences.

DEPARTMENT OF ENERGY OFFICE OF SCIENCE

The American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA–CSSA–SSSA) understand the challenges the House Energy and Water Appropriations Subcommittee faces with the tight budget for fiscal year 2009. We also recognize that the Energy and Water Appropriations bill has many valuable and necessary components, and we applaud the subcommittee for

funding the DOE Office of Science in the fiscal year 2008 Omnibus Appropriations bill at $3.973 billion. Under the Energy Policy Act of 2005 (Public Law 109–58), the Office of Science is authorized to receive $5.2 billion in fiscal year 2009. Congress approved the America COMPETES Act of 2007 (Public Law 110–69), recognizing that an investment in basic (discovery) scientific research is essential to providing America the brainpower necessary to maintain a competitive advantage in the global economy and keep U.S. jobs from being shipped overseas. The President's request of $4.722 billion is consistent with the America COMPETES Act, which authorizes the doubling of the Office of Science's budget over a 7-year period. Such an investment is needed to keep U.S. science and engineering at the forefront of global research and development in the biological sciences and geosciences, computing and many other critical scientific fields. The Office of Science supports graduate students and postdoctoral researchers early in their careers. Nearly one-third of its research funding goes to support research at more than 300 colleges and universities nationwide. Moreover, approximately half the users at Office of Science user facilities are from colleges and universities, providing further support to their researchers. The Office of Science also reaches out to America's youth in grades K–12 and their teachers to help improve students' knowledge of science and mathematics and their understanding of global energy and environmental challenges. This recommended funding level of $4.722 billion is critical to ensuring our future energy self-sufficiency and as a means to address major environmental challenges including global climate change. Finally, a funding level of $4.722 billion will allow the Office of Science to: maintain and strengthen DOE's core research programs at both the DOE national laboratories and at universities; provide support for 1,000 of PhD's, postdoctoral associates, and graduate students in fiscal year 2009; ensure maximum utilization of DOE research facilities; allow the Office of Science to develop and construct the next-generation facilities necessary to maintain U.S. preeminence in scientific research; and enable DOE to continue to pursue the tremendous scientific opportunities outlined in the Office of Science Strategic Plan and in its 20 Year Scientific Facilities Plan.

BASIC ENERGY SCIENCES

Within the Office of Science, the Basic Energy Sciences (BES) Program is a multipurpose, scientific research effort that fosters and supports fundamental research to expand the scientific foundations for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use. ASA–CSSA–SSSA support the President's fiscal year 2009 request of $1.568 billion, a 23 percent increase over fiscal year 2008, for BES. The portfolio of programs at BES supports research in the natural sciences by focusing basic (discovery) research on, among other disciplines, biosciences, chemistry and geosciences. Practically every element of energy resources, production, conversion and waste mitigation is addressed in basic research supported by BES programs. Research in chemistry has lead to the development of new solar photoconversion processes and new tools for environmental remediation and waste management. Research in geosciences leads to advanced monitoring and measurement techniques for reservoir definition. Research in the molecular and biochemical nature of photosynthesis aids the development of solar photo-energy conversion.

Within the Basic Energy Sciences Program, the Chemical Sciences, Geosciences, and Energy Biosciences subprogram supports fundamental research in geochemistry, geophysics and biosciences. The Geosciences Research Program supports research focused at developing an understanding of fundamental Earth processes that can be used as a foundation for efficient, effective, and environmentally sound use of energy resources, and provide an improved scientific basis for advanced energy and environmental technologies. The Biosciences Research Program supports basic research in molecular-level studies on solar energy capture through natural photosynthesis; the mechanisms and regulation of carbon fixation and carbon energy storage; the synthesis, degradation, and molecular interconversions of complex hydrocarbons and carbohydrates; and the study of novel biosystems and their potential for materials synthesis, chemical catalysis, and materials synthesized at the nanoscale.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

Within the Office of Science, the Biological and Environmental Research (BER) Program, for more than five decades, has advanced environmental and biological knowledge that supports national security through improved energy production, development, and use; international scientific leadership that underpins our Nation's technological advances; and research that improves the quality of life for all Ameri-

cans. BER supports these vital national missions through competitive and peer-reviewed research at national laboratories, universities, and private institutions. In addition, BER develops and delivers the knowledge needed to support the President's National Energy Plan. ASA–CSSA–SSSA support a 7 percent increase for BER which would bring the funding level to $582,504,790 for fiscal year 2009. ASA–CSSA–SSSA support a variety of programs within BER including the Life Sciences subprogram which supports Carbon Sequestration Research (we recommend a 7 percent increase, bringing the funding level to $7,625,890), and the Genomes to Life (GTL) program (we also recommend a 7 percent increase to bring funding to $163,422,170). Within Genomes to Life (GTL) are programs supportive of bioenergy development including GTL Foundation Research, GTL Sequencing, GTL Bioethanol Research, and GTL Bioenergy Research Centers, all playing an important role in achieving energy independence for America. Also within BER is the Environmental Remediation subprogram and its Environmental Remediation Sciences Research program, both critical programs to advancing tools needed to clean up contaminated sites. ASA–CSSA–SSSA support the President's budget request for the Climate Change Research subprogram in BER which calls for a 13 percent increase bringing the funding level to $154,927,000. This subprogram supports many important areas of climate change research including: Climate Forcing which supports the Terrestrial Carbon Processes program and supports the Ameriflux network of research sites (which should receive a 7 percent increase, bringing funding to $14,379,730), as understanding the role that terrestrial ecosystems play in capturing and storing carbon is essential to developing strategies to mitigate global climate change. An additional program of high importance within the Climate Change Research subprogram is the Climate Change Response and its associated programs—Ecosystem Function and Response, and Education. Finally, also under the Climate Change Research subprogram is the Climate Change Mitigation program, part of BER's support to the Climate Change Technology Program, which will continue to focus only on terrestrial carbon sequestration.

DEPARTMENT OF ENERGY OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

Biomass is currently the only clean, renewable energy source that can help to significantly diversify transportation fuels in the U.S. DOE's Energy Efficiency and Renewable Energy Biomass Program is helping transform the Nation's renewable and abundant biomass resources into cost competitive, high performance biofuels, bioproducts, and biopower. The Office of Energy Efficiency and Renewable Energy (EERE) manages America's investment in the research and development (RD&D) of DOE's diverse energy efficiency and renewable energy applied science portfolio. For the Office of Energy Efficiency and Renewable Energy, we recommend a funding level of $1.843 billion, a 7 percent increase over fiscal year 2008. The fiscal year 2009 EERE budget maintains focus on key components of the AEI and Twenty in Ten including the Biofuels Initiative to develop affordable, bio-based transportation fuels from a wider variety of feedstocks and agricultural waste products.

Note: ASA–CSSA–SSSA strongly oppose the use by the Department of the term "agricultural wastes". Crop residues, e.g., corn stover, play a very important role in nutrient cycling, erosion control and organic matter development. Recent studies have shown that excessive removal of crop residues from agricultural lands can lead to a decline in soil quality. By no means should they ever be referred to as "wastes".

BIOMASS AND BIOREFINERY SYSTEMS

Within EERE, the Biomass and Biorefinery Systems plays an important role providing support for Regional Biomass Feedstock Development Partnerships and Infrastructure Core R&D programs, both within Feedstock Infrastructure. Activities included within this program are resource assessment, education, sustainable agronomic systems development, and biomass crop development. The mission of the Biomass Program is to develop and transform our domestic, renewable, and abundant biomass resources into cost-competitive, high performance biofuels, bioproducts and biopower through targeted RD&D leveraged by public and private partnerships. ASA–CSSA–SSSA support the President's request for a 25 percent increase for the Feedstock Infrastructure program which would bring the funding level to $15,500,000.

DEPARTMENT OF ENERGY OFFICE OF ENVIRONMENTAL MANAGEMENT

ASA–CSSA–SSSA urge the subcommittee to provide the Office of Environmental Management (EM) a 7 percent increase for fiscal year 2009 which would bring total funding for EM to $6.094 billion. EM supports high-priority soil and ground water remediation and excess D&D at Portsmouth, Paducah, Los Alamos, Savannah River,

Oak Ridge, Idaho, Hanford, and other sites. Technology Development and Deployment supports tank waste, soil and groundwater, and facility D&D.

CLIMATE CHANGE RESEARCH

ASA–CSSA–SSSA urge the subcommittee to continue to provide strong support for Climate Change Research to the following programs as follows: Climate Change Science Program (CCSP), $145,940,000; Climate Change Research Initiative (CCRI), $23,672,000; and Climate Change Technology Program (CCTP), $833,301,000. These three programs together will increase our understanding of the impacts of global climate change and also develop tools and technologies to mitigate these impacts.

BASIC AND APPLIED R&D COORDINATION

The Office of Science continues to coordinate basic research efforts in many areas with the Department's applied technology offices. Within this area is Carbon Dioxide Capture and Storage R&D (we recommend a 7 percent increase, bringing total funding to $18,055,000). The BER research includes understanding, modeling, and predicting the processes that control the fate of carbon dioxide injected into geologic formations, subsurface carbon storage, and the role of microbes and plants in carbon sequestration in both marine and terrestrial environments.

NATIONAL LABORATORIES

The Office of Science manages 10 world-class laboratories, which often are called the "crown jewels" of our national research infrastructure. The national laboratory system, created over a half-century ago, is the most comprehensive research system of its kind in the world. Five are multi-program facilities including the Oak Ridge National Laboratory. In the 2007 fiscal year, these facilities were used by more than 21,000 researchers from universities, national laboratories, private industry, and other Federal science agencies.

NATIONAL ENERGY TECHNOLOGY LABORATORY (NETL)

NETL's Carbon Sequestration Program is helping to develop technologies to capture, purify, and store carbon dioxide (CO_2) in order to reduce greenhouse gas emissions without adversely influencing energy use or hindering economic growth. Terrestrial sequestration requires the development of technologies to quantify with a high degree of precision and reliability the amount of carbon stored in a given ecosystem. Program efforts in this area are focused on increasing carbon uptake on mined lands and evaluation of no-till agriculture, reforestation, rangeland improvement, wetlands recovery, and riparian restoration. ASA–CSSA–SSSA urge the subcommittee to direct the Department to increase funding for its terrestrial carbon sequestration program, specifically The Regional Carbon Sequestration Partnerships, which are collaborations between Government, industry, universities, and international organizations funded by DOE to determine the most suitable technologies, regulations, and infrastructure needs for carbon capture and sequestration.

OAK RIDGE NATIONAL LABORATORY (ORNL)

ORNL is one of the world's premier centers for R&D on energy production, distribution, and use and on the effects of energy technologies and decisions on society. Clean, efficient, safe production and use of energy have long been our goals in research and development. At ORNL, unique facilities for energy-related R&D are used both for technology development and for fundamental investigations in the basic energy sciences that underpin the technology work.

Thank you for your thoughtful consideration of our requests.

PREPARED STATEMENT OF THE FRIENDS COMMITTEE ON NATIONAL LEGISLATION (QUAKERS)

The Friends Committee on National Legislation (Quakers) makes the following recommendations on budget request of the National Nuclear Security Administration for fiscal year 2009 (fiscal year 2009):

—*Reliable Replacement Warhead.*—Under the Weapons Activities/Directed Stockpile Work program, delete all funding from the $10 million requested. Include in the committee report the same language that was in the Consolidated Appropriations Act, 2008: "No funding is provided for the Reliable Replacement Warhead."

—*International Nuclear Materials Protection and Cooperation.*—Under the Defense Nuclear Nonproliferation program, increase funding by $195 million, from the requested $430 million to $625 million for fiscal year 2009. This would be the same amount as was appropriated for fiscal year 2008.

—*Nonproliferation and Verification R&D.*—Under the Defense Nuclear Nonproliferation program, we oppose the administration's proposed budget cut of $112 million and support a funding level closer to the fiscal year 2008 level of $387 million, but make no specific suggestion.

—*Global Threat Reduction Initiative.*—Under the Defense Nuclear Nonproliferation program, we strongly support the administration's proposed increase of $26 million for fiscal year 2009, to $220 million.

Reliable Replacement Warhead.—Congress wisely rejected the administration's request for the Reliable Replacement Warhead for fiscal year 2008. The arguments have not changed since last year.

The Joint Explanatory Statement to the Consolidated Appropriations Act for fiscal year 2008 explains:

"As stated in both the House and Senate reports, Congress believes a new strategic nuclear deterrent mission assessment for the 21st century is required to define the associated stockpile requirements and determine the scope of the weapons complex modernization plans. The NNSA is directed to develop a long-term scientific capability roadmap for the national laboratories to be submitted to the Committee on Appropriations."

FCNL agrees. The United States still has no 21st century nuclear weapons policy in place. Until the reports mandated by the fiscal year 2008 defense authorization bill are completed, there is no framework to base long-term nuclear stockpile decisions on.

The nuclear stockpile continues to be annually certified as safe and reliable by the Secretaries of Defense and Energy. There remains no need to rush to replace the plutonium pits in warheads, which have been found to have lifetimes of a century or more.

Additionally, further development of RRW could have serious adverse international security consequences. Proceeding with RRW would send the wrong message to would-be proliferators, and undermine ongoing efforts to curb the nuclear programs of Iran and North Korea. Development of a new U.S. warhead would also provide nuclear weapons advocates in Russia with effective material to lobby for more aggressive Russian nuclear weapons modernization programs. Senator Sam Nunn's 2007 testimony before your House Subcommittee counterpart remains as relevant today:

"[I]f Congress gives a green light to this [RRW] program in our current world environment, I believe that this will be: misunderstood by our allies; exploited by our adversaries; and complicate our work to prevent the spread and use of nuclear weapons."

Finally, FCNL rejects the Energy Department (DOE) assertion that pursuing the RRW program is the only way to elicit the data needed to address stockpile certification concerns raised by the September 7, 2007 review of RRW by the JASON Defense Advisory Group.

We believe DOE can address the stockpile certification concerns raised by the JASONs review without developing RRW. The Joint Explanatory Statement to the Consolidated Appropriations Act for fiscal year 2008 also reaches this conclusion. By creating the Advanced Certification campaign to address these certification issues and simultaneously zeroing out the RRW program, the subcommittee (in conjunction with your House counterpart) determined that these issues could be pursued without advancement of the RRW program.

Nuclear Nonproliferation Programs.—Hundreds of tons of nuclear weapons materials are stored at inadequately secured facilities in Russia and perhaps 20 other countries. One hundred and ten pounds of highly enriched uranium could be fashioned into a crude nuclear weapon by a committed group of violent extremists. Such a weapon would destroy downtown New York, killing more than half-a-million people from the immediate effects of the explosion. The cost would be well over $1 trillion from the staggering economic disruption. A nuclear detonation in any U.S. city would cause devastation that would make the 9/11 attack and the Katrina hurricane pale in comparison.

These programs continue to enjoy strong support across the political spectrum, as evidenced by these statements from the past few months (emphasis added):

". . . the Department of Defense's Cooperative Threat Reduction program and the Department of Energy's nuclear nonproliferation programs . . . address perhaps the *single biggest threat* to the U.S. homeland, the threat of nuclear terrorism and other weapons of mass destruction." Rep. Ike Skelton, Chairman, House Armed Service Committee, press release, December 7, 2007.

"Nuclear nonproliferation programs such as the NNSA's Global Threat Reduction Initiative, GTRI, are some of the *most important tools* we have to curb the threat of nuclear material being acquired by those who wish to do us harm." Sen. Pete V. Domenici, Ranking Member, Senate Appropriations Subcommittee on Energy and Water Development, Congressional Record, December 12, 2007, p. S15228.

"The proliferation of weapons of mass destruction remains the *number one national security threat* facing the United States and the international community." Sen. Richard G. Lugar, Ranking Member, Senate Foreign Relations Committee, "Remarks at the Defense in Depth against WMD CPC Conference," Chantilly, VA, January 30, 2008.

The House Budget Resolution for fiscal year 2009 also reaches the same conclusions:

"It is the policy of this resolution that . . . implementing the recommendation of the National Commission on Terrorist Attacks Upon the United States (commonly referred to as the 9/11 Commission) to adequately fund cooperative threat reduction and nuclear nonproliferation programs (securing 'loose nukes') is a *high priority and should receive far greater emphasis* than the President's budget provides;" H. Con. Res. 312, sec. 502, March 7, 2008 (emphasis added).

Even the administration's budget request agrees:

"The convergence of heightened terrorist activities and the ease of moving materials, technology and information across borders have made the potential for terrorism involving weapons of mass destruction (WMD) the *most serious threat* facing the Nation. Preventing WMD from falling into the hands of terrorists is the *top national security priority* of this administration." Department of Energy, Fiscal Year 2009 Congressional Budget Request, vol. 1, p. 453, February 2009 (emphasis added).

However, the administration's budget request does not match its rhetoric. We ask the subcommittee to increase the nuclear nonproliferation programs to at least last year's levels.

We greatly appreciate the termination of the Reliable Replacement Warhead program in the Consolidated Appropriations Act for Fiscal Year 2008. We also appreciate the additional funds the subcommittee provided for nuclear nonproliferation programs in the Continuing Resolution, the Supplemental Appropriations Act, and the Consolidated Appropriations Act. We believe the country is more secure because of your actions. We urge you again to apply those priorities to your fiscal year 2009 bill.

Thank you for your consideration.

PREPARED STATEMENT OF THE US FUEL CELL COUNCIL

Chairman Dorgan, Ranking Member Domenici, and distinguished members of the subcommittee, on behalf of the 110 organizations of the US Fuel Cell Council (USFCC), I want to thank this subcommittee for supporting fuel cell funding over the years. We are writing to urge strong support for fuel cell and hydrogen programs managed by the Department of Energy. Specifically, we request the subcommittee to consider the following:

—Provide $20 million to establish a Market Transformation program.
—Restore $39 million to continue Hydrogen Production and Delivery R&D.
—Add $15 million to Technology Validation (managed by Vehicle Technologies—Hybrid Electric Systems).
—Add $5 million to restore EERE Manufacturing R&D.
—Add $10 million to Fossil Energy's SECA program.
—Add $4 million to Safety Codes and Standards, and maintain current jurisdiction.
—Maintain Education jurisdiction under the Hydrogen Technology Program and fund at $4 million.
—Restore $2 million to continue Fuel Processor R&D.

Fuel cells are a family of technologies that are being developed for portable, stationary and transportation applications.

These technologies offer a unique combination of benefits. And while our industry has invested billions to develop fuel cells for portable, stationary and transportation applications, we view our partnership with the Federal Government as vital. Funding for other worthwhile technologies must not come at the expense of the hydrogen program, as we feel this would impede efforts to become more energy independent.

Establishing a Market Transformation program is a top priority for industry. Last year the Senate Energy and Water Appropriations Subcommittee provided funding for this endeavor; however, the measure was not included in the final appropriations bill. The program, when funded, will fulfill congressional intent as outlined in sections 782 and 783 of the Energy Policy Act of 2005.

The Market Transformation program will allow the Department of Energy to assist other agencies to purchase portable, stationary and transportation fuel cell systems. The program, which is voluntary, is seen by industry as a key component to commercialization as it would also help fuel cell manufacturers increase output, thereby reducing costs and creating economies of scale. It would also allow more Federal agencies to comply with new energy efficiency guidelines as directed by Executive Order.

Unfortunately, the President's fiscal year 2009 request cuts or changes a number of critical path programs, including Hydrogen Production and Delivery R&D; Fuel Processor R&D; and Manufacturing R&D. These programs are designed to maximize availability of fuel cells and hydrogen at an affordable price.

With regard to Hydrogen Production R&D and Delivery, the administration justifies the elimination of the program by stating that the "core technology readiness goals established for 2015 can be met with the technologies for producing hydrogen from natural gas that were developed in prior years, so . . . near-term hydrogen production is no longer a critical-path barrier." We disagree. Cost-effective and environmentally benign methods of reforming hydrocarbons are still not commercially feasible. Several technical challenges remain, including low cost desulfurization methods. Current refining methods often produce flammable and/or hazardous waste. While alternative desulfurization materials can avoid these problems, they are prohibitively expensive—as much as 10 times the current cost. If reinstated by Congress, the Department should be instructed to fund improvements in removing sulfur-containing odorants from natural gas and liquefied petroleum gas. In addition, a coordinated, nationwide (or even international) effort to replace sulfur-containing odorants with non-sulfur-containing odorants should be initiated.

In the transportation arena, there is growing support for ethanol and other biofuels, and for hybrid vehicles as responses to our energy challenge. These programs would not, by themselves, solve our problem. They would, however buy us time to make the transition to hydrogen. Automakers still view hydrogen as the ultimate transportation fuel as it allows long range driving, short fueling time with little to zero-emissions. The public/private partnership in fuel cells is working, and more development and demonstration is needed.

Work performed by the Technology Validation program is designed to demonstrate the performance of hydrogen infrastructure and fuel cell systems under real world operating conditions. If development work were to stop due to lack of funding it could take years or even decades to revive the effort. By restoring funding to fiscal year 2008 levels, the Department and private industry will continue to collect necessary data to continue development of fuel cells for vehicles

Manufacturing R&D was also eliminated in the fiscal year 2009 request. Last year, the administration put significant focus on this program as it was critical to "cultivate a robust domestic manufacturing capability in evolving hydrogen infrastructure and fuel cell technologies, vital to establishing U.S. economic leadership in emerging hydrogen and fuel cell industries." After 1 year and a single round of solicitations awarded, the administration now feels the program is not a critical-path barrier to achieving the programs core technology readiness goals for 2015.

Once again, we disagree with the President's plan. The Department, in cooperation with private industry, has made great strides in reducing the high-volume cost of fuel cells. Eliminating this program in its infancy will only delay efforts to bring the cost of fuel cells down.

With regard to the Fossil Energy (FE) activities, we request $70 million for fuel cell activities, which includes funding for the Solid State Energy Conversion Alliance (SECA). The SECA program is designed to develop high-efficiency fuel cells that are capable of utilizing a variety of domestically available fuel, including coal gas, ethanol and other biofuels.

Proposed program cuts aside, we feel that most of the program reorganizations suggested are unnecessary. For example, a proposal to move hydrogen Education and Codes and Standards staff from the hydrogen program to the vehicle tech-

nologies program, in the name of consolidation, is misguided. Department leadership describes these as "complementary" activities, however we strongly disagree.

If altered, we fear the Department will not be able to accomplish its stated mission to educate the public, code and safety officials, and support DOE Market Transformation activities. Given the transformational nature of hydrogen, we believe these positions properly should remain within the hydrogen program for maximum effectiveness, and in any event reorganization ought to be left to the next administration.

Supporting the remainder of the Presidents fiscal year 2009 plan—Hydrogen Storage R&D, Fuel Cell Stack Component R&D, and Distributed Energy Fuel Cells Systems—will maintain the integrity of the competitively awarded projects administered by the Department of Energy and continue our public/private partnership designed to fully commercialize fuel cell and hydrogen technologies.

Over the past 4 years, shortfalls in fuel cell and hydrogen core program funds have slowed and in some cases stopped high-priority research and development. Full funding can restore program momentum, and give the country some hope that we can break the cycle of energy dependence. Competition for energy supply and security of supply are both urgent concerns, and the Nation's investment, we believe, ought to match that urgency.

Thank you for considering our requests.

PREPARED STATEMENT OF THE NATIONAL ASSOCIATION OF STATE ENERGY OFFICIALS

Mr. Chairman and members of the subcommittee, I am Dub Taylor of Texas and chair of the National Association of State Energy Officials (NASEO). NASEO is submitting this testimony in support of funding for a variety of U.S. Department of Energy programs. Specifically, we are testifying in support of no less than $75 million for the State Energy Program (SEP). SEP is the most successful program operated by DOE in this area. Within a $75 million funding level for SEP we would support the administration's proposed $10 million competitive program, but we do not support such an effort at the proposed funding level of $25 million for the core SEP activities and $25 million for the competitive program. SEP is focused on direct energy project development, where most of the resources are expended. SEP has set a standard for State-Federal cooperation and matching funds to achieve critical Federal and State energy goals. We also support $300 million for the Weatherization Assistance Program (WAP). These programs are successful and have a strong record of delivering savings to low-income Americans, homeowners, businesses, and industry. We also support an increase in the budget for the Energy Information Administration (EIA) to $120 million, including an increase of $600,000 for EIA's State Heating Oil and Propane Program, in order to cover the added costs of increasing the frequency of information collection (to weekly), the addition of natural gas, and increasing the number of State participants. EIA's new State-by-State data is very helpful. EIA funding is a critical piece of energy emergency preparedness and response. NASEO continues to support funding for a variety of critical deployment programs, including Building Codes Training and Assistance ($10 million), Rebuild America ($5 million), Energy Star ($10 million) and Clean Cities (Vehicle Technologies Deployment) ($12.5 million). NASEO supports funding for the Office of Electricity Delivery and Energy Reliability, at least at the fiscal year 2006 request of $161.9 million, with specific funding for the Division of Infrastructure Security and Energy Restoration of $18 million, which funds critical energy assurance activities. We also strongly support the R&D function and Operations and Analysis function. The industries program should be funded at a $74.8 million level, equal to the fiscal year 2005 levels, to promote efficiency efforts and to maintain U.S. manufacturing jobs, especially in light of the loss of millions of these jobs in recent years. Proposed cuts in these programs are counter-productive and are detrimental to a balanced national energy policy. The Energy Independence and Security Act of 2007 (EISA) also has a number of exemplary provisions which should also receive funding, including the new commercial buildings initiative. EISA also reauthorized SEP (section 531) and Weatherization (section 411) through fiscal year 2012. We remain concerned that a number of programs authorized in the Energy Policy Act of 2005 (EPACT 2005) have received no direct funding. Of special interest are sections 124, 125, 126, 128 and 140 of EPACT 2005.

Over the past 7 years, both oil and natural gas prices have been rising in response to expanded Chinese and Indian use, other international events, increased domestic use, the falling dollar and the result of the 2005 hurricanes. We expect $100+ oil to continue for an extended period of time, with an expanded problem as summer approaches. Gasoline prices may spike to $4/gallon. Diesel prices are al-

ready over $4/gallon. In addition, we now have quantifiable evidence of the success of the SEP program, which demonstrates the unparalleled savings and return on investment to the Federal taxpayer of SEP. Every State gets an SEP grant and all States, the District of Columbia and territories support the program.

In January 2003, Oak Ridge National Laboratory (ORNL) completed a study and concluded, "The impressive savings and emissions reductions numbers, ratios of savings to funding, and payback periods . . . indicate that the State Energy Program is operating effectively and is having a substantial positive impact on the Nation's energy situation." ORNL updated that study and found that $1 in SEP funding yields: (1) $7.22 in annual energy cost savings; (2) $10.71 in leveraged funding from the States and private sector in 18 types of project areas; (3) annual energy savings of 47,593,409 million source BTUs; and (4) annual cost savings of $333,623,619. The annual cost-effective emissions reductions associated with the energy savings are equally significant: (1) Carbon—826,049 metric tons; (2) VOCs—135.8 metric tons; (3) NO_X—6,211 metric tons; (4) fine particulate matter (PM10)—160 metric tons; (5) SO_2—8,491 metric tons; and (6) CO—1,000 metric tons. The energy cost savings is much higher today, in light of higher prices. State monitoring and verification has confirmed SEP's effectiveness.

State Energy Program Special Projects and Other Deployment Programs.—Through fiscal year 2005, SEP Special Projects provided matching grants to States to conduct innovative project development. It had been operated for 10 years and has produced significant results in every State in the United States. We support funding of DOE's new, proposed SEP competitive program, but only above a minimum $55 million SEP appropriation for the base SEP program. The States with lower populations are disadvantaged by this program.

EISA authorized a new Energy Efficiency and Conservation Block Grants program (section 541–548). We look forward to working with Congress and the administration to make this program a reality. We hope start-up funding can be provided in fiscal year 2009. However, we remain concerned that a structure that requires DOE to review and process thousands of local government grant applications each year will be unworkable. With the elimination of the DOE/EERE Regional Offices, DOE contracting processes have become slower. There is now a more attenuated connection between State and local governments with DOE. We look forward to working with Congress, local governments and DOE to correct this situation. Joint planning needs to occur immediately. State energy offices have partnered with local governments for decades. This program should allow us to supplement and enhance those activities.

Industrial Energy Program.—A funding increase to a level of $74.8 million for the Industrial Technologies Program (ITP) is warranted. This is a public-private partnership in which industry and the States work with DOE to jointly fund cutting-edge research in the energy area. The results have been reduced energy consumption, reduced environmental impacts and increased competitive advantage of manufacturers (which is more than one-third of U.S. energy use). The States play a major role working with industry and DOE in the program to ensure economic development in our States and to try to ensure that domestic jobs are preserved. State energy offices are working effectively with DOE on the "Save Energy Now" campaign. Funding for distributed generation should be included above these amounts.

Examples of Successful State Energy Program Activities.—The States have implemented thousands of projects. Here are a few representative examples.

California.—The California Energy Commission has operated energy programs in virtually every sector of the economy. The State has upgraded residential and nonresidential building codes (including major 2008 upgrades), developed a school energy efficiency financing program (including $100 million for high performance schools), and instituted a new replacement program for school buses utilizing the newest natural gas, advanced diesel and hybrid technologies. The buildings program has reduced consumption by enormous amounts over the past few years, through alternative financing programs and outreach. California's greenhouse gas mitigation plans and a new solar initiative are moving forward.

Colorado.—The State is conducting training to implement the new statewide energy code. The energy office is pushing hard to promote the use of biofuels and create infrastructure for the dispensing of the fuel. The Colorado Carbon Fund has been developed to help individuals and businesses develop and purchase offsets. In addition, the State is working promoting community-based small wind projects, geothermal energy, commercial buildings energy efficiency and a variety of solar energy programs.

Hawaii.—After enacting significant legislation ("Energy for Tomorrow"), the State is focused on implementing a plan to diversify the energy sources utilized in the State. Distributed generation and utility scale solar projects are being installed. An

aggressive hydrogen promotion program is ongoing. The State has a variety of energy performance contracting projects. They have upgraded their tropical energy building code. Extensive utilization of bioenergy and biofuels is a priority and has been expanded.

Kentucky.—The energy office has been working on Energy Star promotion activities and high performance energy programs for schools. They are working to promote energy efficiency programs in the agricultural sector as well, including the Kentucky Rural Energy Consortium activities. They have been executing energy performance contracts for a variety of State facilities.

Louisiana.—The State recently upgraded building energy codes. Now they are embarked on an extensive training program to ensure that the code will be followed and understood. In the alternative fuels area the State has instituted projects including CNG fueling, hybrid electric buses and bio-diesel promotions. Significant attention has been paid to energy efficient reconstruction after Hurricane Katrina.

Mississippi.—The energy office has been working on an extensive energy education program, ranging from school children to higher education initiatives. The State has also been active in promoting alternative motor fuels, rural business opportunities with the agricultural sector, energy efficiency in State buildings and Energy Star product promotions.

Missouri.—The energy office in Missouri has been operating a low-interest energy efficiency loan program for school districts, colleges, universities and local governments. Thus far, public entities have saved more than $93 million, with more than 400 projects. The State energy office has also worked with the Public Utility Commission and the utilities within the State to get $20 million invested in residential and commercial energy efficiency programs, with a significant incremental increase to $20 million in investments in 2008 alone. A new revolving loan for biodiesel has also been initiated. The energy office and the air agency have developed a program to set-aside NO_X allowances for energy efficiency and renewable energy.

New Jersey.—The State's Clean Energy Program expended approximately $171 million in 2006 alone, with the expected electricity and natural gas bill reductions for the life of these projects expected to be over $2.3 billion. New Jersey has an extremely aggressive solar energy program. Recent innovative projects have included a pilot photovoltaics power systems program in Phillipsburg, a wireless energy management demonstration project, an alternative fuel vehicle and a bio-diesel vehicle rebate program, etc.

New Mexico.—After adoption of new energy legislation in 2007, the State is pushing for new renewable energy transmission projects, the implementation of the Renewable Portfolio Standard, expanded promotion of the sustainable buildings tax credits, use of energy bonds, promotion of "solar roofs," and encouraging manufacturers to utilize the alternative energy product tax credit. They have been training green building professionals and promoting clean fuels and efficient transportation options.

North Dakota.—The energy office in North Dakota has focused on promotion of alternative fuels, wind energy projects (including a wind-to-hydrogen demonstration), biomass gasification (with the EERC Center for Renewable Energy in Grand Forks), energy efficiency for schools and local governments and deployment of renewable technology.

South Dakota.—The energy office has instituted a energy efficient grants program for higher education projects, including a 50 percent match. Recent projects have included lighting, energy recovery and heating and controls upgrades. The energy conservation loan program is focused on State agencies and recent projects have included a biomass boiler conversion. These projects have been instituted throughout the State.

Texas.—The Texas Energy Office's Loan Star program has long produced great success by reducing building energy consumption and taxpayers' energy costs through efficient operation of public buildings. This saved taxpayers more than $224 million through energy efficiency projects. In another example, the State promoted the use of "sleep" software for computers, which is now used on 136,000 school computers, saving 42 million kWh and reducing energy costs by $3 million annually. This is part of a broader energy efficiency program that has helped 3,500 schools and local governments thus far. The State has initiated the Texas Emissions Reduction Plan/Texas Energy Partnership in 41 urban counties to reduce emissions through cost-effective energy efficiency projects.

Utah.—The State has recently upgraded their building codes and they have been pushing to train builders, local code officials, architects and engineers. They also developed a zero-interest loan program for school districts. A State renewable energy tax credit has been utilized for large projects. The Governor has instituted a new renewable energy initiative.

Washington.—The energy agency has been working on promoting energy efficiency and renewable energy tax incentives, net metering and biofuels development. The State is also working on promoting Energy Star products and they are working regionally on building energy efficiency activities. They have also instituted a regional energy planning process.

West Virginia.—The Energy Division is focused on promotion of energy efficiency in the industries of West Virginia, including work in the steel, aluminum, chemical/polymer, glass, metal-casting, wood products and mining industries. They are also promoting Energy Star products, especially in the residential sector. The recently developed State energy plan is being utilized to promote a diverse energy future for the State.

PREPARED STATEMENT OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

The American Society of Plant Biologists (ASPB) urges the subcommittee to approve the Department of Energy (DOE) fiscal year 2009 budget request for the Office of Science of $4.7 billion. Please support the Office of Basic Energy Sciences request for $1.568 billion. Included with the Department's budget request for Basic Energy Sciences is $297,113,000 for leading research in the Chemical Sciences, Geosciences and Energy Biosciences Division. We urge you to support the Department's budget request for the division, including $35.6 million for Energy Biosciences research. ASPB supports the DOE budget request of $568.5 million for the Office of Biological and Environmental Research.

Research the subcommittee supported within the Energy Biosciences program has led to many breakthroughs including increased understanding of the composition of the cell wall. These findings help allow scientists and the Department to project further research advances leading to cost-competitive production of cellulosic ethanol. Many years of basic research supported in Energy Biosciences led to these cell wall findings. The highly regarded Energy Biosciences program also funded basic research leading to the landmark discovery of an enzyme that can convert cellulose into sugar for facile ethanol production.

Sunlight is the ultimate energy source for the earth. Harnessing even a fraction of this sunlight would provide us sufficient energy for years to come. Plants do this naturally through photosynthesis, also an area of research that has garnered continuous support from the DOE Energy Biosciences program. The burning of fossil fuels releases stored carbon dioxide into the atmosphere, contributing to global warming. Photosynthesis has the ability to recapture carbon dioxide, making plants a carbon neutral contribution to our energy needs.

We credit the subcommittee, the Office of Basic Energy Sciences Director and Under Secretary for the Office of Science for maintaining each year standards for peer-review selection based on the highest merit of science proposals submitted to the Energy Biosciences program and other programs within the Office.

These findings on the cell wall and enzymes are being built upon in a mission-related basic research effort by the Office of Biological and Environmental Research aimed at achieving advances that make possible cost-competitive production of cellulosic ethanol and other biofuels. The three Bioenergy Research Centers awarded by BER will increase understanding of cell wall and enzyme modifications needed to more cost-effectively capture sugars in the cellulose and hemicellulose in plant cell walls. We urge continued support for the three Bioenergy Research Centers. The Centers will also make possible advances in converting sugars to ethanol, biobutanol and other biofuels for the Nation's motorists. Cellulose is the most abundant biological material on earth. What was once only a dream of capturing and converting this abundant, renewable and sustainable resource into transportation fuels will become a reality thanks to continuing advances in plant and microbial science that the subcommittee is making possible. Advances in the fundamental understanding of oil crops such as soybean will contribute to increased biodiesel fuel production.

We urge support for the $100 million initiative in Energy Frontier Research Centers (EFRCs). Under this initiative, universities, national laboratories, nonprofit organizations, and for-profit firms will be invited to compete, singly or in partnerships, to establish an EFRC. Centers will be selected by scientific peer review and funded at $2–5 million per year over a 5-year period. These integrated, multi-investigator Centers will conduct fundamental research focusing on one of more of several "grand challenges" recently identified in major strategic planning efforts by the scientific community. The purpose of these centers will be to integrate the talents and expertise of leading scientists in a setting designed to accelerate research toward meeting our critical energy challenges.

One of our most pressing energy challenges is in transportation fuels. I wrote a letter to the editor on the exciting next generation of biofuels that was published in The Washington Times on March 6, 2008. Following is the commentary:

[From The Washington Times, Mar. 6, 2008]

THE NEXT GENERATION OF BIOFUELS

Oil closed at $100 a barrel February 19, for the first time. The Washington Times reported on February 20, ("Oil tops $100 on refinery, OPEC," Business) that fears that the Organization of the Petroleum Exporting Countries may cut production contributed to the price increase.

Some analysts see this $100 mark as just a stop on the way to $200-per-barrel oil, possibly by the end of this decade. The reason cited is similar to newspaper reports on the bump to $100 per barrel—OPEC's control of supply.

In addition to the economic and political challenges imposed by our reliance on foreign oil, we also need to be concerned that greenhouse gas (GHG) emissions associated with the use of fossil fuel contribute significantly to global warming, evident from observed increases in global air and ocean temperatures, widespread melting of snow and ice and a rising global average sea level. Is there a large-volume alternative to the use of increasingly costly oil with its high GHG emissions? There will be.

We are at the early stages of research on the next generation of biofuels using plant cellulose. Plant stems, stalks and leaves will become low-cost feedstocks for biofuels. A 2005 report from the U.S. Department of Agriculture and the U.S. Department of Energy projects that there will be enough biomass (cellulose) to meet more than one-third of the current U.S. demand in transportation fuels.

At the same time, next-generation biofuels will greatly lower emissions of stored carbon compared to gasoline. Biofuels will be better for Americans' pocketbooks and the environment.

The President and Congress are to be commended for initiating needed investments in new-generation biofuels research. Additional investment is needed in all phases of plant research. This will help hasten the day when biofuels make up 33 percent instead of 3 percent of the transportation fuels used in the United States.

C. ROBERTSON MCCLUNG,
President, American Society of Plant Biologists, Professor, Dartmouth College.

Understanding plant growth and development at a systems level feeds into increasing biomass, as does understanding basic mechanisms of abiotic and biotic stress tolerance. Understanding how cell walls are synthesized and their composition determined is not only fundamental to our knowledge of basic plant biology, but also is a central issue in biomass production and conversion. The same can be said of understanding how plants synthesize and regulate the production of lipids and oils as well as many other plant constituents and processes.

Please support increases in fiscal year 2009 for the Office of Biological and Environmental Research Program for Ecosystem Research (PER). PER sponsors experimental research to develop a better scientific understanding of potential effects of climatic change on U.S. terrestrial ecosystems and their component organisms. Field or laboratory studies are directed at understanding cause-and-effect relationships between temperature change and the abundance or geographic distribution of terrestrial vascular plants or animals in the United States. During the last decade there have been significant advances in the mechanistic understanding of how the component elements of terrestrial ecosystems are responding to elements of global change. These include changes in: atmospheric carbon dioxide levels, precipitation amount and seasonal distribution, and in daily and seasonal temperature cycles. As the primary producers of terrestrial ecosystems, the response of plants to multiple and interactive effects of global change drive the overall ecosystem response. This mechanistic research involving state-of-the-art physiological, biochemical, molecular, and genomic approaches has been almost exclusively conducted on individual plants exposed to global change scenarios under controlled environment conditions. Over the same period of time there have been tremendous strides made in the phenomenological characterization of the response of terrestrial ecosystems to interactive effects of global change. Again this research effort has centered on plants as the drivers of the central ecosystem processes of carbon, nitrogen, and water cycling. Plants also support the major biotic and trophic interactions within ecosystems and there has been intense interest to characterize the response of these interactions to global change.

The emergent research frontier where breakthroughs are most needed is in bridging mechanism and phenomenology to understand the systems biology of a functioning ecosystem under realistic global change treatments.

ASPB is a non-profit society of 5,000 scientists based primarily at universities. ASPB publishes the most frequently cited plant science journal in the world, Plant Physiology and the plant science journal with the highest impact factor, The Plant Cell. Thank you again for the opportunity to submit these comments to the subcommittee. Please let us know if we could provide any additional information.

PREPARED STATEMENT OF THE ELECTRIC DRIVE TRANSPORTATION ASSOCIATION

In the Nation's two newest comprehensive energy laws, the Energy Independence and Security Act of 2007 (EISA), and the Energy Policy Act of 2005 (EPAct05), Congress recognized the need to invest in technologies and policies that will result in greater energy independence. Those bills authorize research and development, demonstration and deployment and manufacturing innovation programs to promote electric drive technologies, which use electricity to displace oil.

The Electric Drive Transportation Association (EDTA) applauds the Senate's support for electric drive technologies, which reduce petroleum consumption and decrease emissions of greenhouse gases and of air pollutants. Using electricity, by itself or in conjunction with another fuel, electric drive technologies power the wheels of vehicles in use today and numerous others in development. These vehicles can be passenger vehicles, trucks, tractors, locomotives or ground support equipment. Electric drive also powers transportation infrastructure, such as truck auxiliary power units and truck stop electrification facilities, which allow idled trucks to power with clean, alternative electricity.

Multiple fuel and vehicle technologies, including hybrids, battery electric vehicles, fuel cell vehicles, and plug-in versions of these electric drive vehicles, will be needed to end our unsustainable dependence on oil. The Department of Energy's Office of Energy Efficiency and Renewable Energy programs to accelerate development of electric drive vehicle technologies are pivotal to the effort to reduce oil consumption.

The Senate's budget resolution provides $2 billion over the President's request for these programs. As you allocate fiscal year 2009 funding for the important programs in the Office of Renewable Energy and Energy Efficiency, we respectfully request that you provide the resources necessary to realize the electric drive advances outlined in EISA and EPAct05.

ENERGY STORAGE RESEARCH AND DEVELOPMENT

Specifically, we support expanded funding for energy storage research and development at the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), in particular, in the Vehicle Technologies program.

Advanced batteries and other energy storage innovations are the key to commercialization of plug-in electric drive and will accelerate advances in all electric drive vehicles. The administration's request for the existing DOE program is essentially level with fiscal year 2008 funding and does not reflect the intent of Congress as detailed in EISA.

Fiscal year 2009 funding in the Hybrid Electric Systems account should be expanded to include resources for the EISA section 641 energy storage competitiveness program. This program, which is authorized at $295 million, includes basic and applied research, development and demonstration programs to support U.S. competitiveness in energy storage for electric drive vehicles and stationary applications.

FUEL CELL TECHNOLOGIES

We also urge you to ensure that the national effort to develop hydrogen fuel cell options is able to advance toward its goals. The fiscal year 2009 request for the Hydrogen and Fuel Cell Technologies program is $33 million, a reduction from fiscal year 2008 levels. The Department's proposed program realignment should not undermine the ongoing work that is yielding technology breakthroughs and will ultimately yield necessary longer term transportation options.

For instance, the request for the Technology Validation program cuts funding to $15 million, half of the fiscal year 2008 level. In this program, hydrogen infrastructure and fuel cell systems are certified under real world conditions. This work guides research agendas and helps establish the "real world" data collection necessary to develop fuel cell vehicles. Consequently, we believe this program should be funded at least at the fiscal year 2008 level of $30 million.

Other programs necessary to the push toward commercialization are also cut or unfunded entirely, including a $3.5 million reduction in Safety Codes and Standards and a complete elimination of funding for Manufacturing R&D (which received $5 million in fiscal year 2008).

Section 782 of EPAct05 authorizes Federal and State Procurement program funding to help government fleets acquire fuel cells vehicles. The program is designed to reduce the initial market barriers for advanced technology vehicles by covering the cost premium of the early Federal and State fleets of fuel cell vehicles. Congress should provide the $25 million authorized by EPAct05.

The Department of Energy should not abandon its hydrogen production and delivery activities, as the administration requests, and funding for the Transportation Fuel Cell Systems Account should be restored to at least the fiscal year 2008 level of $8 million.

DEPLOYMENT AND DEMONSTRATION

Other new and existing demonstration and deployment programs have the potential to accelerate commercial deployment of electric drive technologies, with the appropriate resources.

Specifically, the EISA section 131 Transportation Electrification (b) Plug in Electric Drive Vehicle Program and (c) Near Term Transportation Electrification Program can help industry partners to work together to put on-road and non-road electric drive vehicles in use, enabling manufacturers and consumers to identify real world performance and establish initial market opportunities. The programs are authorized at a total of $185 million. We ask that you provide substantial funding to allow rapid ramp-up of these programs in their initial year.

The Clean Cities program is another example of a successful, ongoing effort to deploy advanced vehicle technologies. The Clean Cities program consists of voluntary local and regional coalitions working to build clean and efficient private and municipal fleets, with advanced technology and alternative fuel vehicles. We appreciate the Congress' history of support for the program and request that you provide the technology- and fuel-neutral fund at the fiscal year 2008 enacted level, $12.5 million.

Another important activity at DOE in fiscal year 2009 will be the rulemaking that will be required to implement new EPAct fleet requirements. EISA's section 508 amends the existing fleet requirements to finally, explicitly include electric drive (fuel cell, hybrid, plug-in hybrid, medium and heavy duty hybrid electric vehicles and neighborhood electric vehicles) and investments in alternative fuel infrastructure. The $1.8 million in the request is insufficient to ensure an expeditious and effective rule making process, and will delay the ability of covered fleets to comply with hybrid and other electric drive vehicles.

MANUFACTURING INNOVATION

We also support building domestic capacity for advanced batteries and vehicles as envisioned by EISA 2007. The Senate Budget resolution also endorses the effort, explicitly providing an additional $2.7 billion for green jobs initiatives, including "loan guarantee and grant programs" for ". . . production of fuel efficient vehicles."

We respectfully ask that you direct the maximum available funds toward programs authorized in the EISA that will help new and existing manufacturers to produce advanced batteries and vehicles in the United States and expand employment in these fields.

Specifically, we are referring to the section 136 Advanced Technology Vehicle Manufacturing Incentive Program, which provides grants for up to 30 percent of the cost of re-equipping or establishing advanced vehicle and component manufacturing facilities, equipment investment and engineering integration, and section 132: Domestic Manufacturing Conversion, which authorizes grants to manufacturers of fuel efficient vehicles and component suppliers to modernize production facilities.

In addition, we recommend that additional funds be allocated to the existing Loan Guarantee Program to include the battery and component manufacturing guarantees activities authorized in EISA's section 134 Loan Guarantees for Fuel Efficient Automobile Parts Manufacturers and section 135 Advanced Battery Loan Guarantee Programs. The administration request includes $10 billion of $38.5 billion for advanced and innovative energy; that amount should be increased with funds directed to the EISA-authorized manufacturing activities.

EDTA appreciates the subcommittee's support for electric drive and for EERE's Vehicle and Hydrogen and Fuel Cell Technology programs. We respectfully ask that the subcommittee use the funds available in the fiscal year 2009 budget resolution to build on that support and establish the electric drive programs authorized in en-

ergy legislation and to ensure the continuing advancement of electric drive technology.

PREPARED STATEMENT OF GE ENERGY

The following testimony is submitted on behalf of GE Energy (GE) for the consideration of the subcommittee during its deliberations regarding the fiscal year 2009 budget requests for the Department of Energy (DOE). Among GE's key recommendations are: (1) support for the $241.6 million funding request for the Nuclear Power 2010 program to develop new U.S. nuclear generation; (2) $40 million in added funding for the GNEP program, for total funding of $341 million, to start the necessary activities for technology demonstration and to help industry provide DOE with the information necessary to support the 2008 Secretarial Record of Decision; and (3) $27 million additional for the Advanced Turbines program, DOE's major research effort focusing on gas turbines for electricity production which also addresses key needs for hydrogen turbines. Investments in these and the other important programs discussed below will help to meet the challenges of assuring a diverse portfolio of domestic power generation resources for the future.

NUCLEAR ENERGY

Nuclear Power 2010.—The NP2010 Program provides vital funding in three areas that are essential to the development of new nuclear generation capacity in this country. The program provides support for: (1) certification of new reactor designs, such as GE's advanced light water reactor technology (ESBWR); (2) advancement of detailed design and deployment planning to support new nuclear plant construction; and (3) preparation, submittal and NRC approval of two Combined Construction and Operating Licenses (COL). These activities are currently advancing with co-funding support from GE-Hitachi Nuclear Energy (GEH) and Westinghouse. Adequate DOE funding in fiscal year 2009 is necessary to maintain the schedules supporting certification, COL license approval and construction initiation.

The administration has requested $241.6 million for fiscal year 2009 to support the NP2010 Program. GEH supports this funding level, which reflects the additional funding needed above initial estimates to facilitate continued ESBWR detailed design and deployment activities at levels that support industry expectations.

Among other things, funding is needed to support critical detailed design activities including piping and instrumentation diagrams development, process flow diagrams, system design spec development, 3D pipe routing and pipe stress calculations and the development of procurement specifications for long lead and highly engineered equipment. These detailed design activities are required for advanced module design, simulation assisted engineering, and critical path construction activities. Moreover, these detailed engineering activities are critical to the refinement of the ESBWR capital cost estimate. Deployment planning activities include the development of site utilization plans, crane lift plans, construction execution plans, procurement strategies, warehousing strategies and craft labor planning. These are required to allow the ESBWR to be successfully deployed in the desired timeframe well within the next decade.

The costs to complete these activities have escalated due to a number of contributing factors that have changed versus baseline assumptions made in 2005. These factors include, but are not limited to, NRC rate increases, large volume of additional NRC RAI's (Request for Additional Information), recent changes in regulatory position related to aircraft impact and Human Factors Engineering design process, customer expectations of increased design and COL standardization, and performance of COL compliance reviews. Additionally, higher resource demands from increased industry activity as well as the FOAKE nature of the effort have placed a substantial cost burden on the project. These and other factors have led to significant additional program cost above baseline assumptions. The fiscal year 2009 funding requested by the administration will help offset some of these cost escalations.

The Advanced Fuel Cycle Initiative and the Global Nuclear Energy Partnership (GNEP).—The Global Nuclear Energy Partnership (GNEP), initiated in early 2006, benefits from DOE's research and development work currently conducted under the Advanced Fuel Cycle Initiative (AFCI) and previously conducted in the Advanced Liquid Metal Reactor program (circa 1985 to 1995). GNEP seeks to expand the use of nuclear power in a proliferation-resistant manner, and to use nuclear waste by reducing the long-term radiotoxicity of spent nuclear fuel. The key emphases are on solutions for proliferation resistant fuel separations and long-term nuclear waste reduction.

In support of the broad GNEP goals and to help the DOE prepare for the 2008 Secretarial Record of Decision, DOE in October 2007 issued awards to four commercial teams, including the team led by GEH, for technical and conceptual design studies to provide information on commercial methods that are available to close the fuel cycle. The GEH team has explored the technical and business parameters that could support a viable system in a four-part submittal. The submittal included drafts of a Business Plan, a Technology Development Roadmap, a Conceptual Design and a Communication Plan. The Business Plan explored the current market, examined the financial viability of the Advanced Recycling Center and proposed policy direction for solutions to spent nuclear fuel. The cost and schedule report, a part of the Conceptual Design, served as the bridge between the technical details from the conceptual design and provided key financial input to the Business Plan. The Conceptual Design submittal (approximately 4,000 pages long) demonstrated in-depth knowledge developed during the Advanced Liquid Metal Reactor program, GE-funded programs and our current experience. The Technology Development Roadmap recommended direction on a future research and development program that could be started in fiscal year 2009 to engage U.S. universities and national laboratories that would allow the United States to lead within the GNEP policy framework as well as have better collaborations with foreign governments. Finally, the Communication Plan provided guidance on how the DOE may communicate scientific, technical and practical information related to closing the nuclear fuel cycle.

For fiscal year 2009, an additional $40 million above the administration's budget request, for total GNEP funding of $341 million, is needed. The recommended additional funding should be used to help industry conduct technology demonstration projects, such as the manufacture and demonstration of: (1) key reactor components (e.g., reactor vessel); (2) electrometallurgical based fuel separation; and (3) a reactor and fuel separation simulator. GEH further recommends that adequate funding through the GNEP program be provided to both the U.S. industry and the laboratories for electrometallurgical separations and the PRISM reactor in support of the GNEP policy goals.

FOSSIL ENERGY

Coal is facing a challenging landscape. In anticipation of carbon constraints, coal will require carbon capture and sequestration (CCS) if it is to continue serving as a major national energy resource. It is therefore necessary that the viability and efficacy of CCS be proven at large scale, for multiple projects and over a range of geologic settings. Only a major initiative and investment will provide the necessary confidence for the commercial and public acceptance of CCS. Meeting this challenge will require the combined resources of industry and government at all levels working in partnership.

Financial incentives alone will not be sufficient to achieve the goal of validated and commercially robust CCS. Reducing the risk and time required to identify and characterize potential storage sites, to obtain Federal, State and local government commitments related to long-term liability issues, to conduct the necessary reviews and to complete permitting will also require a substantial effort by all levels of government. The DOE must acknowledge this challenge in all programs related to CCS and provide specific assistance in addressing these issues. For this reason, the commitment of government to assume long-term liability for monitoring and safety of the stored CO_2 should be sought in forthcoming solicitations for CCS development. Without such assurances it is not likely that industry participation will be forthcoming.

FutureGen.—DOE's decision to restructure the FutureGen program correctly targets the deployment of CCS technology at a commercial scale. The proposed restructuring recognizes that carbon capture ready IGCC can be commercially supplied today; GE's commercial 630 MW IGCC plant already is carbon capture ready. To be successful, FutureGen's restructuring must address two overarching needs: (1) validation of CO_2 sequestration at a large scale; (2) in multiple geological settings and (3) demonstration that utility powerplants with carbon capture can be successfully integrated with sequestration. DOE's proposed restructuring can provide the platform to satisfy these needs and thus be a major step forward toward assuring a strong future for coal-based power generation. As the Department further develops the restructured FutureGen program, care must be taken, however, to avoid burdening large-scale CCS projects with unneeded additional complexity and cost. Nothing in the program's new structure should be allowed to divert attention from the central objective of proving that the most challenging goal can be met: that large-scale sequestration is viable and safe.

Clean Coal Power Initiative.—GE supports CCPI and its role in validating and testing advanced technology. With the potential refocusing of FutureGen, that program's function as a platform for introduction and validation of advanced IGCC carbon capture technologies will not be available. CCPI must be ready to serve a larger role in the validation and deployment of those technology advancements that are needed to meet DOE's goal of no more than 10 percent additional cost for CCS. However, mounting multiple projects within the overall anticipated funding of $250 million for Round 3 of CCPI will be challenging. Front-end-engineering and detailed site characterization for a CCS project alone could account for $40–$50 million. After capital expenses for carbon capture equipment and sequestration pipeline and site development, there will be little if any funding remaining for the additional costs of CCS operation needed to validate sequestration capacity. For example, for a single 300 MW IGCC train equipped with carbon capture, the minimum 50 percent capture requirement of CCPI will result in over 1 million tons/year of captured CO_2 with potential annual incremental operating costs as high as $40–$50 million. In recognition of these cost challenges, the expectation for multiple project awards within the available CCPI funding needs to be reassessed.

IGCC.—With its pre-combustion carbon capture, IGCC provides a significant advantage over combustion technology. Despite its current 20 percent cost premium over pulverized coal combustion, IGCC can provide a lower cost of electricity with carbon capture. However, it should be recognized that IGCC is still in an early phase of commercial deployment and at the very beginning of a steep cost learning curve. Investment in technology development promises to have a high return.

DOE's goal of a maximum 10 percent premium in cost of electricity for IGCC with carbon capture will not be met with current technology. It will require technology advancements. Key technology areas that can significantly lower cost and improve performance are advanced carbon shift, CO_2 capture and separations, overall process efficiency plus advancing IGCC's capability for subituminous coals. Therefore we strongly endorse the administration's request to increase fiscal year 2009 funding for IGCC by $15.5 million over the fiscal year 2008 level to $69 million.

In addition, cost reduction must be pursued vigorously for IGCC to realize its potential in maintaining coal competitiveness in a carbon-constrained environment. From this perspective, the clearest and quickest path to reducing the cost of carbon capture is the accelerated deployment of IGCC and elimination of its cost premium. In order to achieve this, we recommend a continuation and broadening of the investment tax credits under the Energy Policy Act of 2005 from 6 to 12 IGCC projects and covering a scope that helps to offset both the cost premium of IGCC as well as the incremental cost of carbon capture.

Carbon Sequestration.—GE also endorses the administration's requested technology funding increase of $30 million from fiscal year 2008 levels to $149 million for carbon sequestration. Research in sequestration needs to move forward as rapidly as possible. A primary focus needs to be the development of science-based requirements for site characterization, monitoring and CO_2 quality. Advancements in these areas are necessary to guide commercial-scale sequestration. The DOE also needs to quickly move forward with the demonstration programs authorized under section 702 of the Energy Independence and Security Act of 2007 in order to apply and gain experience with modeling, monitoring and rapid sequestration site characterization.

Advanced Turbines.—GE recommends that funding be increased by $27 million to a total of $55 million for the Advanced Turbines Program. This program represents the Department's high priority research effort focusing on the development of enabling technologies for high efficiency hydrogen turbines for advanced gasification systems. Gas turbine R&D is focused on advanced combustion and high temperature turbine technology for syngas/hydrogen fuels that will result from IGCC and carbon capture type power plants. The program addresses those gas turbine elements where the technology required for the use of syngas/hydrogen fuels differs from the requirements for natural gas fueled gas turbines. Development of these technologies will help offset some of the efficiency and output penalties associated with CO_2 capture. Unless the fiscal year 2009 budget for the Advanced Turbines program is increased, funding will be inadequate for this promising high priority work, and the progress and benefits of this research will be delayed accordingly.

PREPARED STATEMENT OF THE ENERGY COMMITTEE OF ASME'S TECHNICAL COMMUNITIES

Mr. Chairman and members of the subcommittee, the ASME Energy Committee is pleased to provide this testimony on the fiscal year 2009 budget request for research and development programs in the Department of Energy (DOE).

INTRODUCTION TO ASME AND THE ASME ENERGY COMMITTEE

The 127,000-member ASME is a nonprofit, worldwide professional, educational and technical Society. The Energy Committee of ASME's Technical Communities comprises 30 members from 17 divisions of ASME, representing approximately 40,000 of ASME's members.

ASME has long advocated a balanced energy supply mix to meet the Nation's energy needs, including advanced coal, petroleum, nuclear, natural gas, biomass, solar, wind, hydroelectric power, and energy efficient building and transportation technologies. Sustained growth will also require stability in licensing and permitting processes not only for power stations but also for transmission and transportation systems.

Over the past few years, concerns have been growing among policymakers and the general public about adverse security and environmental impacts resulting from America's dependence on foreign sources of oil and gas. As a result, the current administration and Members of Congress have made calls to diversify our energy supply and increase R&D on advanced energy technologies. The Energy Committee fully supports their efforts.

A forward-looking energy policy will require enhanced, sustained levels of funding for R&D as well as Government policies that encourage deployment and commercialization. The Energy Committee supports much of the fiscal year 2009 budget request, especially the increases in funds for fundamental scientific research. We wish to emphasize that increased funding in all areas is essential to meeting our national energy needs.

CRITICAL ISSUES

The Energy Committee would like to point out some critical energy issues:

—There is a critical worldwide shortage of trained persons in the work force at all levels. This includes persons in the building trades, persons in the manufacturing industry, persons who will be available to operate and maintain the energy systems, and engineers and scientists at all levels who will perform the R&D and design functions for all energy systems.

—International programs in energy are growing and will continue to do so in order to make use of shared resources. The International Thermonuclear Experimental Reactor (ITER) and the Global Nuclear Energy Partnership (GNEP) programs are examples of this. The ITER program includes seven international partners and the GNEP program now includes 21 countries. Consistent and sustained funding is required to demonstrate that the United States is a reliable partner in these efforts.

—Investment guarantees for construction of new renewable and nuclear facilities were enacted in previous energy legislation. These guarantees will enable lower financing costs for a variety of energy technologies leading to lower energy costs for the American public. Extending these programs further into the future will allow a reasoned rate of increase in construction and application of these technologies for electric generation.

FOSSIL ENERGY

The fiscal year 2009 budget request of $754 million for fossil energy represents an increase of $11 million over the fiscal year 2008 appropriation. The Energy Committee supports the increase in coal research programs to $624 million. The effective use of coal in today's environment demands an increase in efficiency and a decrease in release of environmentally harmful emissions. The Energy Committee agrees with the DOE in its efforts to build IGCC plants by providing funding for the addition of CCS technology to multiple plants that will be operational by 2015. This approach builds on technological R&D advancements in IGCC and CCS technology achieved over the past 5 years.

The use of advanced integrated gasification combined cycle technology and carbon sequestration may allow the United States to utilize its coal resources in a more environmentally sound and cost effective manner. We encourage strong and consistent funding for these programs now and in future years.

ADVANCED FUELS RESEARCH

The Energy Committee agrees that the advanced fuels research should be aimed at fuels used in the transportation system. We believe that the development of transportation fuel systems that are not petroleum based is a critical part of our future national energy policy. The fiscal year 2009 budget for biomass and bio-refinery systems R&D is increased by $27 million to $225 million. The Energy Committee encourages Congress to ensure that these research programs continue to receive adequate funding. We are also pleased to see the increase to $221 million in the effort related to vehicle technologies with a program emphasis on plug-in hybrid electric vehicles.

NUCLEAR ENERGY

The Energy Committee is encouraged to see the increase in the DOE Nuclear Energy budget to $1.4 billion in fiscal year 2009. Nuclear power, as a non-greenhouse gas-emitting resource, is a critical component of a diverse U.S. power generation mix and should play a larger role in the Nation's base power supply.

Proposed increases in the Nuclear Energy Budget are most evident in the Nuclear Power 2010 program with an increase of $108 million and the Advanced Fuel Cycle Initiative with an increase of $122 million over the fiscal year 2008 Appropriation. The Energy Committee believes that nuclear generated electricity is important to the Nation, especially in a more carbon conscious environment. Therefore continued R&D looking at advanced nuclear systems is critical.

The GNEP program is vital to the international future of nuclear energy. Agreements are already in place to establish cooperative efforts. The U.S. based R&D elements of this program are now part of the Advanced Fuel Cycle Initiative. The Energy Committee concurs with the DOE goal to establish a full scale demonstration of the required facilities, including a burner reactor and fuel recycle plant that will not produce a pure plutonium product stream. The successful implementation of the GNEP initiative will lead to a minimization of high level nuclear waste, enhance the safeguarding of nuclear materials by keeping them in the reactor fuel cycle, lead to an effective and efficient use of all the potential energy contained in uranium and allow cost effective generation of electricity.

The university reactor assistance and education assistance program has been successfully integrated into other programs within the Nuclear Energy budget. The Energy Committee supports the continuation of this change.

ENERGY EFFICIENCY AND RENEWABLE ENERGY

The Office of Energy Efficiency and Renewable Energy (EERE) manages America's investment in research, development and deployment of the Department of Energy's (DOE) diverse energy efficiency and renewable energy applied science portfolio. The fiscal year 2009 request of $1.25 billion provides a balanced and diverse portfolio of solutions to address the urgent energy and environmental challenges currently facing our Nation. Most of the key EERE programs, including Biomass, Building Technologies, Geothermal Energy, Vehicle Technologies, and Wind Energy, have received increases in funding to support the growth of renewable energy that the United States needs. The potential to meet the growing need for domestically produced energy justifies sustained and increased support for these programs.

The Hydrogen Program is reduced $65 million; however, $32 million has been added to hydrogen related activities and funding in the Vehicle Technologies Program. The Energy Committee encourages fully funding the Hydrogen Program as requested and recommends restoring a minimum level of $2 million in funding to the Hydrogen Production and Delivery R&D activity to coordinate efforts with other Hydrogen Production R&D activities in other DOE offices.

The funding to the Water Power Program reflects increasing interest in ocean energy resource characterizations but it neglects the need for sustained support for conventional hydropower R&D. Hydropower is our Nation's largest renewable energy source. This includes pumped storage hydro and repowering existing hydropower facilities with advanced, environmentally benign equipment. The Energy Committee recommends increasing the fiscal year 2009 funding level of the Water Power Program to $10 million to continue supporting development and deployment of advanced conventional hydropower and ocean energy technologies.

The integration of renewable electric generating systems into the operation of the electricity distribution system is critical to economic operation of these systems. The Energy Committee believes that R&D related to the integration of the electric grid and its control as a national system is imperative to the growth of renewable energy generating technologies and we encourage full funding for such research.

SCIENCE AND ADVANCED ENERGY RESEARCH PROGRAMS

The Energy Committee is pleased by the increased request for the Office of Science (OS), $4.72 billion or $749 million over the fiscal year 2008 appropriated amount, which attempts to restore the funding trajectory mandated in the America Competes Act of 2007 (Public Law 110–69). OS programs in high energy physics, nuclear physics, biological and environmental research, basic energy sciences, and advanced scientific computing, serves every student in the country. These funds support research at the DOE Laboratories and at a large number of universities and colleges. We believe that basic energy research will also improve U.S. energy security over the long term, through its support for R&D on cellulosic ethanol, advanced battery systems, and fusion.

Of the fiscal year 2009 requested increase, $214 million is for the ITER fusion energy international agreement taking place in Cadarache, France. This program did not receive funding in fiscal year 2008. The Energy Committee is encouraged by this cooperative agreement and the enormous potential it holds.

The Energy Committee would like to impress upon the members of this subcommittee and their colleagues that high energy physics and nuclear physics programs are very important to all branches of engineering. The information gathered allows the development of data related to material formation and failure which guides the selection of materials for many day to day applications.

OTHER DOE PROGRAMS

DOE is also very active in areas outside of R&D. The environmental remediation program that funds the decommissioning and decontamination of old DOE facilities is one such program. The Energy Committee questions the advisability of the budget decreases in this program. Congress should appropriate the budget to ensure that this work is accomplished in an expeditious manner.

CONCLUSION

Members of the Energy Committee consider the issues related to energy to be one of the most important issues facing our Nation. The need for a strong and coherent energy policy is apparent. We applaud the administration and Congress for their understanding of the important role that scientific and engineering breakthroughs will play in meeting our energy challenges. In order to promote such innovation, strong support for energy research will be necessary across a broad portfolio of technology options. DOE research can play a critical role in allowing the United States to use our current resources more effectively and to create more advanced energy technologies.

Thank you for the opportunity to offer testimony regarding both the R&D and other parts of the proposed budget for the DOE. The ASME Energy Committee is pleased to respond to additional requests for additional information or perspectives on other aspects of our Nation's energy programs.

PREPARED STATEMENT OF THE STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES

Dear Chairman Dorgan and Subcommittee on Energy and Water Development, I appreciate this opportunity to provide testimony outlining the urgent need for energy-related research and resource assessment in Alaska. Specifically, scientific work performed and funded in Alaska through the U.S. Department of Energy provides an invaluable service to the Nation by helping address energy security and development of technologies for the challenges unique to the Arctic. Alaska is one of the few places in the United States where the scientific unknowns are so ubiquitous, and the task so daunting, that Federal and State agencies seldom compete for the most high profile projects; there are too many to go around. In fact, we compliment each other's efforts in an attempt to tackle the many challenges that face us all. The Office of Fossil Energy, National Energy Technology Laboratory (NETL) Arctic Energy Office, plays a critical role in this collaborative effort.

Federal land-management responsibility in Alaska is significant. Although final conveyances are not complete, the current Federal land allotment stands at 243 million acres, or about 64 percent of the total Alaska land surface. The State of Alaska manages about 24 percent, or 90 million acres, and the Native corporations about 10 percent. Additionally, the energy potential in offshore Alaska Federal waters dwarfs nearly all other areas in North America. Those regions are now becoming the next global exploration frontiers of major international oil and gas companies. For example, the most recent lease sale, in the Chukchi Sea, astounded even the

most optimistic of explorationists by the bonus bids that were recorded ($2.6 billion). Many of the geologic attributes that were targeted by the bidding extend onshore to the east into the National Petroleum Reserve Alaska (NPRA). Additionally, the formidable challenges that will be faced to safely bring any discovered commodities to market will require the collaboration of many entities.

Arguably, Alaska has the greatest potential for undiscovered conventional resources of any area in the United States. Current mean-case technically recoverable resource estimates (calculated by the U.S. Geological Survey for on-shore basins and Minerals Management Service for offshore Alaska basins) stand at 200 trillion cubic feet of natural gas potential, and 46 billion barrels of oil. These probabilistic estimates are for undiscovered conventional resources only, and do not include the vast amount of natural gas in unconventional reservoirs such as gas hydrates, coalbed methane, shale-bed gas, and low permeability reservoirs. Additionally, Alaska contains the largest reserves of coal in all of the United States. Given that fossil energy will realistically play a key role in the energy portfolio of America for the foreseeable future, it is imperative that "all hands remain on deck" and agencies like the NETL Arctic Energy Office remain in full functional operation. The alternative will only put us farther behind and even more dependent on the volatilities of the global energy market.

The many important projects being managed from the NETL Arctic Energy Office attest to the critical role they play. Programs that collaborate with other agencies and address key aspects of national energy supply, Arctic engineering, environmentally sensitive exploration and development technologies, and rural energy supply will not be fully realized without committed and long-term participation by the Federal Government. The State of Alaska is rightfully spending hundreds of millions of dollars on these efforts, but we cannot do it alone.

Many changes are needed in the national energy policy, including a focus on and facilitation of dramatic conservation efforts, development of non-fossil energy sources that make environmental and economic sense, technological development for better use of fossil fuels, and continued pursuit of new conventional and unconventional reserves. Nevertheless, whether or not we stand ready, energy demand in the United States is forecast to increase by 19 percent by the year 2030. Even more alarming, global demand for energy is forecast to increase by 57 percent in that same time period. We shall either prepare for the inevitability of dwindling resources, shrinking supply and shortfall, and increasing dependence on foreign energy resources, or pray this calamity is not upon us and continue to cut budgets and hope that a miracle is "just around the corner." I believe we should spend the capital to prepare now.

Thank you for your consideration of this important issue.

PREPARED STATEMENT OF THE ASSOCIATION OF STATE ENERGY RESEARCH AND TECHNOLOGY TRANSFER INSTITUTIONS (ASERTTI)

Mr. Chairman and members of the subcommittee, I am David Terry, Executive Director of the Association of State Energy Research and Technology Transfer Institutions (ASERTTI). ASERTTI is submitting this testimony in support of funding for a variety of U.S. Department of Energy programs. State and local governments host a wide range of public interest energy organizations, including State research and technology transfer institutions, municipal energy organizations, land grant colleges, universities, and others. The members of ASERTTI focus on State- and local-level public interest, applied clean energy research and technology transfer. Our work aims to develop and improve clean energy technologies, rapidly transfer those technologies to the private sector, and aid in the transformation of markets. ASERTTI promotes and facilitates communication and collaboration in the above-mentioned areas among its State and local members, as well as with other organizations, such as the U.S. Department of Energy (DOE) National Laboratories. Each year, our members invest hundreds of millions of dollars in State and local energy funds. We believe improved collaboration with our Federal partners would significantly leverage our efforts and State funds—improving our Nation's energy future. In this regard, ASERTTI wishes to highlight a number of funding priorities, as follow, within DOE's Office of Energy Efficiency and Renewable Energy (EERE) programs for the Industrial, Building, and Vehicle Efficiency Technologies, as well as for the Biomass, Solar, and Weatherization Assistance Programs.

INDUSTRIAL TECHNOLOGIES

The administration's fiscal year 2009 budget request would cut the Industrial Technologies Program by $2.3 million, compared with fiscal year 2008, and contains

cuts in several very important programs. Following are ASERTTI's priorities within the Industrial Technologies Program.

Industrial Assessment Centers (IAC).—The IACs are part of the industrial program's crosscutting budget. The IAC program is unique in that it trains university engineering students in conducting energy audits of small- and medium-sized facilities and, in so doing, helps the facilities identify and implement energy saving measures. We recommend that the program be restored to fiscal year 2006 funding levels of $6.4 million in fiscal year 2009, with additional increases in funding and in the number of centers in future years. This is $2.4 million above the fiscal year 2008 funding level.

Distributed Generation (DG/Distributed Energy).—Over the past decade, this program area has played a key role in the development of high-efficiency clean technologies like combined heat and power (CHP). These activities were moved around within DOE between EERE and the Office of Electricity. For fiscal year 2008, Congress appropriated $14.5 million for these activities. However, the administration's fiscal year 2009 request is only $1.5 million. The program is now part of the crosscutting piece of the Industrial Technologies Program. ASERTTI recommends a robust funding increase over the fiscal year 2008 appropriated level for Industrial DG.

Within this DG (or DE) program, it is especially important to restore critical Centers that have become the cornerstone for regional DG activities, providing technical assistance and becoming involved in State and local interconnection and emissions issues—greatly leveraging Federal, State, and private resources. Section 451 of the recently enacted Energy Independence and Security Act of 2007 expands these Clean Energy Application Centers (formerly Regional Application Centers) and authorizes $10 million for fiscal year 2009. ASERTTI strongly supports this authorization level. These Centers also would support market transformation activities to facilitate deployment and help reduce regulatory and institutional barriers. The Centers also would encourage public private partnerships to achieve these goals. Efficiency can be as high as 85 percent in CHP applications when compared to central station power generation efficiencies of 30–55 percent. These activities are estimated to contribute as much as 11 trillion BTUs of displaced energy and 0.2 MMTCE in carbon savings in 2020.

Industrial Best Practices.—This is one of DOE's most effective industrial energy programs. ASERTTI urges strong support for this program and recommends funding it at the administration's fiscal year 2009 request level of $15.5 million.

Industries of the Future (specific).—This valued program enables cost-shared research with industry at major State and local research institutions. The program focuses on energy-intensive industries such as steel, aluminum, glass and metal casting. This program was reduced from $63 million in fiscal year 2002 to $11 million in fiscal year 2008. The administration's fiscal year 2009 request of $11.4 million represents a cut over the previous year, since most research funding is multi-year, and funding from earlier years is not being replaced. Moreover the glass portion of the program has been eliminated. Congress authorized an expanded Energy-Intensive Industries program under the Energy Independence and Security Act focused on industry-specific research. This program authorized a focused approach that responds to the needs of individual industries and requires their long-term commitment. To begin implementing this approach, ASERTTI recommends fiscal year 2009 funding of $24.2 million—$12.8 million above the administration's $11.4 million request.

BUILDING TECHNOLOGIES

Zero Energy Commercial Buildings Initiative.—The buildings sector in the U.S. accounts for about 40 percent of total energy consumption and 40 percent of carbon dioxide emissions, and nearly half of those emissions and of that consumption comes from commercial buildings. A large multi-year initiative is critical to achieve deep savings throughout the commercial buildings sector. This public-private collaboration will combine RDD&D, as well as better tracking of real energy performance, strategic research, and a market transformation plan. This newly-authorized program will be run by DOE with input from an industry consortium and is a priority for ASERTTI. Thus, ASERTTI recommends $20 million in fiscal year 2009 to fund this new Initiative, in addition to the administration's request of $13 million for the existing Commercial Buildings Integration program, for a total of $33 million for these activities.

Building Application Centers.—It is critical to ensure that technologies developed under various building research programs make it into the marketplace. This important initiative within Building Technologies consists of a regional approach to transferring technologies to the marketplace by providing hands-on, cost-shared technical

assistance to builders, communities, and others. This approach has substantial State, local, and private support and is delivering results. To date, only two regions have been provided funding to move emerging technologies from the laboratory into the marketplace. ASERTTI urges the subcommittee to encourage DOE to expand and support these Centers in each region of the Nation.

VEHICLE TECHNOLOGIES

In the fiscal year 2009 budget request, the administration has proposed a variety of cuts to important vehicle programs—relative to fiscal year 2008 levels for the combined Vehicle and Hydrogen budgets—that would help save energy at a time of record-high gasoline prices and would help reduce greenhouse gas emissions. ASERTTI's priorities are as follows:

Hybrid Electric Systems.—The Vehicle and Systems Simulation and Testing activity relates in part to heavy vehicle systems optimization R&D, which warrants greater attention. The administration's proposed reduction in funding for this activity is a concern. ASERTTI recommends that $7.1 million be restored to Vehicle and Systems Simulation and Testing, which would restore funding for this effort to $28.2 million. Furthermore—and quite critically—energy storage efforts must be accelerated. ASERTTI therefore recommends that the Energy Storage R&D activity be funded at $59.5 million, an increase of $10 million above the administration's request for R&D efforts focused on electric, hybrid, and plug-in hybrid vehicle battery storage capabilities.

Following on from these activities, State and local energy institutions together with DOE created the Nation's first demonstration fleet of plug-in hybrid electric school buses. More than one dozen of these buses are now transporting students to and from schools around the Nation. ASERTTI urges the subcommittee to provide plug-in hybrid deployment funds for heavy duty vehicles to both expand the early adoption of these breakthrough vehicles and to support ongoing incremental improvements that will create a self-sustaining market for these "lead by example" buses. The market for plug-in hybrid school buses offers a means to reduce harmful air and greenhouse gas emissions, and the opportunity to create niche markets in the public sector that can grow into commercial opportunities that transform the market. These heavy duty plug-in hybrid applications are critical to meeting the Nation's energy and climate goals.

BIOMASS PROGRAM

ASERTTI Supports the Administration's Fiscal Year 2009 Request of $225 Million.—To this end, ASERTTI urges the subcommittee to support funding that targets regional coordination of biomass research, demonstration, and technology transfer programs that emphasize the alignment of State and Federal resources. Currently, little attention or funding is provided to achieve joint State-Federal coordination in this critical research area. We believe the Nation could reach the goal of cost-competitive cellulosic-derived biofuels more rapidly if State and Federal research and demonstration resources were better aligned. ASERTTI also encourages Congress to fund analysis and communication activities that better inform the public about the value of biofuels. ASERTTI urges DOE to substantially increase the RDD&D under this program area for stationary applications, including the development of bio-based products and renewable, pipeline-quality biogas. Energy innovations resulting from ongoing cellulosic RD&D should be leveraged to address stationary application challenges, such as the need to increase yield from anaerobic digesters, improve thermochemical gasifiers, refine renewable gas cleanup for use in both power generation and direct use applications. These stationary applications also have the ability to improve the economics, and further reduce the carbon footprint, of biofuels production.

SOLAR ENERGY PROGRAM

The solar thermal research program is dominated by water-intensive technologies for cooling. It is critical, particularly as water resources are already scarce in some areas, and becoming more so throughout the United States, to focus additional RDD&D efforts on dry cooling systems. ASERTTI urges Congress to restore the Solar Energy Program to at least the fiscal year 2008 appropriated level of $168.5 million, which is $12.4 million above the administration's fiscal year 2009 request of $156.1 million. ASERTTI also strongly recommends that there be a particular emphasis going forward on dry cooling systems.

WEATHERIZATION ASSISTANCE PROGRAM

ASERTTI supports the Weatherization Assistance Program (WAP), as it helps low-income households, the elderly, and the disabled by improving the energy efficiency of low-income housing. Each year the program has exceeded its target and has weatherized approximately 100,000 homes. The program also is reducing energy consumption in participating homes by about 20 percent. Increased funding would allow WAP to expand quickly to reduce energy usage by approximately 25 percent in each assisted home. This represents savings that families can use to pay for other critical needs, while reducing the Nation's energy demand by the equivalent of 18 million barrels of oil every year. The administration's request to eliminate funding for the program should be rejected, and ASERTTI urges the subcommittee to fund WAP at no less than $300 million.

PREPARED STATEMENT OF THE UNIVERSITY CORPORATION FOR ATMOSPHERIC RESEARCH (UCAR)

On behalf of the University Corporation for Atmospheric Research (UCAR) and the university community involved in weather and climate research and related education, training and support activities, I submit this written testimony for the record of the Senate Committee on Appropriations, Subcommittee on Energy and Water Development. We urge you to fund the DOE Office of Science at the requested level of $4.7 billion or higher as authorized by the America COMPETES Act.

UCAR is a 71-university member consortium that manages and operates the National Center for Atmospheric Research (NCAR) and additional programs that support and extend the country's scientific research and education capabilities. In addition to its member research universities, UCAR has formal relationships with approximately 100 additional undergraduate and graduate schools including several historically black and minority-serving institutions, and over 50 international universities and laboratories. UCAR's principal support is from the National Science Foundation with additional support from other Federal agencies including the Department of Energy (DOE).

DOE OFFICE OF SCIENCE

The atmospheric and related sciences community is concerned about the final outcome for basic research in many areas of the fiscal year 2008 Consolidated Appropriations Act, including the DOE Office of Science. We do understand that appropriators were faced with extremely difficult funding choices, but the negative consequences of not investing now in science that contributes to our economy, standard of living, and safety and security, will only multiply in the future as this country's global competitors invest on a broader scale than ever before. We appreciate your support for last year's America COMPETES Act and urge you to reinstate the doubling track for the Office of Science with the fiscal year 2009 budget, and/or with a supplement to the fiscal year 2008 budget.

There will surely be immense budget pressures facing you again in your deliberations this year, but we ask that you focus on science as a national priority. We urge you to fund the DOE Office of Science at the requested level of $4.7 billion or higher as authorized by the America COMPETES Act, ask that you make the Office a national priority when difficult choices have to be made at the end of the budget process, and that you enable the agency to apply the entire appropriation toward planned agency research priorities.

Biological and Environmental Research (BER)

Within the Office of Science, the Biological and Environmental Research (BER) program has as a key goal, the development of knowledge necessary to identify, understand, and anticipate the potential health and environmental consequences of energy production and use. These are goals that are essential to our country's well being and security. Peer-reviewed research programs at universities, national laboratories, and private institutions play a critical role in the BER program by involving the best researchers the Nation has to offer, and by developing the next generation of researchers. All BER research projects, other than those that have been in the "extra projects" category, undergo regular peer review and evaluation.

I urge the subcommittee to fund Biological and Environmental Research at the level of the fiscal year 2009 budget request, $568.9, a 4 percent increase over the fiscal year 2008 level, and to enable BER to apply that entire amount toward planned agency research priorities that are peer-reviewed and that involve the best

researchers to be found within the Nation's university research community as well as the DOE labs.

BER's Climate Change Research Program

Within BER, the Climate Change Research subprogram addresses some of the most critical research priorities facing the world today including developing the ability to predict climate change and its impacts on global and regional scales, exploring the impacts of high levels of CO_2 on the Earth system, and providing the scientific foundation necessary to help mitigate those impacts.

One example of the compelling work being done is a BER contribution to the International Polar Year (IPY) utilizing the Community Climate System Model to simulate eight future emission scenarios. The results projected a decline in sea ice, with one scenario showing the Arctic becoming ice-free in summer at the end of this century—an occurrence that could change sea level, economies, world trade, and political stability. Such advanced modeling activities supported by the BER Climate Change Research are obviously critical to our understanding of the current global climate and areas that are being transformed by rapid change, but they are also critical to our understanding of what a changed world may look like in the very near future.

In 2009, Climate Change Research funded work will continue to focus on resolving the role of clouds and aerosols in climate change and their interaction with solar radiation. While great progress has been made in recent years, this remains one of the greatest scientific uncertainties in climate change prediction. As we learn more about climate change and the anthropogenic influences that are forcing change at an unnatural rate, those results must be made accessible to researchers working to understand the regional and local impacts that climate change will produce. A new Climate Change Research effort is strengthening the connections between the climate modeling research communities and those that address integrated assessment of impacts in addition to exploring adaptation methods. To be of use at regional scales (where details make tremendous differences at local ecosystem levels where we all live), models must be resolved at ever higher resolutions to project local impacts with any reasonable certainly. Running models at these resolutions presents complex problems of data retrieval, archiving, analysis, and dissemination for which BER is developing the tools and capabilities necessary.

The Climate Change Research goal to deliver improved regional climate data and models is critical to the ability of policy makers and stakeholders to provide stewardship resulting in a healthy planet—and it is particularly important as signs of increasingly dramatic change in our climate and environment continue to appear.

The Climate Change Research Request of $154.9 million for fiscal year 2009 is a 13.2 percent increase over fiscal year 2008 which will make up some of the ground lost in previous years. Within this amount, Climate Change Modeling receives $45.4 million—a critical 46 percent increase over fiscal year 2008. These additional resources are absolutely necessary for the work that must be accelerated at the regional level. I urge the subcommittee to fund Climate Change Research at the fiscal year 2009 requested level of $154.9 million, and to enable DOE to apply the entire amount toward planned national research priorities.

Advanced Scientific Computing Research (ASCR)

Within DOE's Office of Science, Advanced Scientific Computing Research (ASCR) delivers leading edge computational and networking capabilities to scientists nationwide, enabling advances in computer science and the development of specialized software tools that are necessary to research the major scientific questions being addressed by the Office of Science. Development of this capacity is a key component of DOE's strategy to succeed in its science, energy, environmental quality, and national security missions.

ASCR's continued progress is of particular importance to atmospheric scientists involved with complex climate model development, research that takes enormous amounts of computing power to address the interaction of the earth's systems and global climate change. ASCR is one of the most important resources supporting climate work in this country.

Within ASCR, several programs are of particular importance to climate change computer modeling work, particularly through the development of complex software. The Leadership Computing Facility (LCF) at Oak Ridge National Laboratory (ORNL) provides a high performance computing resource and, in 2009, will continue the development of its world class facility with over 80 percent of its resources being made available to unclassified scientific research. In addition, the National Energy Research Scientific Computing Center (NERSC) operated by Lawrence Berkeley National Laboratory, and the Energy Sciences Network (ESnet) are also important

enablers for climate research, as is Argonne National Laboratory (ALCF) which is strengthening its infrastructure to prepare for future computing capacity. These computational and networking resources play a vital role in the progress of U.S. climate research.

The high performance computing facilities for the Office of Science serve thousands of scientists throughout the country at laboratories, universities, and other Federal agencies. Computing time is awarded to research groups based on peer review of submitted proposals. Basic research accomplished at these facilities covers a wide range of disciplines including climate modeling. ESnet enables researchers at laboratories, universities and other institutions to communicate with each other using collaborative capabilities that are unparalleled. This high-speed network enables geographically distributed research teams to collaborate effectively on some of the world's most complex problems. Researchers from industry, academia and national labs, through this program, share access to unique DOE research facilities, support the frequent interactions needed to address complex problems, and speed up discovery and innovation.

LCF, NERSC, and ESnet play complementary roles in advancing the complex and challenging science of climate change and other scientific areas of extreme importance to the security and quality of life of our citizens. I urge the subcommittee to support the President's fiscal year 2009 request of $368.82 million for DOE Advanced Scientific Computing Research, a 5 percent increase over fiscal year 2008, and to enable DOE to apply the entire amount toward planned national priorities.

Scientific Discovery Through Advanced Computing (SciDAC)

BER and ASCR (through its Computational Partnerships program) partner to support Scientific Discovery Through Advanced Computing (SciDAC), a progressive program that provides the innovations in computational research and development for petascale computational and data management endeavors, including climate research. Along with very broad scientific applications, a current SciDAC goal is to break through the uncertainty still challenging researchers concerning the role of clouds and aerosols in climate change. Additional SciDAC investments address the role of land-ice in the climate system, improved representation of ice sheets in global circulation models, and understanding of climate extremes in a changing climate. Much of the research is designed to provide global community access to the data for impact studies as well as national and international assessments (e.g., the Intergovernmental Panel on Climate Change) concerning the consequences of global warming. This work is becoming increasingly critical as evidence mounts that regions of Earth are warming at an alarming rate. SciDAC research activities are competed through a merit review process and carried out via a synthesis of talent drawn from universities, national laboratories, and private institutions.

BER funding for SciDAC is requested at $7.7 million for fiscal year 2009 with ACSR supporting SciDAC Computational Partnerships at $52.0 million. I urge the subcommittee to support the President's fiscal year 2008 requests within BER and ASCR for overall SciDAC funding.

PREPARED STATEMENT OF RTI INTERNATIONAL

I am writing in support of the following subprogram in the fiscal year 2009 Energy and Water appropriations measure: Department of Energy—Fossil Energy Research and Development: Coal, Fuels and Power Systems, Advanced Integrated Gasification Combined Cycle.

I respectfully request that the President's $69 million request for the Advanced Integrated Gasification Combined Cycle subprogram be fully funded.

Congress and the administration have highlighted energy as critical to America's economic future and national security. It is all too clear that the United States requires cost-effective technologies for clean use of coal to generate electricity and fuel vehicles, to save jobs, and enable domestic growth in critical industries such as chemicals, fertilizer, pulp and paper, metals, and glass.

Funded by Congress, the Advanced Integrated Gasification Combined Cycle subprogram has a historic opportunity to enable such benefits to be achieved in a manner that is environmentally responsible.

DOE's plans for 2009 include scaling up a new technology that greatly reduces the cost and improves the performance of a crucial step in any clean use of coal: cleaning the synthetic gas—"syngas"—that is made from coal. In every opportunity for clean use of coal, the first steps are to make and then clean the syngas. The new technology, called "warm-gas clean-up," has lower capital and operating costs than existing technologies, and does a better job of removing pollutants. This tech-

nology meets or exceeds requirements in the Energy Policy Act of 2005 for reduced sulfur and mercury emissions, contributes to meeting the EPACT's requirements for efficiency, and enhances the opportunity for carbon capture. Furthermore, this technology provides 10 percent greater efficiency compared with current technologies for generating electricity from coal, which causes a 10 percent reduction in carbon dioxide emissions without additional costs or equipment.

The administration has included sufficient funds for DOE's plans to scale up this syngas-cleaning technology. DOE's plans are well-timed, because there is substantial industry interest in scaling up the technology.

Time is of the essence to lower the costs of gasification. Worldwide, electric utilities, chemical companies, and other industries are making decisions today about how they will use coal in the near future. Better technology at lower costs will enable expanded use of gasification, with all of its environmental benefits, instead of conventional approaches. For example, gasification for generating electricity emits less carbon dioxide than conventional power plants. Warm-gas clean-up prevents acid-forming pollutants without the solid waste and carbon dioxide problems that come with scrubbing sulfur from power plants' emissions. Further, warm-gas clean-up enables a cleaner syngas, which means cleaner exhaust gas from the electric generating turbine at greater thermal efficiency. That in turn yields benefits such as significantly reduced cost to capture carbon (and the EPA already notes that carbon capture will be much less costly with gasification than with conventional power plants).

To realize the environmental and economic benefits of gasification, DOE must have sufficient funds to implement the bipartisan intent of Congress expressed in the Energy Policy Act of 2005.

I recognize the constraints by which the subcommittee is bound. I appreciate your consideration of my request that the Advanced Integrated Gasification Combined Cycle subprogram in DOE's Fossil Energy Research and Development be funded at or above the President's $69 million request for fiscal year 2009.

If you have any questions or require additional information, please feel free to contact me. I look forward to working with you as the fiscal year 2009 Energy and Water appropriations bill takes shape.

PREPARED STATEMENT OF FLORIDA STATE UNIVERSITY

Florida State University is seeking $4,000,000 from the U.S. Department of Energy (Electricity Transmission and Distribution) for our Electric Power Infrastructure, Security R&D Program.

Mr. Chairman, I would like to thank you and the members of the subcommittee for this opportunity to present testimony before this subcommittee. I would like to take a moment to briefly acquaint you with Florida State University.

Located in Tallahassee, Florida's capitol, FSU is a comprehensive Research university with a rapidly growing research base. The University serves as a center for advanced graduate and professional studies, exemplary research, and top-quality undergraduate programs. Faculty members at FSU maintain a strong commitment to quality in teaching, to performance of research and creative activities, and have a strong commitment to public service. Among the current or former faculty are numerous recipients of national and international honors including Nobel laureates, Pulitzer Prize winners, and several members of the National Academy of Science. Our scientists and engineers do excellent research, have strong interdisciplinary interests, and often work closely with industrial partners in the commercialization of the results of their research. Florida State University had over $190 million this past year in sponsored research awards.

Florida State University attracts students from every State in the Nation and more than 100 foreign countries. The University is committed to high admission standards that ensure quality in its student body, which currently includes National Merit and National Achievement Scholars, as well as students with superior creative talent. Since 2005, FSU students have won more than 30 nationally competitive scholarships and fellowships including 2 Rhodes Scholarships, 2 Truman Scholarships, Goldwater, Jack Kent Cooke and 18 Fulbright Fellowships.

At Florida State University, we are very proud of our successes as well as our emerging reputation as one of the Nation's top public research universities.

Mr. Chairman, let me summarize our primary interest today.

The electric power system is critical as a fundamental enabling infrastructure for every aspect of the economy, national security, and defense. Large-scale failures in the electrical grid systems of North America and Europe have made us aware of the critical nature of our dependence on the availability of electrical power. A contrib-

uting factor to these failures was a lack of detailed understanding of the system response to an initial minor disturbance. Lack of investment in power systems grids over the last 20–30 years has eroded the redundancy traditionally built into the system. Over time, this lack of investment in R&D resulted in the loss of many power engineering educational programs. The Nation is now facing an acute shortage of power engineers.

This multi-university project will build on existing expertise at FSU, other Florida universities, and several of DOE's National Laboratories. The research conduced will focus on critical issues associated with modernizing the U.S. electric grid to improve reliability, security, and efficiency and to support new technologies. Much of the research will include industrial partners, thereby ensuring rapid technology transfer from research-to-practice. These activities include:

—Employing the real time digital simulator capability at FSU to simulate real-time behavior of regional and local power systems and interconnections and to examine areas of vulnerability to major outages and cascading failures. We plan that this will become a national user facility with remote access capability over high-speed connections.

—Use of the real-time digital simulator through comparisons of concurrent real time modeling and an actual system to assess new technologies.

—Investigation into technology needs for enabling wide area measurement, communications, and control advances for improved coordination over large areas.

—Advanced materials R&D for superconductivity applications in power systems.

Through coordinated efforts across multiple universities, FSU will lead the initiative to address future needs to assure reliable energy. We are seeking $4,000,000 in fiscal year 2009 for this important project.

PREPARED STATEMENT OF THE GROUND WATER PROTECTION COUNCIL

Honorable Chairman Dorgan and members of the subcommittee, the following request by the Ground Water Protection Council (GWPC) is for continued funding in fiscal year 2009, of the U.S. Dept of Energy's Oil Technologies-Effective Environmental Protection: Risked Based Data Management (RBDMS) and Cost Effective Regulatory Approaches (CERA) programs. The request for fiscal year 2009 is at the fiscal year 2008 enacted level of $1.2 million (RBDMS) and $500,000 (Energy Efficiency).

—*RBDMS ACCOMPLISHMENTS.*—Data utilities from the Risk Based Data Management System are installed and under use in 25 States and 1 Indian Nation. The use of RBDMS streamlines State oil and gas permit and response times, enhances ground water protection, provides improved public and industry joint access to data and records, saves money for State and Federal agencies, reduces paper reporting, increases production for small independent domestic operators, and creates real time efficiencies in State and Federal domestic oil and gas programs. Over the life of this successful program, the States have matched Federal funding with their own funds at a 3:1 ratio. If state in-kind contributions are added, the State-to-Federal participation ratio increases substantially. This has been, and continues to be, a sound investment of Federal funds.

Fiscal year 2009 funding would provide:

E-Commerce.—The development of new RBDMS e-commerce applications in fiscal year 2009 will increase environmental monitoring and compliance and at the same time decrease both cost and time allocation for small oil and gas producers. The result is money saved by State governments, Federal agencies and increased domestic oil and gas production.

—*Cost Effective Regulatory Approaches.*—The GWPC will focus on three cost effective priorities: (1) reducing the costs of information exchange between the oil and gas and mining industries and regulatory agencies, (2) eliminating duplicative reporting requirements across State and Federal jurisdictions, while (3) providing the reference data needed to make informed decisions about environmental protection and resource development.

—*Energy-Water Sustainability.*—The USDOE has a goal of minimizing water consumption by energy producing industries. The GWPC will develop applications that will aid State agencies in tracking water quality and quantity data related to oil and gas production. This will assist States in the analysis of related water consumption. Public education efforts through our Ground Water Report to the Nation series will emphasize ground water availability facts and realistic short and long term conservation efforts that can be made locally.

—*CO_2 Geo-Sequestration.*—Capture of CO_2 from power plants is one potential tool for decreasing the release of this gas to the atmosphere. However, storage or sequestration of its liquid form in geologic formations must be done with protection of underground sources of drinking water in mind. The GWPC will continue to work in cooperation with State and Federal agencies to apply sound science in the development of effective regulations, policy and technical guidance, with a focus on protecting the Nation's invaluable ground water resources. With additional funds we would be able to develop a geo-sequestration volume information tracking system.

THE GWPC.—GWPC is a respected national organization of State ground water, UIC, and oil and gas regulatory agencies with a successful track record of providing solutions to ground water protection related issues that are environmentally protective, scientifically based, cost effective and publicly accepted. We are the proud recipient of the Secretary of Energy's "Energy 100 Award"—given to the top 100 most successful and publicly beneficial projects (RBDMS) in the last 30 years of USDOE. We hope the subcommittee will continue to support these efforts in fiscal year 2009 at the fiscal year 2008 level of $1.2 million (RBDMS) and $500,000 (Energy Efficiency).

We are grateful for your past support and would like to also request that the subcommittee continue to support the USDOE Office of Fossil Energy, and the National Energy Technology Lab (NETL). Without their national presence not only our successes, but those of many others would not have been accomplished. The programs they administer serve a valuable purpose and are important to the long term efficiency of the front line State and Federal agencies and the small domestic operators who would not otherwise have been able to extend the life of domestic reservoirs and increase environmental and ground water protection at the same time.

PREPARED STATEMENT OF THE NATIONAL HYDROPOWER ASSOCIATION

The National Hydropower Association (NHA)[1] appreciates the opportunity to submit this statement regarding hydropower funding priorities for the fiscal year 2009 appropriations budget cycle. NHA requests $54 million in fiscal year 2009 Energy & Water Appropriations for the Department of Energy's Waterpower Program.

HYDROPOWER'S CURRENT AND FUTURE POTENTIAL AS THE NATION'S MOST ROBUST, RENEWABLE ENERGY RESOURCE

Congress is currently examining the implications of climate change on the environment, economy, and energy security of the United States. Crucial to the climate debate is the need for policymakers to work together to promote the development, deployment and expanded use of existing renewable resources, as well as innovative new technologies, that can play a significant role in addressing climate issues while maintaining a reliable and affordable electricity supply system. Hydropower of today and new water power technologies of tomorrow can provide significant benefits to these national energy and environmental goals.

Currently, hydropower provides sizeable benefits. As the leading renewable energy resource in the country, it accounts for 7 percent of all of the Nation's electricity in terms of actual generation and approximately 9 percent in terms of actual capacity. Overall, hydropower accounts for 77 percent of actual renewable electricity generation and 83 percent of the Nation's renewable energy capacity.

As an important source of electricity, hydropower offers advantages over other generation options. Importantly, hydroelectric units are able to start, stop, and change output quickly, which provides important grid stability and reliability benefits. As such, hydro has the ability to firm intermittent resources such as wind and solar, a benefit which becomes all the more important as the Nation moves to incorporate more renewables in its energy portfolio. Finally, hydropower's non-power benefits include water supply, flood control, irrigation, navigation and recreation.

Hydropower's potential contribution is notable—from efficiency improvements and capacity upgrades at existing projects, to new development at existing non-powered dams, to significant new capacity gains from emerging waterpower technologies, such as ocean, tidal and instream hydrokinetic projects. According to a March 2007 Electric Power Research Institute (EPRI) report titled, "Assessment of Waterpower Potential and Development Needs," the potential for increases in capacity, mostly without the need to build dams, is conservatively estimated at 23,000 MW by 2025,

[1] NHA is a non-profit, national trade association dedicated to promoting the Nation's largest renewable resource and advancing the interests of the hydropower and new ocean, tidal and instream hydrokinetic industries and the consumers they serve.

with an overall estimate of 85,000 to 95,000 MWs with appropriate public policy support. This includes:

—2,300 MW capacity gains at existing conventional hydropower facilities;
—5,000 MW of new conventional hydropower at existing non-powered dams;
—2,700 MW of new small and low head power conventional hydropower (<30 MW installed capacity);
—10,000 MW from ocean wave energy technologies; and
—3,000 MW from hydrokinetic technologies (river-based).

Realization of these capacity gains will require continued and increased research, development, demonstration and deployment (RDD&D) support and other economic incentives as well as planning, testing and impact evaluation assistance. As stipulated in EPAct 2005, the Secretary of Energy is required to conduct R&D for conventional and new waterpower technologies.[2]

NHA'S STATEMENT REQUESTS FULL FUNDING OF THE SUITE OF INITIATIVES IDENTIFIED IN THE EPRI REPORT UNDER THE DEPARTMENT OF ENERGY'S NEW WATERPOWER R&D PROGRAM AT A LEVEL OF $54 MILLION PER FISCAL YEAR

Waterpower Technology Development Needs

Through direct contact with NHA members, which include hydropower owners and operators, ocean, tidal and instream hydrokinetic technology developers, and the analysts and experts cited in the EPRI report, NHA analyzed the report's suite of development recommendations and concluded that the EPRI report provides a useful model, a roadmap from which to guide activities under the DOE Waterpower R&D program. As such, this statement highlights and summarizes the various R&D initiatives outlined in the report. These directives are intended to address the needs left unfunded by the previous RDD&D program for hydropower and would expand the Department's efforts.

Waterpower Realization Committee.—To provide the initial guidance and future oversight to benchmark results of the RDD&D program in terms of real waterpower capacity and generation gains. This committee, made up of representatives from industry, government resource agencies and non-governmental organizations would guide RDD&D efforts and monitor progress to ensure the realization of the capacity gains. The committee would measure on an annual basis the capacity gains from the various initiatives and make recommendations for refinement of the program, as necessary.

Waterpower Performance Initiatives.—The suite of activities and programs available to meet the goals of the program are outlined below.

Advanced Water Energy Science

Statement of Need.—The industry has identified the need for advanced scientific techniques to support the following activities:

—*Advance Water Energy Science*
  —Work that would support the industry's need to better predict flow measurement. Accurate flow values are needed for a variety of operation and environmental performance topics.
  —Modeling work to improve hydraulic modeling techniques.
  —Turbine research in order to develop better materials resistant to cavitation and erosion damage.
  —Generator research in order to discover materials suitable for use as stator core; build one prototype stator core; and study it over a period of time.
—*Meteorological Forecasting and Optimal Dispatch of Energy/Water Systems.*—Work in this area will examine and determine the benefits of integrating wind and other intermittent renewable energy resources with hydropower and pumped storage resources. Specific work could include:
  —Near-term forecasting of meteorological conditions will help identify needs for improving meteorological data and instrumentation.
  —Long-term projections of global climate change and effects of other cycles and other factors on regional meteorological conditions and future regional electricity and water demand, energy and electricity supply mix, and fuel costs.

[2] EPAct 2005, title IX, sec. 931—"Conduct a program of research, development, demonstration and commercial application for cost competitive technologies that enable the development of new and incremental hydropower capacity, adding diversity of the energy supply of the United States, including: (i) Fish-friendly large turbines. (ii) Advanced technologies to enhance environmental performance and yield greater energy efficiencies. (. . .) The Secretary shall conduct research, development, demonstration, and commercial application programs for—(i) ocean energy, including wave energy (. . .) and (iv) kinetic hydro turbines."

—Research into the integration of meteorological information and load, energy price, and other forecasts with energy and water system operations.

—*Integration and Control of Renewable Energy Technologies.*—Greater opportunities to adopt renewable energy technologies and their integration with water resources can be realized if research is provided to develop advanced integration and control mechanisms. Funding could be directed to the development and demonstration of hybrid control systems to include real time pricing, resource optimization and optimal economic value methodologies.

Hydropower Environmental Performance

Statement of Need.—The following objectives will improve hydropower performance by maximizing hydroelectric generation and protecting fisheries resources.

—*Complete RDD&D for Fish-Friendly Turbines.*—Continued work on fish-friendly turbine development offers the opportunity to address energy and environmental impacts and needs. Activities under this category include:

—Continue prototype Alden/Concepts NREC turbine development in preparation for commercialization. Additional fish survival testing.

—Continue testing of the advanced turbines at Wanapum dam.

—Perform power efficiency testing, and

—Deploy and evaluate the Alden/Concepts NREC design at School Street Project, NY or other location.

—*Bioengineering for Fish Passage and Entrainment Mitigation.*—Technologies are needed to solve the problem of fish mortality involving hydropower structures. Continued work activities include:

—Basic research on the effect of hydraulic process on fish movement.

—Utilize biocriteria in the development of new turbine and fish passage designs.

—Conduct demonstrations of new technology to determine effectiveness in real-world applications.

—*Water Quality Mitigation Technology.*—New and more cost-effective and less water intensive solutions are needed to address dissolved oxygen and water temperature issues involving water quality. Research is needed to:

—Review state of the art techniques for addressing these issues.

—Develop new technologies and target test sites for testing.

—Conduct cost-shared demonstrations of new technologies.

—*Advanced Weirs for Flow Re-regulation and Aeration.*—More work is needed to optimize the design of weirs and demonstrate how they can be used to improve the efficiency of existing projects. Research activities could include hydraulic design studies, coupled with model tests and prototype demonstrations.

Hydropower Operational Performance

Statement of Need.—Improved forecast models and the implementation of advanced technologies can play a crucial role in enhancing the operational performance of hydropower facilities. The following objectives will improve operations at facilities.

—*Hydropower Operation Decision Support Analysis.*—Need to understand various hydropower generation sensitivities to various processes. Research activities could include:

—Determination of sources of hydropower generating variability across spatial and temporal scales.

—Develop improved climate/meteorological stream flow forecast models.

—Incorporate understanding and forecast models into optimization and decision support models.

—Demonstrate benefits of using improved decisions support models.

—*Demonstration Testing of the Advanced Hydropower Turbine System (AHTS) to Increase Use of Efficient Designs.*—Demonstration activities will help potential users understand and overcome potential risks of using new technologies.

—*Advanced Electrical Equipment for Renewable Integration.*—More research into these technologies would increase efficiency and reliability by providing ancillary services to the electric grid.

Waterpower Technology Development.—This part of the program would use funds to advance hydrokinetic and ocean energy technology in four program areas:

Hydrokinetic Resource Assessment

Statement of Need.—New generation technologies are on the threshold of implementation, but require additional site assessment and a mapping program to outline the criteria for development. A complete resource assessment and criteria protocol for hydrokinetic sites in the United States is required and should be available to

potential developers, similar to the resource assessment for small hydropower completed by DOE.

Hydrokinetic Environmental Profiling

Statement of Need.—Advanced technologies on the threshold of implementation often are stalled because prospective users cannot justify implementation risks and lack of knowledge among developers regarding the environmental and institutional barriers. Research to develop minimum time environmental data collection and analysis techniques for use in site evaluation of hydrokinetic machines is needed. This research would standardize monitoring techniques for evaluating the environmental impacts of hydrokinetic technologies and help expedite the deployment of these technologies.

Hydrokinetic Technology Improvement

Statement of Need.—Instream kinetic, tidal/wave energy and kinetic hydropower and pressure systems for manmade conduit systems all require test support and demonstration funding to support development, deployment and realization of their potential. Research is needed to determine proof of concepts with single prototype units and demonstrate operational viability and environmental effects with pre-commercial multiple unit projects. Support is also needed to identify universities, labs, and other entities where proof of concepts and operational tests can be conducted and environmental effects assessed.

Advanced Ocean Energy

Statement of Need.—Federal funding of ocean energy RDD&D and required regulatory activities would enable the United States to develop new domestic energy supplies, create jobs and capture an emerging global export market. Research is needed to develop an ocean wave energy technology industry to commercial deployment level including research into marine resources and converters; energy conversion, delivery and storage; environmental and cost monitoring; and field deployment.

CONCLUSION

Hydropower is already a major source of energy for the Nation. The nascent ocean, tidal and instream hydrokinetic technologies are at the beginning stages of commercial deployment. Yet both technologies have a tremendous growth potential that could be realized through sustained Federal RDD&D support. These renewable resources are clean, climate-friendly technologies that can provide significant base load power to the United States at a time when our demand for electricity continues to increase dramatically. By expanding the funding for the DOE Waterpower R&D program, the Nation could soon realize the tremendous energy and environmental benefits of maximizing existing hydropower projects and infrastructure as well as the suite of emerging waterpower technologies.

PREPARED STATEMENT OF THE HEALTH PHYSICS SOCIETY

This written testimony for the record for fiscal year 2009 requests reinstatement of funding for the Nuclear Education program appropriated to the Nuclear Regulatory Commission (NRC) in fiscal year 2008 to include at least $1.5 million for support of health physics programs, students, and faculty. This support is necessary to address the shortage of health physicists, which is an issue of extreme importance to the safety of our Nation's workers, members of the public, and our environment. As explained below, justification by the Office of Management and Budget (OMB) to rescind the NRC Nuclear Education program is not applicable to the health physics academic programs.

Health Physics is the profession that specializes in radiation safety, which is necessary for the safe and successful operation of the Nation's energy, healthcare, homeland security, defense, and environmental protection programs. Although radiation safety is fundamental to each of these vital national programs, there is no single Federal agency that serves as a home and champion for the health physics profession as this profession cuts across all these sectors. However, health physics is necessary for all these sectors to exist as it supports the principle disciplines in these programs that are championed by multiple Federal agencies, such as engineers, medical professionals, law enforcement professionals, military personnel, and environmental scientists.

As the Nation's development and use of radioactive materials grew following the end of World War II, the Nation's demand for health physicists increased in the areas of energy, defense, public health, and environmental protection. This need was mainly supported by student fellowships and scholarships from the Atomic Energy

Agency (energy and defense) and Public Health Service (public health and environmental protection). However, over the years agencies and their missions changed, the nuclear power industry faltered and the Department of Energy (DOE) nuclear weapons complex downsized following the end of the cold war. This resulted in the academic program support from Federal agencies dwindling until the last remaining support from DOE was terminated in fiscal year 1999. With this dwindling support, the supply of new health physicists declined and the age of the existing health physics workforce increased despite the continued need for health physicists in energy, defense, public health, and environmental protection programs as well as an exponential growth in the medical and academic community. Due to these circumstances a human capital crisis was created in health physics.

As the health physics human capital crisis grew and loomed in the early years of the 21st century, Congress and the DOE took action to add support to the nuclear engineering academic programs through DOE programs in the Office of Nuclear Energy (NE) and eventually agreed that this was an appropriate support mechanism for the health physics academic program. In fiscal year 2005, just 4 years ago, Congress appropriated money to DOE–NE for a health physics fellowship and scholarship program as part of the University Reactor Fuel Assistance and Support budget item. Shortly thereafter, Congress reinforced its position that DOE needed to support the health physics academic programs in provisions of section 954 of the Energy Policy Act of 2005. Despite the fact that the need for an increased supply of health physics professionals continued to exist, the DOE ceased funding the Congressionally authorized DOE–NE health physics fellowship and scholarship program after only 2 fiscal years of funding the programs at minimal levels.

In fiscal year 2008, Congress transferred appropriations for a Nuclear Education program, including health physics programs, to the NRC. The Health Physics Society (HPS) applauds this insightful action. The NRC does have a vested interest in the radiation safety associated with most of the sectors covered by the health physics profession. Although the NRC quickly addressed the demands of starting a new education support program by opening two grant opportunities for student and faculty support, the administration has not included continuation of the program in their budget for fiscal year 2009.

The OMB has provided a justification for rescission of the Nuclear Education program. This OMB assessment is patently wrong with regards to health physics programs.

The OMB states ". . . target levels for the undergraduate enrollment have been met . . ." and "Since the 1990s, enrollment levels in nuclear education programs have tripled . . ."

Specific to "target levels," since DOE has only funded health physics programs for 2 years, they have never established "target levels" for health physics program enrollments nor has there been time to assess the effect of those 2 years of funding on health physics program enrollments. The DOE–NE HP fellowship and scholarship program thus far has provided three graduate fellowships in fiscal year 2006 and zero undergraduate scholarships. In 2004, the HPPDO developed a plan for revitalizing the academic programs to a level that could meet the projected shortfall of health physicists. The Health Physics Program Directors Organization (HPPDO) plan calls for an initial target of 20 graduate fellowships and 20 undergraduate scholarships, i.e., target levels well above the actual performance of the Nuclear Education Programs.

In addition, the HPS does not feel that undergraduate levels are an appropriate metric to measure the success of an academic program. Undergraduate levels are not viewed significant by university Deans looking to justify graduate programs at the Masters and Doctorate level. Furthermore, university administrators will not commit to replacing an increasingly large number of retiring health physics faculty unless the Federal Government demonstrates its commitment to investing in the research and academic health physics infrastructure necessary to support new faculty hires in this vital profession.

The OMB justification also states ". . . and the number of universities offering nuclear-related programs also has increased." Actually, the number of health physics programs graduating at least 5 students annually decreased from 20 programs in 1995 to less than half that number in 2005, which belies the OMB statement.

We find the OMB justification ignores the value of Federal long-term investment in academic infrastructure and ignores the value of professional radiation safety professionals to the successful protection of workers, members of the public, and the environment while benefiting from the use of nuclear technologies.

We consider it would take approximately $1,000,000 to get to the HPPDO plan of 20 fellowships and 20 scholarships in health physics. In addition, funding of $500,000 should allow for up to two young faculty members in health physics aca-

demic programs to receive grant support at the level offered by the NRC fiscal year 2008 grant opportunities. Considering the DOE budgets for the HP Fellowship and Scholarship programs for fiscal year 2005 and fiscal year 2006 combined have totaled $500,000 and only produced 3 fellowships, we feel this request is very modest while we recognize it will not begin to provide the long term support that will eventually be required if we are to have enough safety professionals for our energy, healthcare, homeland security, defense, and environmental protection programs. However, it will go a long way to help building the student and faculty infrastructure needed to reach this goal.

The subcommittee's favorable consideration of this request will help meet our Nation's radiation safety needs of the future.

PREPARED STATEMENT OF THE GAS TURBINE ASSOCIATION

The Gas Turbine Association (GTA) appreciates the opportunity to provide the United States Senate Committee on Appropriations Subcommittee on Energy and Water Development with our industry's statement regarding fiscal year 2009 Department of Energy (DOE) Office of Fossil Energy (FE) Advanced Turbines R&D at $55 million and Energy Efficiency and Renewable Energy (EERE) Industrial Technologies Program (ITP) Distributed Energy at $60 million funding levels.

From Connecticut to California, States are working to put in place regulations to dramatically reduce greenhouse gas emissions. At the same time, our economy will be demanding more electric power to maintain its growth. Without new technology, the power generation industry will be hard pressed to produce additional electric capacity, while at the same time meet the strict greenhouse gas emissions standards being set by States and the Federal Government.

Federal investment in research and technology development for advanced gas turbines that are more versatile, cleaner, and have the ability to burn hydrogen-bearing reduced carbon synthetic fuels and carbon-neutral alternative fuels is needed to ensure the reliable supply of electricity in the next several decades. Domestic coal based Integrated Gasification Combined Cycle (IGCC) with carbon capture and sequestration is one such approach that would significantly supplement available supplies of domestic natural gas to guarantee an adequate supply of clean and affordable electric power. Alternative fuel choices range from imported LNG, coal bed methane, and coal-derived synthetic or process gas to biogas, waste-derived gases and hydrogen. Research is needed to improve the efficiency, reduce capital and operating costs, and reduce emissions.

$55 MILLION FOR DOE FE ADVANCED TURBINES

$60 MILLION FOR DOE EERE ITP DISTRIBUTED ENERGY

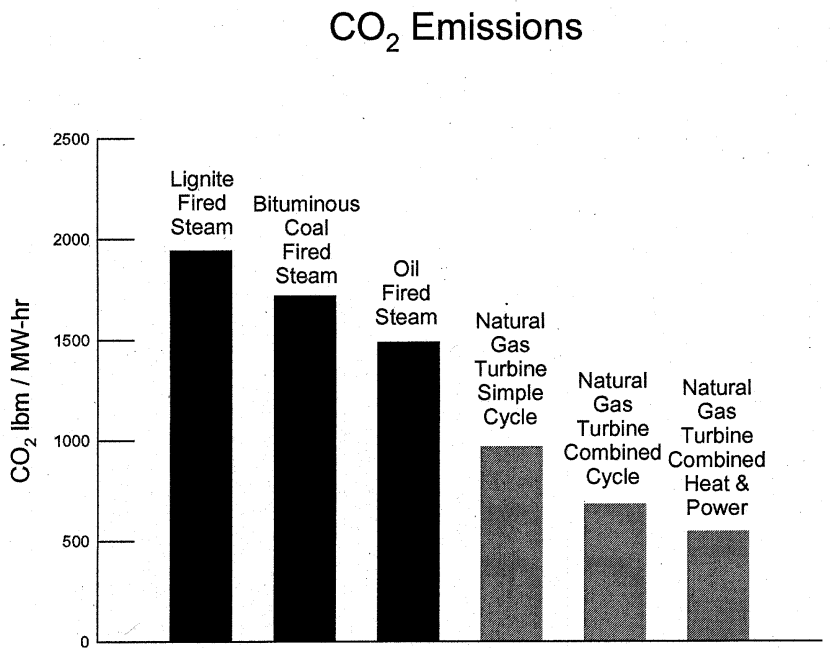
Supporting these programs provides the following benefits:

—Efficient and reliable turbine technologies for alternative fuel, near-zero-emission power plants
—Energy security by utilizing domestic energy sources to reduce the demand for foreign energy imports
—Globally competitive electricity prices for U.S. industries, businesses and homes, with reduced greenhouse gas emissions from power plants

Because policy makers have begun implementing rigid CO_2 regulatory mandates, failure to invest now will translate into stifled economic growth and the loss of our global competitiveness later. The Advanced Turbines program needs $55 million and the Distributed Energy budget needs to be restored to $60 million in fiscal year 2009 to ensure a smooth transition into a low-carbon economy.

GAS TURBINES REDUCE GREENHOUSE GAS EMISSIONS

The gas turbine industry's R&D partnership with the Federal Government has steadily increased power plant efficiency to the point where natural gas fired turbines can reach combined cycle efficiencies of 60 percent, and quick-start simple cycle peaking units can reach 46 percent. The gas turbine's clean exhaust can be used to create hot water, steam, or even chilled water. In such combined heat and power applications, overall system efficiency levels can reach 60 to 85 percent LHV. This compares to 40–45 percent for even the most advanced thermal steam cycles (most of which are coal fired).



Gas turbines already play a very significant role in minimizing greenhouse gas emissions worldwide. Gas turbines are both more efficient and typically burn lower carbon fuels compared to other types of combustion-based power generation and mechanical drive applications. The Nation needs to reinvigorate the gas turbine/government partnership in order to develop new, low carbon power plant solutions without increasing our reliance on natural gas. This can be done by funding research to make gas turbines more capable to utilize hydrogen and synthetic fuels as well as increasing the efficiency, durability and emissions capability of natural gas fired turbines. If Congress provides adequate funding to DOE's turbine R&D efforts, technology development and deployment will be accelerated to a pace that will allow the United States to achieve its emissions and energy security goals.

TECHNOLOGIES FOR ADVANCED IGCC/H_2 GAS TURBINE—REDUCING THE PENALTY FOR CO_2 CAPTURE

The turbines and related technologies being developed under the DOE FE Advanced Turbines program will directly advance the performance and capabilities of future power generation with CO_2 capture and sequestration. Advances are needed to offset part of the power plant efficiency and output reductions associated with CO_2 capture. Program funding is required to cost-share in the technology development of advanced hydrogen/syngas combustors and other components to realize the DOE goals.

Several GTA member companies are working cost-share programs with the DOE to develop technologies for advanced gas turbine power plants with carbon capture. These technologies will: (1) increase plant efficiency; (2) increase outputs; and (3) allow further reductions in combustion emissions of hydrogen rich fuels associated with CO_2 capture and sequestration. This will help offset some of the efficiency and output penalties associated with CO_2 capture. These programs are funding technology advancement at a much more rapid rate than industry can do on their own.

The need for increased levels of Federal cost-share funding is immediate. The fiscal year 2009 funding request for the Advanced Turbines program is inadequate to meet DOE's 2010 Advanced Power System goal of an IGCC power system with high efficiency (45–50 percent HHV), near-zero emissions and competitive capital cost. To meet this 2010 goal, the researchers must demonstrate a 2 to 3 percentage point improvement in combined cycle efficiency above current state-of-the-art Combined Cycle turbines in IGCC applications.

The plan for the IGCC-based FutureGen-type application is to develop the flexibility in this same machine with modifications to operate on pure hydrogen as the primary energy source while maintaining the same levels of performance in terms efficiency and emissions. The goal is to develop the fundamental technologies needed for advanced hydrogen turbines and to integrate this technology with CO_2 separation, capture, and sequestration into a near-zero emission configuration that can provide electricity with less than a 10 percent increase in cost over conventional plants by 2012.

The Advanced Turbines program is also developing oxygen-fired (oxy-fuel) turbines and combustors that are expected to achieve efficiencies in the 44–46 percent range, with near-100 percent CO_2 capture and near-zero NO_X emissions. The development and integrated testing of a new combustor, turbine components, advanced cooling technology, and materials in oxy-fuel combustors and turbines is needed to make these systems commercially viable.

The knowledge and confidence that generating equipment will operate reliably and efficiently on varying fuels is essential for the deployment of new technology. Years of continued under funding of the Advanced Turbines program has already delayed the completion dates for turbine R&D necessary for advanced IGCC, as well as timing for a FutureGen-type plant validation.

MEGA-WATT SCALE TURBINE R&D

In the 2005 Enabling Turbine Technologies for High-Hydrogen Fuels solicitation, the Office of Fossil Energy included a topic area entitled "Development of Highly Efficient Zero Emission Hydrogen Combustion Technology for Mega-Watt Scale Turbines". Turbine manufacturers and combustion system developers responded favorably to this topic, but DOE funding constraints did not allow any contract awards. The turbine industry recommends a follow-up to this solicitation topic that would allow the developed combustion technology to be tested in machines at full scale conditions and allow for additional combustion technology and combustor development for high-hydrogen fuels.

The turbine industry believes that this technology is highly relevant to industrial coal gasification applications: (1) site-hardened black-start capability for integrated gasification combined cycle applications (the ability to restart an IGCC power plant when the electric grid has collapsed); (2) supplying plant electric load fueled on syngas or hydrogen; (3) increasing plant steam cycle capacity on hot days when large amounts of additional power are needed; and (4) in gas turbines for compression of high-hydrogen fuels for pipeline transportation. The development of MW-scale turbines (1–100 MW) fueled with high-hydrogen fuels will promote the sustainable use of coal. In addition, highly efficient aeroderivative megawatt scale engines operate under different conditions than their larger counterparts and are installed for peaking or distributed generation applications. LNG, syngas and hydrogen combustion are issues for new sites and the legacy fleet. Funding is required to design efficient and low emissions combustors that accommodate the new fuels.

HIGH-EFFICIENCY, ALTERNATIVE-FUELED DISTRIBUTED ENERGY

The administration's budget request recognizes the need for the development of alternate and dual fueled combined heat and power gas turbines systems. The budget document states "ITP would also pursue the growth opportunity in traditional industry CHP applications below 20 MW, including medium-sized plants that require both power and process heat. Specific activities would include the development of alternative/dual fuel capability for turbines that meet the most stringent NO_X and CO regulations (e.g., those in southern California)".

However, there are insufficient funds allocated in the request to do any work in this area. The administration's justification contends "full consideration of the new DG/CHP activity within the context of the fiscal year 2009 request was not possible". If the United States is serious about transitioning to a low-carbon economy, we must restore the Distributed Energy budget to $60 million in fiscal year 2009 to allow DOE to fund partnerships to develop ultra-high efficiency alternative and dual fuel CHP systems.

UNIVERSITY TURBINE SYSTEMS RESEARCH (UTSR) PROGRAM

Under the UTSR program, a consortium of 111 U.S. universities located across 42 States conducts fundamental and applied research to resolve critical knowledge gaps identified by the 17 industrial partners that sit on the UTSR program's Industrial Review Board and by the DOE in support of the IGCC/FutureGen program. The UTSR program has been described as a model for university/government/indus-

try collaboration that is tightly focused on the research needed to support widespread use of syngas and hydrogen fueled gas turbines for power production.

This DOE/industry/university partnership is needed to help power producers cleanly and efficiently produce electric power from gasified coal, biomass and hydrogen, as well as natural gas. The UTSR program is the only federally-funded university-based program in the gas turbine area. The UTSR program's critical research efforts is needed to meet the Advanced Turbine program goals of preparing low-cost, high-efficiency, high-reliability, low-emission gas turbines for electricity production using IGCC-derived fuels. The UTSR program provides critical gas turbine research expertise in the United States and graduates with knowledge and training. Without adequate DOE funding, universities will de-emphasize this area in their own research investments and curriculums and the United States will lose its competitive advantage in this critical industry.

The Advanced Turbines program needs $55 million and the Distributed Energy budget needs to be restored to $60 Million in fiscal year 2009 to keep pace with the rapidly approaching Climate Change emissions mandates.

PREPARED STATEMENT OF SNM—ADVANCING MOLECULAR IMAGING AND THERAPY

SNM, formerly known as the Society of Nuclear Medicine, appreciates the opportunity to submit written comments for the record regarding funding in fiscal year 2009 at the Department of Energy (DOE). SNM is an international scientific and professional organization of over 16,000 members dedicated to promoting the science, technology, and practical applications of molecular imaging and therapy.

In fiscal year 2008, Congress restored funding for nuclear medicine research, after the Federal Government abandoned its over 50-year commitment to funding vital nuclear medicine research by eliminating funding in fiscal year 2006 for the research at the Department of Energy (DOE) and making no accommodation to transition nuclear medicine programs to other Government organizations. In past years, nuclear researchers have used Federal funding within DOE to make major accomplishments benefiting millions of patients with heart, cancer, and brain diseases. The loss of Federal funding for nuclear research adversely impacted future innovation in the field. With the restoration of funding last year and the continuation of funding in fiscal year 2009 we will be able to get this research back on track. For that reason, SNM advocates the continuation of funding for fiscal year 2009 at the level of $17.5 million for the nuclear medicine research program now housed under the Office of Science's Biological Research Life Science Radiochemistry and Instrumentation program[1] in the fiscal year 2009 Energy and Water Appropriations bill.

WHAT IS NUCLEAR MEDICINE?

Nuclear medicine is an established specialty that performs non-invasive molecular imaging procedures to diagnose and treat diseases and to determine the effectiveness of therapeutic treatments—whether surgical, chemical, or radiation. It contributes extensively to the management of patients with cancers of the brain, breast, blood, bone, bone marrow, liver, lungs, pancreas, thyroid, ovaries, and prostate, and serious disorders of the heart, brain, and kidneys, to name a few. In fact, recent advances in the diagnosis of Alzheimer's disease can be attributed to nuclear medicine imaging procedures.

Annually, more than 20 million men, women, and children need noninvasive molecular/nuclear medicine procedures. These safe, cost-effective procedures include positron emission tomography (PET) scans to diagnose and monitor treatment in cancer, cardiac stress tests to analyze heart function, bone scans for orthopedic injuries, and lung scans for blood clots. Patients undergo procedures to diagnose liver and gall bladder functional abnormalities and to diagnose and treat hyperthyroidism and thyroid cancer.

LACK OF FEDERAL FUNDING THREATENS FUTURE INNOVATIONS

The goal of the DOE's nuclear medicine research program is to deliver relevant scientific knowledge that will lead to innovative diagnostic and treatment technologies for human health. The modern era of nuclear medicine is an outgrowth of

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[1] Previously nuclear medicine research was funded under the DOE's Office of Science, Biological and Environmental Research (BER) program's Medical Applications and Measurement Science. The BER program has been restructured, as directed by Congress, into two separate sub programs—Biological Research and Climate Change Research. Biological Research included activities in Life Sciences which is where this research is now housed. They also renamed it to Radiochemistry and Instrumentation.

the original charge of the Atomic Energy Commission (AEC) to exploit nuclear energy to promote human health. This program supports directed nuclear medicine research through radiopharmaceutical development and molecular nuclear medicine activities to study uses of radionuclides for non-invasive diagnosis and targeted, internal molecular radiotherapy.

Over the years, the DOE nuclear medicine research program has generated advances in the field of molecular/nuclear medicine. For example, DOE funding provided the resources necessary for molecular/nuclear medicine professionals to develop PET scanners to diagnose and monitor treatment in cancer. PET scans offer significant advantages over CT and MRI scans in diagnosing disease and are more effective in identifying whether cancer is present or not, if it has spread, if it is responding to treatment, and if a person is cancer free after treatment. In fact, the DOE has stated that this program supports "research in universities and in the National Laboratories, occupies a critical and unique niche in the field of radiopharmaceutical research. The NIH relies on our basic research to enable them to initiate clinical trials."

The majority of the advances in molecular/nuclear medicine have been sponsored by the DOE, including:

—*Smaller, More Versatile PET Scanners.*—Brookhaven National Laboratory (BNL) has completed a prototype mobile PET scanner, which will record images in the awake animal. The mobile PET will be able to acquire positron-generated images in the absence of anesthesia-induced coma and correct for motion of the animal. The long-term goal is to develop PET instrumentation able to diagnose neuro-psychiatric disorders in children.

—*Highest Resolution PET Scanner Developed.*—Scientists at the Lawrence Berkeley National Laboratory (LBNL) have developed the world's most sensitive PET scanner. The instrument is 10-times more sensitive than a conventional PET scanner and became operational in 2005.

—*Imaging Gene Expression in Cancer Cells.*—Images of tumors in whole animals that detect the expression of three cancer genes were accomplished for the first time by investigators at Thomas Jefferson University and the University of Massachusetts Medical Center. This advanced imaging technology will lead to the detection of cancer in humans using cancer cell genetic profiling.

—*Modeling Radiation Damage to the Lung.*—Treatment of thyroid disease and lymphomas using radioisotopes can cause disabling lung disease. Investigators at Johns Hopkins University have developed a Monte Carlo model that can be used to determine the probability of lung toxicity and be incorporated into a therapeutic regimen. This model will optimize the dose of radioactivity delivered to cancer cells and avoid untoward effects on the lung.

—*New Radiopharmaceuticals with Important Clinical Applications.*—The DOE radiopharmaceutical science program has developed a number of innovative radiotracers at the University of California at Irvine for the early diagnosis of neuro-psychiatric illnesses, including Alzheimer's disease, schizophrenia, depression, and anxiety disorders.

—*Rapid Preparation of Radiopharmaceuticals for Clinical Use.*—The DOE-sponsored program at the University of Tennessee has developed a new method for preparing radiopharmaceuticals by placing a boron-based salt at the position that will be occupied by the radiohalogen. The method has been used to prepare a variety of cancer-imaging agents.

With continued DOE funding, essential molecular/nuclear medicine research will continue at universities, research institutions, national laboratories, and small businesses. Moreover, research with radiochemistry, genomic sciences, and structural biology will be able to usher in a new era of mapping the human brain and using specific radiotracers and instruments, to more precisely diagnose neuro-psychiatric illnesses and cancer.

In addition, to gain the full benefits of nuclear medicine, it is important to ensure that nuclear medicine researchers have a steady supply of radionuclides. One way to accomplish this goal would be to create a National Radionuclide Enhancement Production program at the DOE that would meet the Nation's medical and homeland security needs.

NAS STUDY RECOMMENDS ENHANCED FEDERAL COMMITMENT TO NUCLEAR MEDICINE RESEARCH

On September 20, 2007, the National Academy of Sciences (NAS) released a report sponsored by the Department of Energy (DOE) and National Institutes of Health (NIH), entitled Advancing Nuclear Medicine Through Innovation. The charge

of the NAS study was to provide findings and recommendations on the state of the science in nuclear medicine.

As one of the important findings, the report highlighted the detrimental loss of Federal commitment to nuclear medicine research, as evidenced by the large cuts in funding for the basic sciences related to nuclear medicine in the DOE Office of Science Office of Biological and Environmental Research (OBER) Medical Applications and Measurement Science (MAMS) program in fiscal years 2006 and 2007.

As a result, says the report, "there is now no short- or long-term programmatic commitment by any agency to funding chemistry, physics, engineering research and associated high-technology infrastructure (accelerators, instrumentation, and imaging physics), which are at the heart of nuclear medicine technology research and development."

There are countless new innovations on the horizon in this area that promise to improve patient care through new therapeutic isotopes to cure disease, earlier diagnosis of Alzheimer's disease and cancer, detection of the effectiveness of cancer therapies, development of the next generation of imaging technologies, and more. However, without ongoing funding for basic nuclear medicine research at DOE Office of Science, these breakthroughs may never materialize.

To enhance Federal commitment, the NAS report recommended that "reinstating support for the DOE–OBER nuclear medicine research program should be considered." Additionally, the report recommends "a national nuclear medicine research program should be coordinated by the DOE and the National Institutes of Health with the former emphasizing the general development of technology and the latter disease-specific applications."

The report also states, "Although the scientific opportunities have never been greater or more exciting, the infrastructure on which future innovations in nuclear medicine depend hangs in the balance. If the promise of the field is to be fulfilled, a federally supported infrastructure for basic and translational research in nuclear medicine should be considered."

We are at a critical juncture in nuclear medicine. In order to capitalize on groundbreaking research that will improve and save lives, Federal support for basic nuclear medicine research at DOE Office of Science must continue. Therefore, SNM calls on Congress to support the DOE Office of Science's Radiochemistry and Instrumentations programs with $17.5 million in funding for nuclear medicine research for fiscal year 2009.

CONCLUSION

By continuing funding for the DOE's Radiochemistry and Instrumentation nuclear medicine research program at the DOE, policy makers will keep our Nation at the forefront of nuclear medicine research and innovation. We thank you for the opportunity to present our views on funding for these initiatives at the DOE and would be pleased to answer any questions you may have.

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