ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2012

WEDNESDAY, MAY 4, 2011

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

The subcommittee met at 2:21 p.m., in room SD–192, Dirksen Senate Office Building, Hon. Dianne Feinstein (chairman) presiding.

Present: Senators Feinstein and Alexander.

DEPARTMENT OF ENERGY

NATIONAL NUCLEAR SECURITY ADMINISTRATION

STATEMENT OF HON. THOMAS P. D'AGOSTINO, UNDER SECRETARY FOR NUCLEAR SECURITY AND ADMINISTRATION

ACCOMPANIED BY:

ANNE HARRINGTON, DEPUTY ADMINISTRATOR, NUCLEAR NONPROLIFERATION

ADMIRAL KIRKLAND DONALD, DEPUTY ADMINISTRATOR, NAVAL REACTORS

DR. DONALD COOK, DEPUTY ADMINISTRATOR, WEAPONS ACTIVITIES

OPENING STATEMENT OF SENATOR DIANNE FEINSTEIN

Senator FEINSTEIN. Good afternoon, ladies and gentlemen, and welcome to the Energy and Water Development Subcommittee's oversight hearing on the National Nuclear Security Administration's (NNSA) fiscal year 2012 budget request.

NNSA has requested $11.8 billion for fiscal year 2012. It is an increase of $1.1 billion, or 10.2 percent, more than the fiscal year 2011 level. I think in a sense, they are an endangered species because they are probably the only one, Senator Alexander, that is going to get this kind of a raise. I noted all of the smiles on their faces when they came into the room. This is, in fact, the largest increase to NNSA since it was established 11 years ago.

This increase also follows another record-breaking increase of $813 million, or 8.2 percent, in fiscal year 2011. Based on the 2012 budget request, NNSA's budget would grow by about $2 billion over 2 years.

The budget increase presents a number of opportunities including:

—accelerating efforts to secure all vulnerable nuclear materials by the end of fiscal year 2013 to reduce the threat of nuclear terrorism;
—extending the life of nuclear weapons currently in the stockpile;
—replacing or upgrading aging infrastructure needed to ensure the safety, security, or reliability of nuclear weapons; and
—designing nuclear reactors that will operate for 40 years without refueling for Ohio Class ballistic missile submarines.

Now, with these opportunities also come some challenges. Regarding nonproliferation, the goal announced in April 2009 to secure all vulnerable nuclear materials in 4 years has accelerated nuclear security efforts.

I would like to highlight a few recent achievements over the last 2 years. NNSA has removed 960 kilograms of highly enriched uranium, enough nuclear material for 38 nuclear weapons. NNSA has removed all highly enriched uranium from six countries. One of these countries was Libya. Given the recent unrest in Libya, the presence of this dangerous nuclear material in an unstable part of the world would have increased the risk of nuclear terrorism. Removing highly enriched uranium from six countries in 2 years is much faster than one country a year that NNSA has averaged in the last 13 years. NNSA has also completed security upgrades at 32 buildings in Russia containing weapons usable materials.

Now, despite this progress, stockpiles of nuclear weapon materials around the world are still vulnerable to theft. In particular, all of the publicly known cases of theft of weapons usable nuclear material were perpetrated by insiders. Corruption and insider threats are endemic in many parts of the world, including Russia. That places unsecured weapons usable nuclear weapons in great jeopardy.

I would like to discuss how NNSA has addressed this threat for a moment. Regarding nuclear weapons activities, I am concerned about your ability to develop reliable costs and schedule estimates for complex nuclear infrastructure projects. You plan to build three new facilities that will each exceed $3 billion in costs, and in some cases may exceed $6 billion—the Chemistry and Metallurgy Research Facility at Los Alamos, the uranium processing facility at Y–12, and the pit disassembly and conversion facility at Savannah River. NNSA plans to spend $682 million on these three projects alone in fiscal year 2012, and will reach a peak of $1.1 billion by fiscal year 2014. New cost estimates for these facilities are three times more than the original estimates. So, we need to discuss this.

NNSA has a long history of underestimating budget needs and increasing cost projections because of design schedule, design changes, and schedule delays. If the costs for these facilities increase further, I am concerned that it could harm higher-priority missions, such as life-extension programs and increased weapon surveillance. NNSA must demonstrate to the Congress that it can effectively manage these complex projects and complete them on time and on budget.

Modernizing our infrastructure on time and on budget, however, is not enough. NNSA must clearly demonstrate how this new infrastructure will not only enhance the safety, security, and reliability

of our nuclear weapons, but also help reduce the size of the stockpile.

The new START Treaty was a step in the right direction by reducing the size of our actively deployed nuclear weapons to 1,550. However, we still maintain 5,100 nuclear weapons. A major justification for investing in new infrastructure is to reduce the hedge; that is, the weapons we hold in reserve in case an unforeseen problem occurs with their reliability and performance.

NNSA must do a better job explaining how these multi-billion dollar facilities and major investments in experimental facilities, such as the National Ignition Facility, will help us draw down the stockpile further.

As you know, Mr. D'Agostino, this is important to me. You are asking for a lot of money, so the performance has to be there to back up this additional money in reduction of nuclear weapons.

Joining us today to explore these important national security issues is Thomas P. D'Agostino, the Administrator of the National Nuclear Security Administration. Senator Alexander, I want you to know I have the highest respect for him. We had substantial classified briefings on the prior effort on the Reliable replacement Warhead program and, before that, on the proposal for increased nuclear weapons, plutonium pits, advanced weapons concepts, and on and on. He has always been an absolute straight shooter, and I really, really prize that. So, I know what you say is the truth, and I very much appreciate that.

Joining Mr. D'Agostino is Dr. Donald Cook, the Deputy Administrator for Weapons Activities; Anne Harrington, the Deputy Administrator for Nuclear Nonproliferation; and Admiral Kirkland Donald, Deputy Administrator for Naval Reactors. So, thank you all for taking time to be here today, and let me turn to Senator Alexander for his comments.

STATEMENT OF SENATOR LAMAR ALEXANDER

Senator ALEXANDER. Thank you, Senator Feinstein. As always, it is good to work with you and to see you. And thank you for our very accomplished witnesses for being here. I look forward to your testimony.

I have three or four points I would like to make.

Number one, if Senator Inouye and Senator Cochran were here, I would say—and if they come I will say—that most of NNSA's responsibility are in support of the U.S. military, and this appropriation ought to be treated in part like Defense spending. And that will become increasingly important as we make budgets over the next several years because when we have a Government that is collecting $2.2 trillion and spending $3.7 trillion, we have a lot of tough decisions to make. And we have, as the Senator said—the Chair said—we have a significant increase in a—in nuclear modernization, for example. We agreed on that. The President agreed with that in connection with the vote of the new START Treaty, which I supported. I think it was a wise treaty. But at the same time, we do not want our nuclear weapons to begin to resemble a collection of wet matches, and they will not, given the plan that is laid out here.

So, that is my first point, Madam Chairman, that I think as we talk with Senators Inouye and Cochran, that when allocations are made, that this spending should be defense spending and not be competing with National Labs, other environmental clean-up, et cetera.

Number two, I would like to follow up on Senator Feinstein's point about management of projects. Probably the area where we in the Senate have not done as well as we should have is in the area of oversight. That really is a true function of the Congress, especially of the appropriations subcommittees. I mean, it is our job really to understand issues. We work hard on that, but we get pulled in many different ways and do not have a chance to do that as much as we should.

And that should be particularly true with the Department of Energy (DOE) and with this part of DOE because it is just full of multi-billion dollar projects. I just left a meeting with Secretary Chu. We were talking about environmental management projects, which are a different part of DOE. But there, he has got massive projects, and when we are spending too much, there are difficult decisions. We have got to clean up radiation. We have got to clean up mercury. But if we can save $1 billion here or $1 billion there, that money can go to National Laboratories. It can go to research for energy. It can go to environmental clean-up. It can go to a whole variety of areas.

So, I hope that I can support the chairman and that we can vigorously assist you in taking a fresh look at project management as we go through this period of reduced spending. In fact, we are going to have to if we are going to have the money to do what we need to do.

Third, I have a list of about $20 billion of your major NNSA projects. And it would be nice to talk about ways to figure out what is it really going to cost, and then can it stay that way? I remember while I was running for Governor, a group in Knoxville wanted a road built. And I asked the chairman of the Chamber of Commerce, well, how do you propose I do that if I am elected? He said, well, I would get the best possible person to run it, to agree on a plan and meet with him once a month, and see if you are following the plan. Well, I was elected. I got that person to come be the transportation commissioner. We met once a month. The road got built. So, maybe we need to make sure that we get designs that we agree with, cost amounts that we agree on, and have monthly report sessions to make sure that we are on schedule or not on schedule. Maybe we can be of assistance in that way.

Fourth, that leads me to some questions I will be asking during my question time about whether it is a good idea, Mr. D'Agostino, to spend time consolidating a contract at Oak Ridge and Pantex, or Y–12 and Pantex, whether you could really save more money and more of your management energy doing that and causing the contractor to work on that, or whether you would be better off working on all these big projects I was just talking about. So, we will get into that.

Finally, I am delighted to see—delighted to talk a little bit about naval reactors. It has always puzzled me, Senator Feinstein, about why we seem to do so well with the naval reactors and we cannot

build a nuclear power plant in the United States. In fact, one of my proposals, and I was only partly in jest, that the way to have clean electricity in the United States, the largest amount of it, is just to build seven nuclear-powered destroyers and plug them in around the country where the population centers are, and have, you know, add 15,000 or 20,000 megawatts of clean electricity. We could probably get that done in a short period of time. We are able to—I mean, both have been safe. We have never had a fatality either in connection with a naval reactor or with a civilian reactor. But I think we have a lot to learn from naval reactors that we might transfer to our civilian reactor program. So, I will look forward, Admiral, to talking about that and what you think we might learn from that as well as supporting your efforts.

So, Madam Chair, this is—and ought to be—a fascinating hearing. I look forward to the testimony and thank you for your time.

Senator FEINSTEIN. Thank you very much, Senator, and I look forward to working with you. We did so on Interior, and we will do so on this subcommittee as well.

Let me turn to you now, Mr. D'Agostino. Will you be making the comments for everybody at the table?

Mr. D'AGOSTINO. Yes, Madam Chairman.

Senator FEINSTEIN. Okay. Please proceed.

SUMMARY STATEMENT OF THOMAS P. D'AGOSTINO

Mr. D'AGOSTINO. Thank you. Madam Chairwoman, Ranking Member Alexander, thank you for the opportunity to address this subcommittee today. But more importantly, thank you for your continued support of the NNSA and the 35,000 men and women working across our enterprise to keep our country safe, protect our allies, and enhance global security. We could not do this work without strong bipartisan support and engaged leadership from the Congress.

As I come before you today, the capability NNSA offers to the Nation, and indeed the world, are on display in real time. Just last week, I had the opportunity to travel to Nevada to visit the Remote Sensing Laboratory. For 7 weeks, the talented and dedicated men and women at the Remote Sensing Laboratory had been working with their colleagues from across the enterprise to support the response to the devastating earthquake and tsunami that struck Japan on March 11, 2011. They had been providing critical information to our interagency colleagues and to our partners in Japan. Of course, our thoughts and prayers are with the Japanese people during this very difficult time, but I was honored to have the opportunity to thank our men and women personally and directly last week for their outstanding work.

Our ability to respond to this crisis is the latest example of the vital and diverse role we play in implementing the President's nuclear security agenda and of the need to invest in the future of our enterprise. This budget request seeks the funds required to make these investments.

As I see it, the budget request can be broken down into three key themes. First, we're investing in the future. President Obama has requested $7.6 billion for our weapons activities account to support our effort to leverage the best science and technology in the world

to maintain our nuclear deterrent. This will enable us to enhance our surveillance of the stockpile, continue to design modern facilities that we need to maintain our Nation's expertise in uranium and plutonium processing and research, and proceed with key life extension programs for our weapon systems.

A critical part of that is the life extension program for the W78 warhead. Consistent with the policies in the President's Nuclear Posture Review, we have submitted a request to this subcommittee and the House Energy and Water Development Subcommittee to begin studying the requirements for the W78 life extension, including the option for interoperability of the nuclear explosive package with the Navy's W88 warhead. I strongly encourage this subcommittee to approve this request.

Investing in a modern enterprise is critical to our stewardship program, but it also supports the full range of NNSA's nuclear security missions, which brings me to the second key theme that this budget request shows, and that is implementing the President's nuclear security agenda. As President Obama has said in his speech in Prague in April 2009, the threat of a terrorist acquiring and using a nuclear weapon is the most immediate and extreme threat we face. Preventing the spread of nuclear weapons and keeping dangerous materials out of the hands of terrorists is a vital national security priority.

To address that threat, we are requesting $2.5 billion in 2012 and more than $14.2 billion over the next 5 years for our nuclear nonproliferation programs. This will provide the resources required to meet the commitment secured during the 2010 Nuclear Security Summit.

To power the nuclear Navy, President Obama has requested $1.1 billion for NNSA's naval reactors program. This will allow us to continue the design work on the propulsion unit for the Ohio Class Replacement Submarine in order to meet the Navy's required procurement date of 2019. It includes critical investments in a modern and sustainable spent fuel, spent nuclear fuel infrastructure at the naval reactor site in Idaho National Laboratory. And finally it seeks the resources to refuel the land based prototype in upstate New York.

Madam Chairwoman, I realize that this subcommittee has many competing requirements and that this request comes at a time of acute financial stress for our entire country. But I believe nothing is more important than ensuring our Nation's security. It is my responsibility to assure you that we can manage these increases wisely.

That brings me to the third key theme outlined in this budget request, and that is our commitment to improve the way we do business and manage our resources.

For us, improving our project management is part of the implementing, achieving our mission, and implementing the President's nuclear security agenda. To better ensure that we bring these major projects to completion on time and on budget, we will ensure that we have qualified project managers leading our major projects. We will set costs and schedule baselines on construction projects when design work is 90 percent complete, and we will subject these estimates to rigorous independent reviews.

We are partnering with our Management and Operations (M&O) partners to streamline our governance model to devote more resources to critical mission work while maximizing safety and security at our sites. We are making sure that we have the right contracting strategy in place. We are continuing to find innovative ways to save money across the enterprise. For example, since 2007, our Supply Chain Management Center has used new technologies and pool purchasing power to drive efficiencies across our sites. The result has been more than $213 million in auditable cost savings.

PREPARED STATEMENT

All of this is part of our effort to create one NNSA, a true partnership between all of our programs and all of our partners to fulfill a common mission. Taken together, these steps will ensure that we have a modern, 21st century nuclear security enterprise that is safer, more secure, more efficient, and organized to succeed. That is the vision outlined in this budget request. It supports the full range of NNSA missions, and, more importantly, it represents a critical investment in the infrastructure, the people, the science, technology, and engineering required to fulfill our missions. I look forward to working with the members of this subcommittee to help make that vision a reality.

With that, we would be happy to take any questions you may have.

[The statement follows:]

PREPARED STATEMENT OF THOMAS P. D'AGOSTINO

Thank you for the opportunity to present the fiscal year 2012 President's budget request for the National Nuclear Security Administration (NNSA). This budget request will allow the NNSA to meet its commitments to the American people and our international partners to provide for nuclear deterrence, to reduce nuclear dangers around the world, and to provide the capabilities to address the broader national security challenges of the 21st century.

The vision of NNSA is to make the world a safer place. NNSA's mission is to enhance global security through nuclear deterrence, nonproliferation, counterterrorism, naval nuclear propulsion, and to support national leadership in science and technology.

Recognizing the economic challenges facing our Nation and the budget pressures being felt throughout the Federal Government, the President demonstrates through this fiscal year 2012 budget request his strong commitment to the nuclear security of our country and our allies by proposing an unprecedented investment in NNSA's mission. This investment is a commitment to recapitalize the nuclear security enterprise and do it in a way that makes sense.

The fiscal year 2012 President's budget request provides $11.78 billion to invest in a modern, 21st century nuclear security enterprise, implement the President's nuclear security agenda, and improve the way the NNSA does business and manages its resources.

The fiscal year 2012 request represents an increase of 5.1 percent more than the $11.2 billion requested for fiscal year 2011, reflecting a commitment to investing in a modern enterprise that can support the full range of nuclear security missions. The request highlights the vital role NNSA plays in implementing the President's nuclear security agenda and the broad, bipartisan consensus that has developed over the last 2 years regarding the role NNSA plays in enhancing our Nation's security and the resources needed to get the job done.

INVESTING IN THE FUTURE

Secretary of Energy Chu and I work closely with Secretary of Defense Gates and other Defense Department (DOD) officials to ensure that NNSA remains focused on a strong interagency partnership that meets our national security requirements and

promotes NNSA's sustainability. As a result, the President's request includes $7.6 billion for the weapons activities appropriation, an 8.9 percent increase more than the President's fiscal year 2011 request and a 19.5 percent increase over the fiscal year 2010 appropriation to invest in the future of the nuclear security enterprise. These resources will support, among other things, the operation and construction of the modern research facilities needed to do cutting-edge science and attract the next generation of nuclear security experts. It continues implementation of the President's commitment to invest $85 billion over the next decade to sustain the nuclear deterrent and to modernize the infrastructure that supports it, as well as to implement the agenda outlined in the Nuclear Posture Review, the Stockpile Stewardship and Management Plan and the updated section 1251 report submitted to the Congress.

NNSA's budget request also includes associated out-year projections in the Future-Years Nuclear Security Program (FYNSP) that identifies resources needed to meet the continuing requirements for significant long-term investments in the deliverables, capabilities and infrastructure of the enterprise.

These resources will help us invest in a modern, 21st century Nuclear Security Enterprise that can sustain the stockpile and support our full range of nuclear security missions. With these investments, NNSA will be able to continue to move toward an enterprise that is safer, smaller, more secure, more efficient, more sustainable, and more adaptable.

The request includes an increase of 3.1 percent more than the fiscal year 2011 level to protect and advance the scientific capabilities at the U.S. national security laboratories and a 21 percent increase for infrastructure improvements, including continuing work on the Uranium Processing Facility at the Y–12 National Security Complex and the Chemistry and Metallurgy Research Replacement facility (CMRR) at Los Alamos National Laboratory. These capital projects are key for ensuring safe, secure, and reliable uranium and plutonium capabilities for nuclear security and other important missions.

To power the nuclear navy, the budget request includes $1.2 billion for the NNSA's Naval Reactors program, an increase of 7.8 percent more than the fiscal year 2011 President's request. The programs in this appropriation support the U.S. Navy's nuclear fleet. Specifically, the request supports the administration's decision to recapitalize the sea-based strategic deterrent. The Ohio Class ballistic submarines, the most survivable leg of the Nation's strategic deterrent, are reaching the end of their operational life. The request will enable Naval Reactors to continue reactor plant design and development efforts begun in 2010 for procurement of long-lead reactor plant components in 2017, in support of Navy procurement of the first Ohio Class submarine replacement in 2019. Providing the Ohio Class replacement a life-of-the-ship reactor core will require substantial advances in manufacturing technology to provide a new cladding and a new fuel system. The request also supports the refueling of a land based prototype reactor, providing a cost-effective test platform for these new technologies.

Increased funding is also requested for the Spent Fuel Handling Recapitalization Project, which will replace the more than 50-year old Expended Core Facility as the location for naval spent nuclear fuel receipt, inspection, dissection, packaging, and secure dry storage. Fiscal year 2012 funding continues the conceptual design for the facility, equipment, and related systems, as well as continues meeting the National Environmental Policy Act's requirements and project oversight (e.g., engineering procurement and construction management). Detailed project engineering and design work will commence in fiscal year 2013 and construction will commence in fiscal year 2015.

These vital projects will replace facilities that date back to the dawn of the cold war with modern facilities that can support the full range of nuclear security missions—including maintaining the nuclear deterrent, preventing proliferation, securing vulnerable nuclear material, powering the nuclear Navy and providing the Nation with the best emergency response and counterterrorism capabilities possible. They will also ensure that NNSA can continue to work with the Department of Defense and other interagency partners to keep the Nation safe.

IMPLEMENTING THE PRESIDENT'S NUCLEAR SECURITY AGENDA

The fiscal year 2012 budget request also provides the resources required to continue to work toward the President's commitment to secure vulnerable nuclear material around the world within 4 years, a key national security goal. The budget request includes $2.5 billion for Defense Nuclear Nonproliferation in fiscal year 2012 and $14.2 billion over the next 5 years to reduce the global nuclear threat by detecting, securing, safeguarding, disposing and controlling nuclear and radiological mate-

rial worldwide, as well as promoting the responsible application of nuclear technology and science.

This request reflects the significant accomplishments of NNSA's nuclear nonproliferation programs in the past year, and seeks the resources needed to complete the President's goals. This budget request provides the resources required to meet commitments secured from international partners during the 2010 Nuclear Security Summit to remove all remaining highly enriched uranium (HEU) from Belarus, Ukraine, Mexico, and other countries by April 2012 and to work with the Defense Department to improve international nuclear security cooperation.

The request of $2.5 billion is a decrease of 5.1 percent from the fiscal year 2011 President's request, but an increase of 19.6 percent more than the fiscal year 2010 appropriation. This 5.1 percent or $138 million decline flows logically from the fiscal year 2011 request which was "front loaded" to accelerate the effort to secure vulnerable nuclear materials within the President's stated timeframe. Even with this decrease, the NNSA's budget request remains consistent with our overall strategy to ensure that programs supporting the President's commitment to lead an international effort to secure all vulnerable nuclear materials around the world in 4 years are fully funded in the request. The Global Threat Reduction Initiative efforts related to radiological material, as well as the International Nuclear Material Protection and Cooperation program's activities to enhance the ability of our foreign partners to detect nuclear smuggling at border crossings and in megaports have been prioritized to accommodate accelerated nuclear material lockdown efforts. The decrease in the request for Fissile Materials Disposition reflects the completion of long-lead procurements for the MO_X and Waste Solidification projects, as well as the decision to wait to request additional funds associated with the $400 million United States pledge for the Russian program until agreement is reached on milestones for the program.

IMPROVING THE WAY NNSA DOES BUSINESS

Consistent with the President's commitment to deliver on critical national nuclear security missions at the best value to the American taxpayer, the fiscal year 2012 budget request will enable NNSA to continue to improve the way it does business and manages resources. The President's budget request for Federal oversight and staff included in the Office of the Administrator appropriation is $450.1 million, an increase of 0.4 percent more than the fiscal year 2011 request and an increase of 7 percent more than the fiscal year 2010 appropriation.

NNSA recognizes that the fiscal year 2012 budgetary investments come at time of severe economic challenge for our country and a renewed commitment to reduce the deficit. To maintain bipartisan support for the NNSA programs, the enterprise has a responsibility to work together as "One NNSA", a fully integrated enterprise that operates efficiently, is organized to succeed, that performs its work seamlessly, and speaks with one voice. This "One NNSA" needs to be a true partnership among Headquarters, the Site Offices and our Management and Operations (M&O) partners.

Changing the way NNSA does business is an important part of the effort to transform a cold war nuclear weapons complex into a 21st Century Nuclear Security Enterprise. NNSA simply cannot expect the Congress to support major investments in its programs and its facilities unless the enterprise can demonstrate that the Department of Energy is a responsible steward of the taxpayer's money.

NNSA needs to do better, which is why the Federal sector leadership is working with its M&O partners to streamline the enterprise governance model in order to devote more resources to critical mission work and maximize NNSA's ability to complete its mission safely and securely.

NNSA is making sure that it has the right contracting strategy in place. The agency is improving its project management by, for example, ensuring that NNSA no longer sets cost and schedule performance baselines on construction projects until design work is 90 percent complete, ensuring it has the right leadership teams in place, and performing independent cost reviews. NNSA has also created a new policy and oversight office for managing major projects. The new office reports directly to the Administrator. This will help ensure that project management gets the high-level focus it requires.

We are already beginning to see results. NNSA is increasingly recognized for its efforts to be an effective steward of tax dollars. For example, since 2007, NNSA's Supply Chain Management Center has saved $213 million by using pooled purchasing power to drive efficiencies across the enterprise. In the last year NNSA's Kansas City Plant won the prestigious Malcolm Baldrige Award, America's highest honor for innovation and performance excellence. Two other NNSA programs were

recognized with Project Management Institute (PMI) awards. In 2010, the Global Threat Reduction Initiative became the first Federal project to receive PMI's Distinguished Project Award, while the National Ignition Facility at Lawrence Livermore National Laboratory received PMI's project of the year.

CONCLUSION

The Nation has carefully evaluated its security needs in an international landscape that remains challenging and uncertain. NNSA has charted a path forward that shows our unwavering commitment to the Nation's security and enhances our formidable capabilities to address broader security challenges.

The NNSA is a technically based organization with a strong nuclear heritage that serves as the base for our contribution to a wide range of national security solutions. NNSA is rooted in the management of our Nation's nuclear weapons stockpile and the application of nuclear energy for naval propulsion. Additionally, NNSA capabilities support a broad range of U.S. and international activities that address existing dangers, identify and prepare for future challenges, and advise the U.S. Government and our international partners on nuclear security matters.

This budget request takes the NNSA into the next decade and strengthens the capabilities that are themselves integral elements of our nuclear deterrent. The challenge is to retain the capabilities that continue to be essential, and to identify and develop those needed for the future.

Senator FEINSTEIN. Thank you very much. I appreciate that.

Data provided by DOE and your entity shows that there are more full-time equivalent (FTE) staff working at the three nuclear weapons labs—Los Alamos, Livermore, and Sandia—than at the height of the cold war. In 1987, there were 12,160 FTEs when the United States had 23,575 nuclear weapons. In 2009, the labs had 13,977 FTEs when the United States had one-third the number of nuclear weapons, namely 5,113.

So, you have had 15 percent more FTEs to maintain a nuclear stockpile that is 78 percent smaller. Could you please tell us why?

Mr. D'AGOSTINO. Yes, ma'am. I think it's due to a couple of reasons, and I—if it is possible, I would like for my colleagues to also answer—follow on with me behind me.

I think one of the main reasons is we have an inherently different program now than we had during the height of the cold war. During the height of the cold war, we were in the process of constantly cycling and training and designing, develop, test, deploy, and take out systems, so there was a constant flow in production. And that type of a process allows a very efficient design through production through finishing off a life-cycle process, if you will, in our weapon systems. And we are obviously doing underground nuclear tests.

Now, we are relying on science a lot more, if you will, to ensure that we can take care of these—the stockpile without underground testing. That is a completely new era that we have had to, in fact, invent, if you will, with our laboratories to develop the tools, deploy the tools. Tools in this case I am talking about are computers, are large, experimental facilities, like the dual access radiographic hydro test facility at Los Alamos, the National Ignition Facility at Lawrence Livermore, the Z machine at Sandia—develop these tools in order to do a lot more subcritical experiments and basic science and material experiments and use the codes to do this. And this requires a tremendous amount more, in my view, of scientists and engineers in order to achieve that capability.

So, the job, I think, in many respects is a harder job, and is not directly attributable one-to-one to the size and number of the stockpiles.

I think the second major reason is we have, in my view, particularly as we look at the data, an increase in the recognition of how these laboratories contribute to a much broader range of national security and nuclear security work than they did 20, 30 years ago. We are obviously—in many cases, our response, the DOE's response, to the Macondo oil spill—the BP oil spill is what it has been called—much of that technology came from three national security laboratories themselves. I would ask Don to add.

Dr. COOK. I think it is a good question. Madam Chairman, if I could add to what the administrator has said, I would emphasize that we do have a broader range of work for multiple agencies. The national weapons labs especially are very important capabilities. They are accessed routinely these days by the Departments of Defense, Homeland Security, and Director of National Intelligence, in addition to DOE.

With regard to the stockpile, it is true that we have the oldest stockpile we have ever had.

Senator FEINSTEIN. Well, that is going to continue.

Dr. COOK. Yes. Yes.

Senator FEINSTEIN. I mean you are just going to build the stockpile.

Dr. COOK. I think that is a clear statement. It is going to continue. It is also currently the smallest stockpile we have had since the days of the Eisenhower administration. The fact that it is the oldest and smallest means now that as we go forward, while we may continue to reduce warhead numbers, we must modernize, at the same time, the deterrent warheads and the infrastructure. And those are key contributors to the size of the workforce that we have.

Senator FEINSTEIN. Just as an aside to my colleague, you know when I was mayor of San Francisco—it has been that long ago—we computerized the city. I had the computer companies in and talked to them because it was a big contract. We thought oh, it would save the city money. I think it was a substantial number of employees, in the thousands; I cannot remember what. So, we did it. Do you think it reduced employments? No. It increased employments. So, you know, I think there is that factor that technology does not necessarily reduce employees qualified to handle the technology.

But since it is just the two of us, and I will give the ranking member as much time as he wants, I want to just ask one other question right now.

Senator ALEXANDER. Please go ahead.

Senator FEINSTEIN. I expressed some concern about the risk of insiders stealing or helping to steal nuclear materials, and I think the large number of sites around the world magnifies that threat. For example, Russia and countries in the former Soviet Union alone have more than 230 buildings at more than 130 sites that store weapons usable nuclear materials.

So, the question is, what is NNSA doing to consolidate nuclear materials to a much smaller and easier to protect number of sites and buildings, especially in Russia?

Mr. D'AGOSTINO. If I could start and then ask Anne Harrington to follow on.

Senator FEINSTEIN. Please.

Mr. D'AGOSTINO. But we have a very active program with the Russians to not just secure material at their sites, but we have a sustainability component with the Ministry of Defense in Russia. We have essentially completed the security work there, and they have agreed and are following up on making sure that those security upgrades are maintained and to have them out into the future.

With Rosatom, which is what—a little bit more on the civilian side or a little bit more equivalent to the NNSA, we have an active program of upgrading their sites there, and we have more of a cost-share arrangement to do on the work there.

There is more work that has to be done in Russia, and Anne's team is working actively to partner with our colleagues there to make this happen.

Senator FEINSTEIN. Let me just stop you. Does it need 230 buildings at 130 sites?

Mr. D'AGOSTINO. In fact, this is one of the concerns that we, together with the Russians, acknowledge that the more material that you have and more sites there is, the harder it is to protect. In this country, we have undertaken our own efforts for material consolidation because in the long run it is cheaper to protect material at fewer sites.

Senator FEINSTEIN. How many sites do we have in comparison?

Mr. D'AGOSTINO. Well, the 230 sites are—we have our 7 main sites, but within those 7 sites we are looking to move material out of the Lawrence Livermore Laboratory to reduce the security footprint and move some of that material into some of our other sites because we think it is not just safer to protect, but it is also cheaper. We hope to be saving some security dollars as a result of that.

Senator FEINSTEIN. We will mark that down.

Mr. D'AGOSTINO. Anne, do you want to add anything, please?

Ms. HARRINGTON. I would just add that it is a matter of our program policy that any country in which we work, we do encourage the consolidation of materials. And, in fact, that is what the 4-year effort is really aimed at, is not just consolidating materials, but consolidating and then removing the materials permanently, and then providing physical security upgrades in that interim period between when we negotiate the agreement and physically remove the material.

Senator FEINSTEIN. Ma'am, let me just interrupt you again. I understand that April 2010 was the halfway mark of the goal of securing all vulnerable nuclear materials in 4 years. Are you on track to secure it all in 4 years?

Ms. HARRINGTON. Well, April 2010 would have been 1 year, so approximately now would be 2 years from April, yes.

Senator FEINSTEIN. Well, now it is 2 years.

Ms. HARRINGTON. Yes, correct. We are about halfway at this point.

Senator FEINSTEIN. So, you have 2 more years.

Ms. HARRINGTON. Correct. I have to admit the continuing resolution situation that we have been in up until recently this year has presented some real challenges in terms of maintaining our schedule. We have deferred some other activities in order to keep these removals on schedule. We will have perhaps a little slippage, but

not out of calendar years. We certainly are on track right now with Ukraine, Mexico, and Belarus to meet those high-level nuclear security summits commitments to remove all materials by the time we hit the 2012 summit. So, we feel confident right now that we can make up——

Senator FEINSTEIN. You could make that 2-year goal.

Ms. HARRINGTON. We are on schedule to do that right now.

Senator FEINSTEIN. One quick question, are you prioritizing the sites?

Ms. HARRINGTON. Absolutely.

Senator FEINSTEIN. So, there is a list of priorities?

Ms. HARRINGTON. Correct.

Senator FEINSTEIN. Could we see that list please?

Ms. HARRINGTON. We can get that to you, yes.

Senator FEINSTEIN. Okay. Thank you very much.

Mr. Vice Chairman? You go ahead, and then we will go back and forth.

Senator ALEXANDER. Okay. Thanks, Madam Chairman.

Mr. D'Agostino, I would like to have just a little conversation with you about big projects and bringing them in on time and on budget. I mean, you have got a former mayor here and a former Governor here, so we are frustrated by the lack of executive opportunities we have in the U.S. Senate. So, this is a chance for us to weigh in.

But you have got some really big things going on. I mean, the Uranium Processing Facility (UPF) is estimated to cost $4.2 to $6.5 billion. That is a pretty big range. I mean, and a few years ago it was $1 billion, and then it was $2 billion, then it was $3 billion, and it is still going up. The Chemistry and Metallurgical Research Facility at Los Alamos, the range for it is $3.7 to $5.8 billion, and that is a massive range. And then we can go down the list of other big projects. Mixed oxide fuel, which is nearly $5 billion. The Life Extension Projects that is part of our nuclear modernization, those are $3 billion and $4 billion. So, these are big, big projects. And I remember the excitement that happened in Oak Ridge when the Spallation Neutron Source came in on time under budget, although it was a massive physics project.

So, what can we do to be helpful to administrators, such as yourself, to set up a process by which we can take these big—I mean, I can add up at least $20 billion of projects over the next few years just in your area, and come up with a goal and a design, and then together we will see if we can stick to that goal and design and see if we can do it in a way that does what we need to do, but at the least possible cost.

I know that is your objective, but sometimes that is hard to do in Government. What can we do to help you achieve that?

Mr. D'AGOSTINO. Senator Alexander, first of all thank you. I appreciate the opportunity to talk to executives in this fashion and get your insight as well.

I think one of the main things as a subcommittee that you can do is give us the time to interact in sessions such as this and in other sessions where we can talk about, on a fairly regular basis, our progress, our plans, and our steps on meeting our, essentially, our collective objectives of providing the Nation the capability. The

objective is not to spend all that money; that is not the objective. The objective is to get the capability for the Nation, as you said, in a fashion that gets it on time, on budget, and what the country needs to move forward. So, time with you, Sir, with the subcommittee as a whole, with you and your staff, and reporting, you know, on the appropriate basis is very helpful to us.

Senator ALEXANDER. But would not the first thing to do to be—to get a design and a cost estimate that you can live with? Would that be the first thing? How do we get to that point?

Mr. D'AGOSTINO. I basically see three broad steps that we are in the process of taking and either have completed or need to finish off on. One is getting our policy—project management policies correct. We have in the Department, most recently within the last year, and now are implementing in our projects, whether they are small dollar projects or billion dollar projects, a couple of key principles. And that is, we do not go off and declare what something is going to cost until we actually know what it is we are building and we have that design largely completed. Once that baseline is set, then it sticks. That would be one thing.

The second thing is annual detailed independent peer review analysis. One of the things that we have learned from the Office of Science, which talked about the spatial neutron——

Senator ALEXANDER. Analysis of what, of the construction?

Mr. D'AGOSTINO. Of the construction project—of the project itself, independent peer reviews on an annual basis of the projects themselves, so this is something we are committed to doing. And, in fact, for two of these large facilities that we were just talking about, that is actually under way. My principal deputy, Neile Miller, sitting behind me, has started this type of an interaction and dialogue with the Defense Department, people outside of the NNSA and even outside of DOE, to bring project experts and other experts that independently check our work on a regular basis. That is another important policy element that we have in place.

The next important thing is bringing the right people to bear on the problem. One of the great things that Neile Miller has brought to the table is looking at and recognizing that over the next 10 years, project management is our—has to be our key focus in this organization because that will define, first of all, can we——

Senator ALEXANDER. Well, let me not be rude and interrupt.

Mr. D'AGOSTINO. Yes.

Senator ALEXANDER. Let me go—get you to slim that answer down a little bit. I mean, what are the three steps you need to take? Do you not first need to design—you first you need a policy.

Mr. D'AGOSTINO. We have to get the policy right.

Senator ALEXANDER. Right.

Mr. D'AGOSTINO. We have to get a design——

Senator ALEXANDER. Then you have to get a design.

Mr. D'AGOSTINO [continuing]. That we have actually checked on, that has been independently checked to be true and been validated—independently checked and validated.

Senator ALEXANDER. Then you need a cost estimate, is that fair?

Mr. D'AGOSTINO. That cost estimate and the design will go together.

Senator ALEXANDER. So, those come together.

Mr. D'AGOSTINO. We have a schedule.

Senator ALEXANDER. So, once you have a policy and a cost estimate design, then you are ready to go, is that——

Mr. D'AGOSTINO. Then we are ready to go——

Senator ALEXANDER. Right.

Mr. D'AGOSTINO [continuing]. And then we will come back and——

Senator ALEXANDER. And then it is the regular review of your progress toward a goal.

Mr. D'AGOSTINO. Right.

Senator ALEXANDER. And our involvement in that—well, lets just—take these two examples of the UPF—I mean, there you have got $4.2 billion to $6.5 billion in the Chemistry and Metallurgical Building at Los Alamos, $3.7 to $5.8 billion. How soon before we get—is the policy set on those two projects?

Mr. D'AGOSTINO. Yes, it is, to get 90 percent design on those projects, yes, Sir.

Senator ALEXANDER. Okay. When we do we get 90 percent design on those two projects?

Mr. D'AGOSTINO. October 2012, is that right, Don?

Dr. COOK. Yes. It is the end the end of fiscal year 2012.

Senator ALEXANDER. Yes, the end of next year——

Mr. D'AGOSTINO. Yes.

Senator ALEXANDER [continuing]. We will have our policy and our cost-estimate design at some number.

Dr. COOK. That is correct. We are now just a bit beyond 50 percent full engineering design on each of the two projects, chemistry and metallurgy research, UPF. Another step we have taken is to require actually the parent companies to integrate the design teams, look for common buys, gloves boxes we will use in both facilities, develop a plan of phasing that allows us to build—these are, after all, new nuclear builds. They are the hardest categories to replace capabilities really that have exceeded 60 years of age.

Senator ALEXANDER. Right. So by the end of next year there is a design and a cost estimate. But between now and then, what do we need to know about what you are doing to help you get a cost estimate you can live with? I mean, what do we need to be doing?

Mr. D'AGOSTINO. Well, Sir, you need—one of the things you will need to know is that we are not just resting on input we are getting from our M&O contractors. We are having these independently checked on one case, and we are probably going to have two independent checks because these are such large facilities. The one that we are doing with our colleagues in the Defense Department, and we will commission another independent check ourselves separately from that because one of the things I want to get us in the habit is under promising and over delivering, and when we make a commitment we deliver on that commitment.

Senator ALEXANDER. Well, we can continue this discussion another time. But to me, this boils down to a pretty simple thing, from our point of view, a very complex operation from yours. But it is to define the points where we get a real cost estimate and a real design and we say okay, that is it, you know. And we are then going to probably embark on a 3-, 5-, 6-, or 7-year period, right, of construction.

Mr. D'AGOSTINO. Yes, Sir.

Senator ALEXANDER. And so, during that period of time we should be having quarterly discussions about are you on schedule? If you are not, why not, so that we do not wind up and find that a $4 billion cost estimate ends up being a $7 billion——

Mr. D'AGOSTINO. We would be happy to come up quarterly during the period of time as we get into construction in order to let you know the progress. We will be getting ourselves monthly updates on earned value as well. So, I think rolling it out on a regular basis so you have confidence that we are on track is——

Senator ALEXANDER. Madam Chairman, that sounds awfully primitive for me to suggest, but it is almost a matter of being that simple from our—I mean, if every 3 months all they have to report is we are under budget and we are on schedule, then the meeting might last 10 minutes. If it is not, why, it might take a longer period than that.

Senator FEINSTEIN. I understand that, right.

Senator ALEXANDER. So, I have some other questions, but I think I will stop now. Thank you for your courtesy.

Senator FEINSTEIN. Okay, all right. Let me just put my philosophy on the table, which I think you already know. I am not for new nuclear weapons. I will do everything I can to prevent the development of a new nuclear weapon. I want to see them gone all over the world, and I will support any program to get that done, and I think I have been fairly consistent. We have had this discussion before, and you know where I stand.

Okay. As you know, the JASONs have found that most plutonium pits have a lifetime of at least 100 years. It is my understanding that once again you are planning to manufacture new plutonium pits for weapons undergoing life extensions. The question is why.

Mr. D'AGOSTINO. I will start and then I will pass to Dr. Cook to add to that with some details.

The JASONs did validate the analysis that we have performed at our laboratories that pit aging is not the issue that we once thought it was 8—7, 8 years ago or so. And that is actually a great thing because had it been the case where plutonium aging was one of the things that we would have to more aggressively go after, we would be looking in—at a situation—looking at a different type of a problem on the need to have a higher pit production capacity.

The plutonium production pit sustainment effort itself that Don's program runs has a large part, in my view, couple of components to it. One is bringing back and maintaining a capability, maintaining a very small set of expertise in order to—for the Nation to be able to respond to unknown technical changes as a result of dealing with this very unique material that is a manmade material that we have a fairly limited data set of knowledge on. It has been around for 60 plus years or so, and that is about all the information we have on it. So——

Senator FEINSTEIN. Let me cut to it. If the pits are all good, why do you want to manufacture new pits?

Mr. D'AGOSTINO. Don.

Dr. COOK. Again, I think it was a very good question. Let me try to give a quick technical answer.

JASON determined that the lifetime of the plutonium parts in pits are good for 100 years or 80 was their conclusion. Due to plutonium decay, which is by alpha—that is helium—that interstitially causes a potential problem.

The actual problems that we have go well beyond that. We have the plutonium pits in the midst of the chemistry of high explosives with binders that decompose just like plastics in cars exposed to the sun. The plutonium is radioactive; the decay goes on. That degrades all of the plastics, all of the cushions, all of the things that are around the pit. And it also causes corrosion in the pit.

So, on the one hand, JASON is absolutely correct about what they said, but the difficulty is that as weapons get older, much of the chemistry in a radiolitic environment starts to take over. And that has been the problem.

Senator FEINSTEIN. Yes.

Dr. COOK. And we have invested many of the people and time in surveillance to actually pin down in which weapon systems we are seeing those kinds of problems, and we can predict how long they are good for. Those are not good for 100 years.

Senator FEINSTEIN. Well, I think I would like to have a discussion with the JASONs, and particularly SIDREL. I have discussed this in the past, and I would like to do it again, and I would like to do it with both of you present——

Dr. COOK. I absolutely support that.

Senator FEINSTEIN [continuing]. And Senator Alexander, because I hear different things. It is fair to say that you all wanted to develop new nuclear weapons. That's what RRW essentially did. It was killed because of it, and I do not want to see, you know, RRW in disguise right now.

Mr. D'AGOSTINO. We would be glad to come up and talk to you, Senator, in a session. The key here are no new pit nuclear component designs and we are very consistent with that. I think Sid and I will be on the same page with this, but we would like to be able to show you personally.

Senator FEINSTEIN. Because what you have always led me to believe is that modernization is really for the protection of the workers who work around some of the chemicals that are extraordinarily dangerous and may be deteriorating. But I was under the express belief, based on some of our discussions, that all of these new pits that were requested some years ago were really forming the foundation of a new nuclear weapon, not just a modernized nuclear weapon.

Mr. D'AGOSTINO. Senator, I want to make sure I am clear on what our plan is on plutonium sustainment so there is no question about it.

What we are planning on doing is manufacturing a pit design that we currently have in the stockpile of a particular warhead and wanting to—because those we have very few of. And we believe that in order to reduce the size of the stockpile, that particular pit design, which already exists—it is not a new pit—is going to be the pit design that will allow us to potentially consolidate the number of different types of warheads and allow us to reduce the overall number of warheads.

Senator FEINSTEIN. Okay.

Mr. D'AGOSTINO. That is the key.

Senator FEINSTEIN. So, how many pits are you talking about?

Mr. D'AGOSTINO. On the plutonium sustainment? Don, what—are there 20 per year?

Dr. COOK. The answer in terms of our capability——

Mr. D'AGOSTINO. Yes.

Senator FEINSTEIN. No, amount total to manufacture under this proposal.

Dr. COOK. Let us see. We have been required by the Department of Defense, by U.S. Strategic Command, and by the requirements that we have laid to have a capability that is not less than 50 pits per year nor more than 80 for the——

Senator FEINSTEIN. So, are you saying to produce 50 to 80 new pits a year?

Dr. COOK. That to have not less than 50 and not more than 80 is the——

Senator FEINSTEIN. Produced each year?

Dr. COOK. That capability requires, yes, that is correct.

Senator FEINSTEIN. For a total of how many new pits?

Dr. COOK. That is the number per year, and so if one calculates the number of years you would get that. It is consistent with the——

Senator FEINSTEIN. Calculated how many years?

Dr. COOK. It is consistent——

Senator FEINSTEIN. Somebody must know how many pits you plan to make.

Dr. COOK. Yes. It supports a stockpile of 3,000 to 3,500 weapons in aggregate, the total as the Nuclear Posture Review and the national policy has laid out. Not that many will be on active alert, but that is the requirement for the total number including those——

Senator FEINSTEIN. So, what you are telling me is that the administration's design, or the Government's design, is that there are essentially 3,500. Well, I will not use the word new nuclear weapons, but with new pits essentially within what period of time?

Dr. COOK. I—you know, I do not want to say that every one of those is a new pit. The capability that we are putting in place has that capability to manufacture that number of pits per atom—per annum, and the comparable number of secondaries in UPF at Y–12, if required. Overall, the capabilities support the stockpile as envisioned in the Nuclear Posture Review, the new START requirement. And the plan to continue to reduce the number of nuclear weapons——

Senator FEINSTEIN. To what?

Dr. COOK. All together.

Senator FEINSTEIN. If you had these pits, how much would you reduce the stockpile by? I mean, this is important.

Mr. D'AGOSTINO. Yes, it is very important. We have a report called the Stockpile Stewardship Management Report. There is a section in it that is classified which goes system by system, and it talks about taking—there are two numbers there. One is obviously bigger than the other one. I would say just quick math off the top of my head, there is about, if you will, once the capability is in place, maybe a 40 percent reduction in the size of the stockpile.

Senator FEINSTEIN. I do not want you to do it off the top of your head as much as I think you are terrific.

Mr. D'AGOSTINO. Yes.

Senator FEINSTEIN. This is a big thing for me.

Mr. D'AGOSTINO. Sure.

Senator FEINSTEIN. I mean, it is one of the reasons why I am sitting right here—why I run for this office, because I want my grandchildren and their children to grow up in a nuclear-free world. I am going to do everything I can to be helpful to get there. So, this is not something that I am just going to fluff off and forget about.

Mr. D'AGOSTINO. Madam Chairman, I would say we have the details that we would like to share with you in the report that we provided, and we will go over that in great detail with you, with our Defense Department colleagues to show about the types of changes that we are—that we collectively are planning on making in our proposal, if you will, which this budget is a part of. It is—budget——

Senator FEINSTEIN. Because the way you have always sold your program to me is that if we do this, we can reduce the stockpile by more.

Mr. D'AGOSTINO. Yes, ma'am, that is the case.

Senator FEINSTEIN. You gave me some numbers before, but I did not think they were very sufficient. So, I want to know with this proposal and all this money you are getting, by how much will the nuclear stockpile be reduced?

Mr. D'AGOSTINO. We will be glad to go over that with you precisely by—with actual numbers and warheads.

Senator FEINSTEIN. Okay. Thank you.

Senator Alexander.

Senator ALEXANDER. I have three questions, and they do not necessarily require long answers. But I would like to ask all three questions——

Senator FEINSTEIN. Go ahead.

Senator ALEXANDER. Mr. Administrator, I am a little puzzled by your single-mindedness on consolidating the contracts that—at Y–12 and Pantex. I mean, they do not have overlapping missions. They both seem to be operating efficiently right now. You have got all these big projects to supervise and try to do as efficiently as possible. GAO has been studying the consolidation proposal, and a preliminary report suggests it is not a great opportunity for savings.

Would it not be better to defer any decision about consolidation until we get the GAO report in July, and instead focus more of your time on working with the existing contractor to find savings and on other big projects where you might find savings?

Mr. D'AGOSTINO. Senator Alexander, we are committed to working with the existing contractor, and have worked with the existing contractor to identify savings, and have gotten—received some input from the existing contractor, who is doing a very good job.

We have been looking at ways to make sure that we run our enterprise in the most efficient and integrated fashion as possible. One of our views is that we are looking to have an enterprise, if you will, not eight independent sites make maximizing their capability at their sites. And, in fact, I have studied this for about 3

years. We did not just study it ourselves. We asked an external consultant known as Navigant Consulting, to take a look at what opportunities there are specifically at each of these sites, and what could the Federal Government realize from the standpoint of efficiency improvements, couched in dollar terms, of course, but our goal, of course, is to drive those resources into mission critical work and have the workforce realigned from that standpoint.

So, we have done a study ourselves. We, in fact—we commissioned a completely independent study, which showed many hundreds of millions of dollars per year as an opportunity over the next 10 years that could be saved—many hundreds of millions of dollars.

I have not seen the GAO study. I recognize that there was a press report I think that just came out recently. But what I will say is—and I am anxious to see it frankly because it is important for us, and this is why we are proceeding methodically to make sure we get input from the contractor community before we make a final decision. A decision will rest essentially with the—the Secretary and I will go through and we are going to conduct our external checks to make sure that things are done in an appropriate manner.

This is probably, you know, one of the more important decisions we will be making this year, and I am committed to making sure that we have all the data. If the GAO has uncovered new information, I want to make sure that gets factored into our analysis and the like.

I do believe in discussions that are very sensitive to the particular point on disruption of potential contract competition might have on very important work that is ongoing. And we have looked ahead at when we expect to be at the 90 percent design points and what it will take to independently check those. And, as Dr. Cook mentioned, the end of next year is roughly a period of time that—where that comes to play. And it is clear we probably would not want to have any changes prior to that point because as—because of the disruption piece.

But we have managed contract changes in the past, and we know it can be done in a way that does not impact the workforce and does not disrupt, more importantly, the workflow that happens there as well.

Dr. Cook, if you have any other insights on this.

Dr. COOK. I would just say we are paying particular attention to making sure that we are not doing anything to destabilize the UPF team or any of the M&O teams. They continue to do very high-quality work.

With regard to the cost savings, it is not our objective to reduce the employment levels. It absolutely is our objective to increase productivity, not just through consolidation if appropriate of contracts, but the linking of the deliverables through all that we do. And we are studying that fairly intensely as you might normally expect.

Senator ALEXANDER. Thank you. The new mixed oxide fuel that will be produced at Savannah River—do you have any concerns about its safety if it is used in Tennessee Valley Authority reactors? And should it be less expensive fuel for the reactors, thus saving the Tennessee Valley Authority (TVA) rate payers money?

Mr. D'AGOSTINO. I will start, and then I will ask Dr. Harrington to follow.

We have done, and there have been done a number of studies with respect to mixed oxide fuel. It is the material—fuel material that has been around for a while and has been in many tens of reactors worldwide and operating for more than 20 years. So, I think the safety aspect of this is well established.

We, of course, will continue to study this with potential buyers at TVA, for example, to make sure that they have complete and full access to any information they need to make sure that they are confident in that.

Senator ALEXANDER. My question simply is, is it safe to use it, and will it be cheaper——

Mr. D'AGOSTINO. Yes.

Senator ALEXANDER [continuing]. To use it?

Senator ALEXANDER. The answer is, yes, it is safe to use.

Ms. HARRINGTON. Yes, it is. And I think on the question of cost, obviously this is a nonproliferation program; it is not a commercial fuel program, so there is that difference. And the cost will be no more than and perhaps less than other commercially available fuel.

Senator ALEXANDER. Thank you. Madam Chairman, I have one other question, but I will defer to you for——

Senator FEINSTEIN. No, please. I think I have satisfied my questions, and I am going to follow up on the items of interest to me.

Senator ALEXANDER. I have got an idea you were going to do that.

But my question is simply for the Admiral, and it goes back to what I said. The Navy operates small reactors, and it has about the same number of small reactors that we have civilian reactors around the country, all of which are large. In the civilian area, we speculate—I know Dr. Chu has talked about this—that a small reactor might be a useful way for the United States to move ahead with nuclear power, maybe 125, 150 megawatt reactors. What can the Navy's experience with small reactors teach us about how we might move ahead in the civilian side with small reactors?

Admiral DONALD. Yes, Sir. Thank you for the opportunity to be here today.

Senator FEINSTEIN. Could you qualify small reactors?

Senator ALEXANDER. Well, a small reactor—a typical one like the new one, Watts Bar reactor being built at—by TVA is 1,180 megawatts. A small reactor, such as the one that B&W proposes to build would be about 125 megawatts. And 125 megawatts, Dr. Chu has talked about a small reactor of that size would be a lot cheaper to build, and it would be about enough power to operate the entire Oak Ridge complex, for example. The city, the laboratory, and the Y–12 facility might all operate with that one small reactor. The argument for it is it could be made in the United States, shipped to Oak Ridge or Alaska, wherever they want to use them. And if they needed two, they could put two side by side or three side by side. That is the argument for it.

But with the Navy having all this experience since the 1950s, so successful with small reactors, I wonder—if we are taking advantage of your experience or if this is one silo over here and this is another over here.

Admiral DONALD. Well, Sir, I think you really have to go back to the very beginning of the commercial nuclear power program. Where it started was with naval reactors. Amarico, we are building the shipping port plant in Pennsylvania. Really that design stemmed from what he had learned from building the Nautilus and subsequent submarine plants and the technology—basic pressurized water reactor technology, which is one of the options for small modular reactors. That really was founded in the Naval Reactors Program and has been developed through the Naval Reactors Program with collaboration in commercial industry either directly or indirectly. We have had engagement with commercial industry over our history in design work and things of that sort. Indirectly there are a significant number of employees working in commercial nuclear who started in the Navy nuclear program. So, many of the standards and technologies and things that they learned in our program, they have transitioned into the commercial sector.

With specific focus on the small modular reactors that are being discussed today, in fact Babcock and Wilcox, B&W, who is—has one of the options for a small modular reactor in power, I believe it is called, it just so happens that they also are one of our major suppliers, and they do much of our work. In fact, about 70 percent of our industrial base is really B&W type work that is done. So, there is some leveraging there of lessons that they have taken from building our plants, obviously with protecting our security, our classified information, but translating that into what could be a viable small modular reactor. So, I think that is a good synergy there if that is to be made to happen.

I think there are those who—some have considered should we just transition naval reactors directly into small modular reactors, and the fact of that is that is probably not a good idea. Because of the standards that we build them to, we have to have shock standards that are significantly above what a commercial reactor would have to operate at.

Our operating profile is very different from a commercial plant, so we design them for different ends, and they actually would likely not be cost effective for a commercial application. But again, the application and the synergy between the industrial base in the commercial world and the industrial base in the naval world I think provides opportunity for them to learn from what we have learned and provide opportunities in small modular reactors, if the commercial industry sees them as being feasible.

ADDITIONAL COMMITTEE QUESTIONS

Senator ALEXANDER. Thank you, Madam. Thank you, Admiral. Thank you, Madam Chairman.

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

QUESTIONS SUBMITTED BY SENATOR DIANNE FEINSTEIN

Question. The National Ignition Facility (NIF) was supposed to demonstrate ignition by September 2010. However, the goal of achieving ignition has been postponed by more than 1½ years because of unexpected scientific and technical challenges.

How confident are you that the NIF will achieve ignition by June 2012? If this goal is not achieved by then, what does it mean for the future of the ignition program?

Answer. Pending any unforeseen major technical challenges, I am confident in NIF's ability to achieve ignition by fiscal year 2012. NIF is currently operating on a schedule where as by the end of fiscal year 2011, all of the experiments and capabilities required for the NIF to begin ignition experiments will be complete, and the goal is to demonstrate ignition, or "gain equal to one", by fiscal year 2012. "Gain equals one" means the capsule will produce more energy than the amount of energy delivered to the target, also called the hohlraum.

An National Nuclear Security Administration (NNSA) panel chaired by the Under Secretary for Science, Dr. Steve Koonin, has been formed to advise on technical progress, and the most recent review showed that the National Ignition Campaign (NIC) is making excellent technical progress. The principal focus is to ensure that a rapid, yet reasonable, amount of progress is being made on completing the scheduled ignition efforts. The NNSA's major concern is to ensure that further delays do not occur, except as a result of presently unknown technical issues that might have to be resolved. Ignition is a major technical challenge and the present NIF work is a culmination of decades of research. Should any unforeseen major technical issues arise that could potentially impact the goal of achieving ignition by fiscal year 2012, NNSA will re-evaluate and adjust the goals of the NIC accordingly.

Question. NNSA owns 43 million square feet of physical infrastructure.

What plans does NNSA have in place to reduce the footprint of the labs and production facilities and reduce maintenance costs?

Answer. NNSA is continuing its footprint reduction efforts within available funding. The fiscal year 2012 Stockpile Stewardship and Management Plan conveys NNSA's strategy to consolidate and modernize the Nuclear Security Enterprise.

NNSA has actively been working to comply with the Energy and Water Development Subcommittee fiscal year 2002 conference report 107–258 for reduction of footprint. For the period 2002 through 2009 NNSA constructed 1,447,865 gross square footage and eliminated 3,700,620 gross square feet of facility footprint. The net result of these efforts is elimination of approximately 2,252,755 gross square feet of the NNSA footprint. NNSA will continue working to meet this requirement by reducing excess facilities as funds allow and by using footprint reductions to ensure the offset requirement is met.

Question. NNSA has been criticized over the last several years for failing to maintain an adequate surveillance program, which is essential for determining the health of the nuclear weapons stockpile.

To what extent has NNSA improved its surveillance program and addressed the concerns of the JASONs, lab directors, and the Department of Defense (DOD).

Answer. Surveillance activities are essential to enabling continued certification of the reliability of the stockpile without nuclear testing. Surveillance involves withdrawing weapons from deployment and subjecting them to laboratory tests, as well as joint flight tests with the DOD to assess their reliability. These activities allow detection of possible manufacturing and design defects as well as material degradation over time. NNSA continues to implement a surveillance program that builds on those core activities, which allows us to support the current state of the stockpile, detect in advance potential problems, and take remedial actions.

NNSA has reviewed the stockpile surveillance program and its funding profile. Since fiscal year 2009, the surveillance budget has increased by 50 percent, from $158 million to $239 million. In the fiscal year 2012 budget, the President seeks to sustain this increase and a more robust surveillance program throughout the fiscal year NSP.

With this increased funding, many improvements have been made on surveillance. NNSA increased the number of planned laboratory and flight tests from 48 in fiscal year 2010 to 74 in fiscal year 2011. The total number of planned major surveillance activities (including pit, canned subassembly, gas transfer systems, detonator cable assembly tests and disassembly and inspection) also increased from 276 in fiscal year 2010 to 432 in fiscal year 2011. In addition, surveillance activities supported the development of diagnostic capabilities at Y–12 for critical components of the nuclear explosive package. These capabilities will aid the current W76–1 production and surveillance of other warheads in the stockpile. This increased testing rate and improved diagnostics continue to be supported in the fiscal year 2012 budget request. Furthermore, NNSA has taken action to hire a Surveillance Senior Technical Advisor, supported by an appropriate staff through a newly developed Surveillance Governance structure to assure a cohesive program, enables a cost-effective program, and integrates surveillance activities across the nuclear weapons enterprise. Together, the increased funding, additional focus, and hiring of a senior surveillance

engineer should address the concerns expressed by the JASONs, laboratory directors, and DOD.

Question. The JASONs found that most plutonium pits in nuclear weapons have a lifetime of at least 100 years. However, NNSA is planning to manufacture new plutonium pits for weapons undergoing life extensions.

Why does NNSA have plans to manufacture new pits? What are the advantages and disadvantages?

Answer. The Nuclear Posture Review (NPR) found that in order to sustain a safe, secure, and effective U.S. nuclear stockpile, for as long as nuclear weapons exist, the United States must possess a modern physical infrastructure and a highly capable workforce with the specialized skills needed to sustain the deterrent and support the President's nuclear security agenda.

In 2006, the Los Alamos National Laboratory and Lawrence Livermore National Laboratory reported that the majority of pits in the stockpile can have estimated "lifetimes" in excess of 85 years or more based on the best estimates of plutonium changes with aging. All nuclear weapons generally and primaries specifically have other components with much shorter shelf lives that have to be maintained or replaced on a more frequent basis. Finally, as recognized by the JASONs and NNSA, the science of plutonium aging is not complete. The uncertainties in these estimates are large and contain significant variables which may affect plutonium and pit lifetime that are not yet fully understood. As the weapons age, they must be maintained in order to assure their reliability and extend their lives. Throughout this maintenance or life extension process, NNSA is directed by National Security Presidential Directive 28 to look for opportunities to enhance the safety and security aspects of the weapon (while still meeting the military requirements originally established for the weapon). One of the ways to enhance both safety and security is to move toward a stockpile that is based on insensitive high explosives (IHE) instead of conventional high explosives (CHE). IHE-based weapons are safer in almost every environment across the Stockpile-to-Target Sequence. Should NNSA receive authorization to proceed toward a totally IHE-based stockpile, we will need the ability to either manufacture these previously designed and tested pits or perform rework on existing pits.

The current facility that NNSA manages for producing plutonium pits requires modernization to continue maintaining a "safe, secure, and effective" stockpile in the future. The manufacturing capacity will need to be increased to meet the anticipated requirement of 50–80 pits per year by 2022. The aging infrastructure is being addressed through TA–55 reinvestment. Additional programmatic investments will be required to develop and sustain the workforce required to execute the program at TA–55 in the coming years. What we are doing now is an effort to create a sustainable plutonium pit manufacturing capacity at the PF–4 facility that will be able to support the body of work addressed in the fiscal year 2012 Stockpile Stewardship and Management Plan. Moreover, the PF–4 facility is an important component of the administration's effort to provide a sustainable Nuclear Security Enterprise. Such a facility is one of the enablers for the United States to shift away from retaining large numbers of nondeployed warheads as a hedge against technical failure or geopolitical surprise.

The pit manufacturing capability being pursued for PF–4 will provide NNSA the ability to produce a limited number of new pits, up to 80 per year, or to perform rework on existing pits—this does not mean that each year we will exercise the full capacity of the facility. PF–4 will provide NNSA with the minimum capacity to support the President's plan to life extend the stockpile. Per the NPR, each life extension program will be conducted on a case-by-case basis and we will study options for ensuring the safety, security, and reliability of each nuclear warhead. Our scientists, engineers, and technicians will study the full range of life extension approaches, to include refurbishment of existing warheads, reuse of nuclear components from different warheads, and replacement of nuclear components. In any decision to proceed to engineering and development, strong preference will be given to the refurbishment and reuse approaches. However, we may not be able to meet some critical Stockpile Stewardship and Management Plan goals, such as increased safety, security, and reliability, using those two approaches. In such cases, replacement of nuclear components will be pursued, but only when specifically authorized by the President and approved by the Congress.

Possessing the ability to manufacture plutonium pits provides many advantages to the Nation and to NNSA. We are able to exercise and retain the highly skilled workforce of scientists, engineers, and technicians central to a responsive manufacturing capability. Further, we retain the agility necessary to respond to technical or geopolitical issues in a timely manner, allowing us to retain a smaller hedge. The

pit manufacturing and rework capability presents opportunities to take advantage of safety and security advancements to make the stockpile safe, secure, and reliable.

FOUR-YEAR EFFORT

Question. April 2011 was the half way mark of the goal of securing all vulnerable nuclear materials in 4 years.

Is NNSA still on track to achieve this goal in 4 years?

Answer. NNSA is currently on track to complete the objectives outlined in its 4-year effort. NNSA's progress to secure and eliminate nuclear material is described in more detail in the classified "Report to Congress on Securing Vulnerable Nuclear Material" submitted jointly in April 2011 by NNSA and DOD. Although the focused 4-year effort ends in 2013, nuclear security is an enduring responsibility as long as any material exists, and NNSA programs will continue to be guided by the evolving threat environment.

NNSA plays a major role in the international effort to secure the most vulnerable nuclear material around the world in 4 years, working in coordination with DOD, the Department of State, the Nuclear Regulatory Commission (NRC), other elements of the U.S. Government, and international partners. NNSA programs have made significant progress toward achieving key programmatic goals for securing and eliminating weapons-usable nuclear material. NNSA's accomplishments include the following:

—Removed approximately 3,085 kilograms of weapons-usable highly enriched uranium (HEU) and plutonium from countries around the world, including 960 kilograms—enough material for 38 nuclear weapons—since April 2009.

—Completed security upgrades at 32 buildings containing weapons-usable material in Russia and initiated new insider threat upgrades at 15 facilities in Russia since April 2009.

—Completed shipments of spent fuel from Kazakhstan's BN–350 plutonium production reactor to a secure facility in eastern Kazakhstan in 2010. The spent fuel contains enough HEU and weapons-grade plutonium for 775 nuclear weapons.

—Advanced efforts to establish Centers of Excellence (COE) for nuclear security with China, India, Japan and the Republic of Korea, working in coordination with DOD, NRC, and Department of State. The COEs will provide national, regional, and international training and workshops on nuclear security best practices; demonstration of available and effective nuclear security technologies; nuclear security research and development; legal and regulatory frameworks; and bilateral and/or regional nuclear security initiatives.

Question. What specifically does NNSA hope to achieve at the end of those 4 years?

Answer. NNSA has a number of programmatic goals in support of the broader international 4-year effort, including the following:

—Complete the removal of approximately 3,615 kilograms of weapons-usable nuclear material cumulatively from sites around the world by the end of 2013.

—Complete Material Protection Control and Accounting (MPC&A) upgrades at a cumulative total of 229 buildings with Category I nuclear material by the end of fiscal year 2013. However, security upgrades at additional buildings after 2013 may be needed, as U.S. programs are guided by the evolving threat environment.

—Continue working with DOD, NRC, and the State Department to support the establishment of Centers of Excellence for nuclear security with key international partners.

—Contribute to key global initiatives, including the Nuclear Security Summit in 2012, the Global Initiative to Combat Nuclear Terrorism, the implementation of United Nations Security Council Resolution 1540, and the G–8 Global Partnership.

—Lead efforts to implement the fifth revision of the nuclear security recommendations document INFCIRC/225, "The Physical Protection of Nuclear Material and Nuclear Facilities", which will ensure strengthened physical protection of nuclear material and facilities worldwide.

Question. How does NNSA prioritize to determine which nuclear materials in which countries are the most vulnerable and need to be secured first?

Answer. NNSA prioritizes its efforts to secure and eliminate vulnerable nuclear material based on a number of factors, including nuclear material attractiveness (amount and form of the material), the existing site security conditions, the assessed country threat environment, and political opportunity.

Question. What are the most significant challenges in securing the highest-risk materials?

Answer. NNSA works with other countries to minimize the civilian use of HEU, eliminate unneeded weapons-usable nuclear material, and improve security of nuclear material by providing equipment and training. In many cases, getting direct access to facilities to carry out such work can be a challenging process. Sometimes, direct access to facilities is not possible or appropriate, and NNSA works with other elements of the U.S. Government on alternative approaches to improve security of nuclear material such as regional centers of excellence for nuclear security and support for global initiatives.

In addition, these NNSA programs are voluntary in nature, so each country must first agree that it would like to cooperate with NNSA on nonproliferation activities. In some isolated instances, a country has decided that it does not wish to participate. In these instances, NNSA looks to other organizations such as the International Atomic Energy Agency to help facilitate nonproliferation efforts in that country.

MATERIAL CONSOLIDATION

Question. What is NNSA doing to consolidate nuclear materials to a much smaller and easier-to-protect number of sites and buildings, especially in Russia?

Answer. Under the International Nuclear Materials Protection and Cooperation Program (INMP&C), NNSA is continuously promoting the benefits of nuclear material consolidation with its partner countries and especially within the Russian nuclear complex. In May 2010, INMP&C held a Nuclear Material Consolidation Best Practices workshop, with presenters from the NNSA complex and the Rosatom complex to exchange lessons learned regarding the consolidation of nuclear materials. The NNSA, through INMP&C, has also hosted Russian officials, including the head of Rosatom, Sergei Kiriyenko, to tour the Highly Enriched Uranium Materials Facility at Y–12 and discuss the cost savings that will be achieved by conducting this major consolidation effort.

It is standard operating procedure to evaluate intra-site consolidation at every Russian site participating in INMP&C cooperation and to support such consolidation when the sides can identify and agree to an effective approach. INMP&C has supported the removal of all HEU from one Russian site and has significantly reduced the number of buildings requiring protection by supporting the consolidation of nuclear material within sites in Russia. Moreover, INMP&C is currently supporting a large intra-site consolidation activity at one Russian site, and such activities are under consideration with several other Russian sites. In addition, U.S. project teams from INMP&C look for opportunities to transfer excess, nonweapons HEU out of facilities, thereby decreasing the amount of material requiring protection.

The excess HEU transferred from sites is usually downblended into low-enriched uranium (LEU) under INMP&C's Material Consolidation and Conversion (MCC) Project. To date, that project has supported the downblending of almost 14 metric tons of nonweapons HEU to LEU. On a cost-sharing basis with Russia, the MCC Project is also supporting the creation of additional downblending capacity at one Russian site in order to increase the amount of excess nuclear material that can be consolidated and then downblended into LEU. For this activity, Rosatom will fund the additional downblending line, and the MCC Project will support the associated security requirements. This additional capacity is expected to become operational at the end of calendar year 2012. In addition, the MCC Project continues to support the downblending of returned Russian-origin fuel that has been consolidated from the FSU and other countries. The MPC&A management is currently discussing with Rosatom the potential to include additional excess material under the MCC Project, which would remove significant quantities of such material from four sites.

TECHNOLOGICAL SURPRISE

Question. A national security concern is always technological surprise. In particular, the United States needs the best information possible on the nuclear weapons activities of foreign countries.

What has NNSA done to increase our capabilities to monitor the nuclear weapons capabilities of other countries, such as Iran?

Answer. NNSA has a long-standing research and development (R&D) program focused on improving U.S. nuclear security through the development of novel technologies to detect foreign nuclear weapons proliferation/detonation and verification of foreign commitments to treaties and agreements.

Using the unique facilities and scientific skills of the NNSA Nuclear Security Enterprise as well as other DOE National Laboratories, in partnership with industry and academia, the program sponsors R&D to support U.S. nuclear nonproliferation policies and programs by closing technology gaps identified through close interaction with NNSA and other U.S. Government agencies and programs.

Specifically, NNSA provides technical expertise and leadership toward the development of next-generation nuclear detection technologies and methods to detect foreign nuclear materials and weapons production. Through the development of new tools, technologies, and techniques designed for the detection, location, and analysis of global proliferation of nuclear weapons technology with special emphasis on verification technology and transparency measures, NNSA provides the Nation—both unilaterally and multilaterally—with the technical means to monitor foreign nuclear weapons programs.

Question. How confident are you that the United States has the means to detect a nuclear weapons test in another country?

Answer. NNSA, and its predecessor agencies, have more than 50 years of history in developing the leading technologies used by the United States to monitor and verify foreign nuclear testing. Working intimately with the Department of Defense and other U.S. Government agencies, NNSA develops and builds all space-based nuclear detection equipment. This equipment, which continuously monitors the globe, is operated by the U.S. Air Force for the Nation.

Further, NNSA develops other leading-edge technologies, such as seismic sensors and radionuclide and particle collection systems for the detection of a foreign nuclear test. Like the space-based sensors, these ground-based systems are operated by the U.S. Air Force.

Where applicable, and in keeping with the President's nuclear security agenda, NNSA transfers some of these technologies to international nuclear monitoring organizations, such as the International Atomic Energy Agency and Comprehensive Test Ban Treaty Organization.

QUESTIONS SUBMITTED BY SENATOR JON TESTER

Question. Administrator D'Agostino, it's my understanding that the National Nuclear Security Administration (NNSA) shares jurisdiction over fusion energy research with the Department of Energy's Office of Fusion Energy Sciences (OFES). In Montana, the Plasma Physics Group at the University of Montana is currently conducting research with an emphasis on magnetic fusion. The University of Montana Plasma Physics Group and other university programs are researching fusion energy in conjunction with many of our National Laboratories including the Princeton Plasma Physics Laboratory, the Lawrence Livermore National Lab and the National Ignition Facility (NIF). I, and many others, are eagerly awaiting the results of the NIF full ignition tests this year.

In 1980, the Congress passed an authorization bill that envisioned a demonstration fusion power plant by the year 2000. That clearly did not happen. Today, China, South Korea, and many European nations are investing in and advancing fusion energy research, with the hopes of commercialization. Commercialization of fusion energy could assist our Nation in achieving energy independence, and would undoubtedly lead to job creation in whichever nation accomplishes it.

What are the resources in fiscal year 2011 that NNSA is currently providing for the advancement of fusion energy?

Answer. Thermonuclear fusion is pursued at the Department of Energy and NNSA for two important and different purposes. OFES, in the Office of Science, is pursuing fusion science for eventual energy applications.

NNSA pursues Inertial Confinement Fusion (ICF) in support of Stockpile Stewardship. Thermonuclear fusion is the essential process of all U.S. nuclear weapons. Much of SSP inertial confinement fusion research can provide information relevant to inertial fusion energy, so it can be thought of as dual use. NNSA built and operates its large high-energy density facilities to support the stockpile. If successful, ignition on the NIF will demonstrate that ICF in the laboratory is feasible and, as a side-benefit, will be an important advance for fusion energy. Other areas of the ICF program may help develop the fundamental science of inertial fusion energy, including research on direct drive and pulsed power fusion.

NNSA requested $481.5 million in fiscal year 2011 for the ICF Ignition and High Yield Campaign. The ICF fiscal year 2011 budget is $477.6 million. We have requested $476.3 million for fiscal year 2012.

This year NIF is focusing on experimentally optimizing the laser and target conditions as part of the National Ignition Campaign (NIC) and has made significant

progress. We expect to perform full ignition tests in the fiscal year 2012 to 2014 window. NIF is also focusing on material properties under extreme conditions and on finishing up work to validate codes devoted to the energy balance problem.

Question. How much additional funding would NIF require for full commercialization within the current framework?

Answer. When NIF achieves ignition, it will establish the scientific basis for inertial confinement fusion, but will not have the performance required for the energy mission. The NIF was not designed to be converted to a prototype commercial reactor. Significant technical development, independent economical studies, and licensing processes will be required beyond the demonstration of ignition on the NIF for inertial fusion energy. In addition, the demonstration of ignition at NIF does not guarantee that this would be commercially viable.

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Several approaches to achieving thermonuclear fusion are being pursued. In NNSA, we are pursuing indirect drive for the first demonstration of ignition on the NIF and polar direct drive as an alternate approach led by the University of Rochester. The Naval Research Laboratory is engaged in direct drive research with an alternate laser driver using a Krypton Flouride laser, and pulsed power fusion research is conducted at Sandia National Laboratories. In the Office of Science, heavy ion fusion, fast ignition, and other approaches are being pursued.

DOE has asked the National Academy of Sciences (NAS) to conduct a review on inertial fusion energy and to make recommendations on how best to pursue inertial fusion energy as a long-range energy option after the demonstration of NIF Ignition. NAS will assess the prospects for generating power using inertial confinement fusion, and will identify scientific and engineering challenges and cost targets. We look forward to receiving the panel's interim report, expected in September 2011.

Question. What are NNSA's goals for fusion energy in fiscal year 2012 and beyond?

Answer. NNSA's goal for the National Ignition Campaign (NIC) is to demonstrate ignition on the NIF. In fiscal year 2012 and beyond, NNSA will work to improve ignition performance and develop advanced ignition concepts and platforms that further its Stockpile Stewardship mission. NNSA will continue to provide peer-reviewed access to it major facilities (NIF, Omega, and Z), which includes work in support of inertial fusion energy as well as basic science. The Department will review the report from NAS on ICF, and use the report's findings to inform our decision on how to proceed with a program in inertial fusion energy.

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Question. Can you detail the collaboration between NNSA and OFES?

Answer. The main mechanism for collaboration between the OFES and NNSA's Inertial Confinement Fusion (ICF) program is the Joint Program in High Energy Density Laboratory Plasmas. High-energy-density laboratory plasma physics is the study of matter at extremely high density and temperature; it is a broad and rapidly growing area of research that includes ICF, laboratory astrophysics, materials properties under extreme conditions, and warm dense matter. Through the joint program, OFES and the ICF programs conduct peer-reviewed solicitations for basic high-energy density research and organize scientific workshops. In fiscal year 2011, the joint program provided support for 50 research awards in more than 30 institutions.

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Question. What is the current backlog of fusion energy related experiments and what can be done to advance them?

Answer. In the near term, NNSA's ICF program will concentrate on achieving ignition in the NIF. This is an essential step for stockpile stewardship, and will also contribute to developing fusion energy. Achieving ignition will be a great technical accomplishment and will establish the scientific feasibility of inertial fusion energy.

The development of inertial fusion energy is not part of NNSA's mission and, as such, no backlog of experiments exists.

This year NIF is focusing on experimentally optimizing the laser and target conditions as part of the NIC and has made significant progress. We expect to perform full ignition tests in the fiscal year 2012 to 2014 window. NIF is also focusing on material properties under extreme conditions and on finishing up work to validate codes devoted to the energy balance problem.

Fusion energy has proven to be a daunting and elusive goal. In support of this goal, however, recently NAS' Committee on Inertial Fusion Energy (IFE) has been asked to:

—Assess the prospects for generating power using inertial confinement fusion;
—Identify scientific and engineering challenges, cost targets, and R&D objectives associated with developing an IFE demonstration plant; and
—Advise DOE on its development of an R&D roadmap aimed at creating a conceptual design for an inertial fusion energy demonstration plant.

The Department will evaluate the recommendations from the subcommittee before deciding how to proceed.

Question. Where does our domestic fusion energy research stand in comparison to China, South Korea, and other nations?

Answer. NNSA is the world leader in inertial confinement fusion research, which we primarily conduct to support Stockpile Stewardship. France and the United Kingdom also have strong programs in inertial confinement fusion to support their nuclear weapons stockpiles. France is building a NIF-scale laser facility named Laser Mega Joule (LMJ). The UK has built a smaller laser facility named Orion. The Japanese conduct research in inertial fusion for energy applications and have a modest-size laser named FIREX I. Germany conducts research in heavy ion fusion. The European Community has proposed the HiPER project to build an inertial fusion energy research program. China is active in high-energy density physics and is building a new large laser system at a Government laboratory. This laser will be smaller than NIF and is not likely to achieve ignition. A number of countries have modest z-pinch pulse power programs for fusion. We are not aware of any substantial ICF program in Korea. Many of the countries mentioned also have significant magnetic energy fusion programs, and the OFES could provide a detailed comparison for those technologies.

This year NIF is focusing on experimentally optimizing the laser and target conditions as part of the NIC and has made significant progress. We expect to perform full ignition tests in the fiscal year 2012 to 2014 window. NIF is also focusing on material properties under extreme conditions and on finishing up work to validate codes devoted to the energy balance problem.

QUESTIONS SUBMITTED BY SENATOR LAMAR ALEXANDER

EXPORT CONTROL REGULATIONS

Question. National Nuclear Security Administration (NNSA) is responsible for implementation of export control regulations under 10 CFR 810 which authorizes transfer of peaceful nuclear technology. The number of specific authorizations issued by Department of Energy under 10 CFR 810 has roughly tripled over the past 5 years and industry has recently noted that the amount of time required for issuing these authorizations has increased significantly as well. These delays have a negative impact on the ability for U.S. firms to compete in the global nuclear marketplace currently estimated to exceed $50 billion per year.

While industry has remarked on the professionalism and dedication of NNSA staff, is the agency sufficiently staffed to respond the increasing number inquiries and authorizations requested?

Answer. Pursuant to section 57b of the Atomic Energy Act, the Secretary of Energy must authorize all U.S. persons who wish to engage directly or indirectly in the production of special nuclear material outside the United States, provided that the assistance is not inimical to the interests of the United States. The Secretary of Energy's authority is nondelegable. The implementing regulation for section 57b of 10 CFR part 810 also requires DOE to address eight specific questions to determine whether proposed assistance raises proliferation concerns. Besides the analysis of the eight specific questions in the regulation, the Department also requests via the State Department, foreign government assurances from the recipient's government that state that the assistance will be for peaceful, nonmilitary purposes, will not be retransferred without U.S. consent, and that the resulting nuclear material

will be under IAEA safeguards. These assurances are consistent with the requirements of section 123 of the Atomic Energy Act and the nuclear suppliers group.

Over the past few years, as the global nuclear industry has seen resurgence in business opportunities, the number of part 810 applications has increased accordingly. In 2007, the Department authorized 1 specific authorization; in 2010, the Department authorized 15. In addition to an increase in the number of applications, the complexity of the applications has also increased as nuclear commerce has become more globalized. Each specific authorization requires approval by the Secretary and must include an in-depth technical and policy analysis addressing the eight questions in the regulation. However, a vast amount of nuclear commerce that takes place with our close trading and nonproliferation partners takes place under general authorization provisions of 10 CFR part 810 and does not require the same intensive analysis by the Department's staff. The Department has recognized the increase in part 810-related activities by U.S. industry and has brought on qualified and experienced staff to help adjudicate these applications. The Department believes that it has the staff in place to address the 810 applications that it currently receives and has plans for streamlining its review processes to enable timelier responses to industry's applications.

Question. If so, why are these delays increasing and what plan does DOE have in place to make the 810 process more efficient?

Answer. One significant reason for the delays has been the lack of prompt government assurances from our foreign partners. Some of the assurances, especially from China and India, have taken more than 18 months to obtain. Without these assurances the Secretary would have been unable to make the legally required noninimicality finding, and the United States would not have been acting in accordance with the nuclear suppliers group guidelines. We are working with the State Department and applicants at the beginning of the part 810 process to identify where potentially long delays may arise. We are also working to structure applications in such a way that will enable us to efficiently and effectively authorize the assistance within the bounds of U.S. law and policy. We have also instituted new policies, such as the "deemed export" process through which we have been able to find ways to satisfy the requirements of the Atomic Energy Act for companies that wish to employ foreign nationals in the United States, thus alleviating one class of applications, which we had been unable to process at all in the past.

Question. If not, what process improvements does DOE plan to put in place to make the 810 process more efficient?

Answer. The Department is also looking at how the nuclear industry does business in a globalized world and is reviewing potential amendments to the part 810 regulation to reflect today's realities. The part 810 regulation has remained essentially the same for more than 25 years. It was designed and implemented at a time in the U.S. nuclear industry's history that is vastly different from how industry works today or will work in the future. We recognize that the part 810 regulations need to be more user-friendly and consistent with current U.S. nonproliferation policies.

NAVAL REACTORS FACILITY, IDAHO NATIONAL LABORATORY

Question. The Naval Reactors Facility (NRF), located at the Idaho National Laboratory (INL), is responsible for fuels and materials research and development, and processing, analyzing, and storing reactor cores that are removed from aircraft carriers or submarines at refueling and decommissioning. NRF's location within the laboratory boundaries enables the Navy to utilize the laboratory's capabilities, such as the Advanced Test Reactor and the Idaho Nuclear Technology and Engineering Center to fulfill mission requirements.

Please describe:

—which non-NNSA facilities at INL are used by the Naval Reactors Program;

—the type of work performed for the program at each facility, and whether it is performed by the Navy or others;

—a comparison of the work at each facility performed by or for the Navy to the work performed by all other users in the aggregate, expressed as a percentage for each facility; and

—whether each facility is essential to the mission of the program.

Answer. Naval reactors uses the following facilities at INL:

Advanced Test Reactor (ATR)

Naval reactors utilizes ATR for materials research and fuel system development. Naval Reactors Facility (NRF) at INL prepares "test trains" that contain materials destined for irradiation. The NRF ships those test trains to ATR. The ATR personnel receive the test trains, insert them into the reactor, operate the reactor, re-

move the test trains from the reactor, and ship the test trains back to NRF. The data generated at ATR is needed to support the operational fleet, support reactors currently being designed, and develop fuel and poison systems for future reactors. For example, testing currently underway to support the newly designed, reduced-cost VIRGINIA forward fit (VAFF) core procurement will provide data needed to develop operational limits, casualty procedures, refueling limits, and shipping requirements that ensure safe and efficient operation of our nuclear plants at sea.

In fiscal year 2012, the Naval Nuclear Propulsion Program (NNPP) will provide $64 million to ATR, representing approximately 62 percent of ATR operations.

ATR is essential to the NNPP mission.

Idaho Nuclear Technology and Engineering Center (INTEC)

Some naval spent nuclear fuel is currently stored at INTEC. The INTEC personnel are currently preparing that fuel for dry storage, loading it into uniquely designed baskets, loading those baskets into shipping containers, and shipping those containers back to NRF. INTEC is also preparing and shipping naval transuranic waste for disposal at the Waste Isolation Pilot Plant. The INTEC facility is needed to support NNPP commitments to the State of Idaho in the 1995 Settlement Agreement and the 2008 Settlement Addendum. Failure to meet these commitments will potentially prevent NNPP from receiving fuel at NRF, which would prevent NNPP from refueling and defueling nuclear powered warships.

In fiscal year 2012, NNPP will provide $22.3 million of INTEC funding, which represents approximately 21 percent of INTEC operations.

INTEC is essential to the NNPP mission.

Radioactive Waste Management Complex (RWMC)

NNPP disposes of remote-handled low-level radioactive waste (RH–LLW) at RWMC. Operations at NRF will continue to produce these wastes indefinitely. NNPP generates approximately one-half of the RH–LLW that is disposed at RWMC. RWMC, and the planned replacement, are essential to the NNPP mission. The RWMC is the only cost-effective disposal path for this waste. Without a disposal path, waste will collect within the ECF water pool and eventually preclude spent-fuel processing operations. Spent-fuel processing is essential to unload shipping containers that support refueling and defueling nuclear warships and meeting NNPP commitments to the State of Idaho in the 1995 Settlement Agreement and the 2008 Settlement Addendum. If RWMC suspended operations, Naval Reactors would be forced to dispose of low-level radioactive waste off-site, at a significantly higher cost.

NNPP will contribute to the construction costs for a planned replacement facility.

The work done at RWMC and the work that will be done at RMWC's replacement is essential to NNPP mission.

Materials and Fuels Complex (MFC)

NNPP occasionally contracts examination of expended core and ATR test specimens to MFC when detailed analytical chemistry services are required to obtain the needed data. These examinations require use of the MFC hot cell facilities and analytical chemistry laboratories. These examinations are essential to the NNPP mission. There are other analytical chemistry laboratories (e.g., ORNL) that could perform these examinations; however, shipment costs would be significantly higher. NNPP plans to ship specimens to MFC for analytical chemistry evaluations in 2015. In the future, the NNPP plans to make use of MFC capabilities (currently in development) to perform focused ion beam machining, transmission electron microscopy, and atom probe evaluations of irradiated material. Using MFC capabilities eliminates the need for NNPP to develop these capabilities at NRF or ship the materials for examination offsite.

The percentage of MFC's work that supports naval work varies from year to year.

The work done at MFC is essential to the NNPP mission.

NNPP also subcontracts many site services (e.g., fire department and emergency services) to INL contractors that require use of various INL facilities. The total value of these services is $17 million in fiscal year 2011. In addition to this, in fiscal year 2011, NNPP initiated a permanent annual budget transfer of $1.5 million for security and safeguards at INL. These services are essential to support operations at NRF. If INL were not able to provide these services, the NNPP would need to develop and fund these capabilities independently.

Question. Please describe the effect that suspending operations at the facilities described in question one would have on NRF and the Navy's ability to perform mission work.

Answer. Suspending operations at each of the facilities would have the following impacts:

ATR.—If ATR suspended operations, Naval reactors would be unable to attain the information required to resolve problems as they arise in the operating fleet, unable to develop or improve future fuel systems and materials applications, and unable to develop the life-of-ship core required for the Ohio Replacement SSBN.

INTEC.—If INTEC suspended operations, Naval reactors would be unable to meet the terms of its agreements with the State of Idaho, placing in jeopardy the ability to refuel and defuel nuclear powered warships.

RWMC.—If RWMC suspended operations, Naval reactors would be forced to dispose of low-level radioactive waste offsite, at a significantly higher cost.

MFC.—If MFC suspended operations, Naval reactors would be forced to contract for equivalent examinations offsite at significantly higher costs.

Question. Please describe in detail the amounts and sources (e.g. DOD or DOE) of funding the program contributes for the use of the facilities described in question 1, including any funding or transfers provided for INL's safeguards and security program.

Answer.

[Dollars in millions]

Facility	Fiscal Year 2012 funding
ATR	[1] 64.0
INTEC	[2] 22.0
RWMC	[1] 0.8
MFC	
Site services (e.g. mail, EMS, fire)	[3] 17.0
Safeguards and Security	[4] 1.5

[1] DOE.
[2] Navy.
[3] DOE fiscal year 2011.
[4] Permanent annual budget transfer.

SMALL MODULAR REACTORS PROGRAM

Question. The Navy has a unique expertise in designing, building, and maintaining modular reactors or use on their vessels, in addition to an impeccable safety record.

Given this expertise, could you describe what role, if any, the Naval Reactors program will (or could) play in DOE's planned Small Modular Reactor program?

Answer. Since 1955, the Naval Nuclear Propulsion Program (NNPP) has provided militarily effective nuclear propulsion plants and ensured their safe, reliable, and long-lived operation. NNPP's reactors are designed to meet requirements associated with their military-unique application, and are not suitable for commercial use. However, there are areas for cooperation and possible technology transfer between NNPP, other Government agencies, and industry. NNPP and the Office of Nuclear Energy will continue to seek opportunities to collaborate and share information with each other and other appropriate parties to the mutual benefit of all organizations.

One example of interagency collaboration occurred in 2009 when NNPP supported the Nuclear Regulatory Commission's (NRC) "Report on Internal Safety Culture". The exchange provided NRC with potential initiatives to increase awareness of and improve the agency's internal safety culture and to identify best practices currently used across the nuclear industry. Specifically, NRC benchmarked NNPP to gather information about practices, programs, and processes that could be considered as best practices. As part of this process, NNPP offered valuable insights and perspective from its extensive knowledge and experience in this crucial area. Similar collaboration with the Small Modular Reactor program may be possible.

As the Small Modular Reactor program moves forward, NNPP and the Office of Nuclear Energy will continue to seek areas to cooperate to the mutual benefit of each organization and taxpayers, while protecting sensitive military technology.

QUESTION SUBMITTED BY SENATOR MITCH MCCONNELL

URANIUM DOWNBLENDING

Question. What is the most current estimate for the amount of down-blended uranium that NNSA plans to down blend in 2012? Are future years' estimates similar in size? What percent of the 10 percent cap does that consume?

Answer. In fiscal year 2012, NNSA's contractors will down blend approximately 8 metric tons of highly enriched uranium (HEU). Because a majority of the resulting low-enriched uranium (LEU) will be retained in two LEU inventories, only the fraction of the material that will be used to compensate the down-blending contractors will enter the market in fiscal year 2012. The estimated net quantity of LEU that will enter the market is equivalent to 281 metric tons of natural uranium, or 1.4 percent of domestic demand for natural uranium (14 percent of the 10 percent guideline). Quantities comparable to those above are expected to prevail for the next couple of years.

SUBCOMMITTEE RECESS

Senator FEINSTEIN. Thank you very much. Mr. D'Agostino, Ms. Harrington, Dr. Cook, and Admiral Donald, thank you very much for your testimony today. I will be talking with you, Mr. D'Agostino. Thank you very much.

This hearing is recessed.

Mr. D'AGOSTINO. Thank you.

Dr. COOK. Thank you very much.

[Whereupon, at 3:35 p.m., Wednesday, May 4, the subcommittee was recessed, to reconvene subject to the call of the Chair.]