

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2017

WEDNESDAY, MARCH 16, 2016

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

The subcommittee met at 2:34 p.m. in room SD-138, Dirksen Senate Office Building, Hon. Lamar Alexander (chairman) presiding.

Present: Senators Alexander, Graham, Feinstein, and Udall.

DEPARTMENT OF ENERGY

NATIONAL NUCLEAR SECURITY ADMINISTRATION

**STATEMENT OF LIEUTENANT GENERAL FRANK G. KLOTZ, U.S. AIR
FORCE (Retired), UNDER SECRETARY FOR NUCLEAR SECURITY
AND ADMINISTRATOR**

ACCOMPANIED BY:

**BRIGADIER GENERAL STEPHEN L. DAVIS, UNITED STATES AIR
FORCE, PRINCIPAL ASSISTANT DEPUTY ADMINISTRATOR FOR
MILITARY APPLICATIONS**

**ANNE HARRINGTON, DEPUTY ADMINISTRATOR FOR DEFENSE
NUCLEAR NONPROLIFERATION**

**ADMIRAL JAMES F. (FRANK) CALDWELL, JR., UNITED STATES
NAVY, DEPUTY ADMINISTRATOR FOR OFFICE OF NAVAL
REACTORS**

OPENING STATEMENT OF SENATOR LAMAR ALEXANDER

Senator ALEXANDER. The Subcommittee on Energy and Water Development will please come to order.

As I was saying to Senator Feinstein, my co-chairman in effect, both Senator McConnell and Senator Schumer were saying yesterday that Senator McConnell hopes to begin the appropriations process on the floor on April 18. Senator Schumer said he intended to support having an appropriations process, and the Democrats have all written Senator McConnell saying they want one. It looks like everybody wants an appropriations process this year, so we're hoping very much that's possible. And Senator Feinstein and I will work with our House committee chairs to try to make ours one of the first bills that's available to the majority leader to bring to the floor. We hope to do it in a bipartisan way. And if there are controversial amendments, we hope those will be offered on the floor of the Senate rather than in the committee.

This afternoon, we are having a hearing to review the President's fiscal year 2017 budget request for the National Nuclear Security Administration. Senator Feinstein and I will each have an opening statement. I will then recognize each Senator for up to 5 minutes for an opening statement, alternating between the majority and the minority in the order in which they arrived.

We will then turn to our witnesses for their testimony. General Klotz will present testimony on behalf of the National Nuclear Security Administration. And we'll include the full written statements of all the witnesses in the record. After General Klotz, Senators will then be recognized for 5 minutes of questions each.

First, I would like to thank our witnesses for being here, and also Senator Feinstein, an exceptional co-chairman of this committee. We work together regardless of which party has the majority and usually come up with a pretty good result for the country.

Our witnesses today include Lieutenant General Frank Klotz, Administrator of the NNSA (National Nuclear Security Administration); Brigadier General S.L. Davis, Principal Assistant Deputy Administrator for Military Applications; Ms. Anne Harrington, Deputy Administrator for Defense Nuclear Nonproliferation; and Admiral Frank Caldwell, Deputy Administrator for Naval Reactors.

NNSA is a semi-autonomous agency within the Department of Energy that's responsible for a vital mission, managing our nuclear weapons stockpile, reducing global dangers posed by weapons of mass destruction, and providing the Navy with safe and effective nuclear power. This is the subcommittee's fourth hearing this year on the President's budget request.

NNSA has an important national security mission, but faces many challenges. We'll have to make some hard decisions on the most important priorities.

The President's 2017 budget request is \$12.9 billion, an increase of 2.9 percent over the fiscal year 2016. The focus of my questions today will be on four main areas: one, keeping critical projects on time and on budget, that is a major priority of Senator Feinstein and of mine; two, effectively maintaining our nuclear weapons stockpile; three, supporting our nuclear Navy; and four, maintaining our vital nuclear workforce.

PROJECT OVERSIGHT

NNSA is responsible for three of the largest construction projects in the Federal Government: the Uranium Facility in Tennessee, the MOX Fuel Fabrication Facility in South Carolina; and the Plutonium Facility in New Mexico. Combined, these projects could cost more than \$20 billion to build, and over the past 4 years, Senator Feinstein and I have worked hard to keep costs from skyrocketing. We want to make sure that hard-earned taxpayer dollars are spent wisely and that these projects are on time and on budget.

We have focused most of our oversight on the Uranium Facility in Tennessee for the past 5 years. We asked for a Red Team review headed by Oak Ridge National Laboratory Chief Thom Mason to review the project, which recommended ways to get it back on track. We said that the project had to be completed by 2025 with a cost of no greater than \$6.5 billion and that the design had to be at least 90 percent completed before we even began construction

of the nuclear facility. We urged the Department to take aggressive steps to get costs under control so we could meet these goals.

The facility is off to a good start, but there is a lot more work to do. I am going to ask you more today about the Uranium Facility, particularly about your schedule for completing the design and when you anticipate construction can begin.

I would also like to discuss the MOX Facility in South Carolina. You have proposed that we stop construction of the MOX Fuel Fabrication Facility and recommended that Congress fund a different process called Dilute and Disposal. You've said the Dilute and Disposal alternative will cost less, actually a lot less, and get the material out of South Carolina much sooner than if we continue to fund MOX.

General Klotz, I am particularly interested in your plan for dealing with the 13 tons of plutonium that are currently in South Carolina, and ask that you address this either in your opening statement or questions.

EFFECTIVELY MAINTAINING NUCLEAR WEAPONS

Another major part of your budget maintains our nuclear weapons stockpile, and I want to make sure we're spending those dollars effectively. The budget request includes \$1.3 billion to continue the four ongoing life extension programs, which fix or replace components in weapons systems to make sure they're safe and reliable. The work must be done, but life extension programs are very expensive, so they need to be properly managed. I will ask you about that today.

SUPPORTING OUR NUCLEAR NAVY

Naval Reactors is responsible for all aspects of nuclear power for our submarines and aircraft carriers. Naval Reactors has a lot on its plate right now. They are designing a new reactor core for the next class of submarines, refueling a prototype reactor, and building a new spent fuel processing facility. In addition, you have to support the day-to-day operation of 73 submarines and 10 aircraft carriers, including a total of 97 operating reactors. You have about the same number of operating reactors that we have in the commercial world.

The small nuclear reactors that Naval Reactors designs and oversees have had an impeccable safety record for more than 60 years. There has, I believe, never been a reactor accident.

While life extension programs provide the opportunity to maintain vital skills in many areas, now moving on to those, they do not exercise all of the skills needed for a healthy weapons program.

When I had the opportunity to talk to Admiral Caldwell about the Naval Reactors program last week, he told me about his technical base, the men and women who respond when our ships are at sea. I would like to hear more today about that.

[The statement follows:]

PREPARED STATEMENT OF SENATOR LAMAR ALEXANDER

We're here today to review the president's fiscal year 2017 budget request for the National Nuclear Security Administration, a semi-autonomous agency within the Department of Energy that is responsible for managing our nuclear weapons stock-

pile, reducing global dangers posed by weapons of mass destruction, and providing the Navy with safe and effective nuclear power.

This is the Subcommittee's fourth hearing this year on the president's budget request, and I look forward to hearing our witnesses' testimony.

The National Nuclear Security Administration, or NNSA, has an important national security mission, but faces many challenges. That's why we need to do what we were sent here to do—to govern.

Like last year, we will have to make some hard decisions so we can continue to fund the most important priorities.

The president's fiscal year 2017 budget request for the NNSA is \$12.9 billion, an increase of \$357 million (or 2.9 percent) higher than the fiscal year 2016 enacted level.

Today, I'd like to focus my questions on four main areas:

- 1) Keeping critical projects on time and on budget;
- 2) Effectively maintaining our nuclear weapons stockpile;
- 3) Supporting our nuclear Navy; and
- 4) Maintaining our vital nuclear workforce.

KEEPING CRITICAL PROJECTS ON TIME AND ON BUDGET

The NNSA is responsible for three of the largest construction projects in the Federal government: the Uranium Processing Facility in Tennessee; the MOX Fuel Fabrication Facility in South Carolina; and the Plutonium Facility in New Mexico.

Combined, these projects could cost more than \$20 billion dollars to build, and over the past 4 years, Senator Feinstein and I have worked hard to keep costs from skyrocketing. We want to make sure hard-earned taxpayer dollars are spent wisely and that these projects are on time and on budget.

Senator Feinstein and I have focused much of our oversight on the Uranium Processing Facility in Tennessee over the past 5 years.

We asked for a Red Team review of the project, which recommended ways to get it back on track.

We said the project had to be completed by 2025 with a cost no greater than \$6.5 billion, and the design had to be at least 90 percent completed before we began construction of the nuclear facilities. We urged the Department to take aggressive steps to get costs under control.

The Uranium Processing Facility is off to a good start, but there's a lot more work to be done.

I'm going to ask you more today about the Uranium Processing Facility, particularly about your schedule for completing the design and when you anticipate construction can begin.

I'd also like to discuss the MOX Fuel Fabrication Facility in South Carolina. The NNSA has proposed that we stop construction of the MOX Fuel Fabrication Facility and recommended that Congress fund a different process, called Dilute and Disposal.

You have said that the Dilute and Disposal alternative will cost less, and get the material out of South Carolina much sooner than it would if we continue to fund MOX.

General Klotz, I am particularly interested in your plan for dealing with the 13 tons of plutonium currently in South Carolina, and ask that you address this in your opening statement.

EFFECTIVELY MAINTAINING OUR NUCLEAR WEAPONS

Another major part of the NNSA's budget maintains our nuclear weapons stockpile, and I want to make sure we are spending taxpayer dollars effectively.

The budget request includes \$1.3 billion to continue the four ongoing life extension programs, which fix or replace components in weapons systems to make sure they're safe and reliable.

This work must be done—but life extension programs are very expensive, so they need to be properly managed.

I will ask you today whether you will be able to meet your production deadlines on time and on budget.

SUPPORTING OUR NUCLEAR NAVY

Naval Reactors is responsible for all aspects of nuclear power for our submarines and aircraft carriers.

Naval Reactors has a lot on their plate right now—they are designing a new reactor core for the next class of submarines, refueling a prototype reactor, and building a new spent fuel processing facility.

In addition, Naval Reactors supports the day-to-day operations of 73 submarines and 10 aircraft carriers—including a total of 97 operating reactors.

The small nuclear reactors that Naval Reactors designs and oversees have had an impeccable safety record for more than 60 years; there has never been a reactor accident.

MAINTAINING OUR VITAL NUCLEAR WORKFORCE

While life extension programs provide the opportunity to maintain vital skills in many areas, they do not exercise all of the skills needed for a healthy weapons program.

When I had the opportunity to talk to Admiral Caldwell about the Naval Reactors program last week, he told me about his “technical base”—the men and women who respond when our nuclear ships at sea have a problem.

I’d like to hear more from the witnesses today about the challenges they face in maintaining the needed skills within their workforce, and what they are doing to make sure they have the right skills to meet their important missions.

Senator ALEXANDER. With that, I would recognize Senator Feinstein to make her opening statement.

STATEMENT OF SENATOR DIANNE FEINSTEIN

Senator FEINSTEIN. Thanks very much, Mr. Chairman, and I think you know how much I respect you. And to the panel, I want to say welcome. And this is one of the best parts of working in the Senate, that you can work with somebody you respect, that you work out differences of opinion that he gives on some, I give on some, and for some reason, it all works. I wish we could do more of that.

So thank you, Senator Alexander.

As you said, NNSA’s overall request is a 3 percent increase in fiscal year 2016, but, and I want to talk about this for a minute, the nonproliferation program sees a 7 percent decrease, and I am a strong proponent of that program. Compared to 2010, the fiscal year 2017 request for weapons is a \$2.9 billion increase. I think that’s very difficult for me. The nonproliferation program request is a \$300 million decrease from its peak in fiscal year 2012, General. The nonprogram is down \$500 million, while weapons program’s budget continues to climb. “Why?” I ask.

General, your appearance here today is 2 weeks before the final Nuclear Security Summit, where 50 countries will gather to discuss ways to further strengthen nuclear security measures and cooperation. I think it was in Prague in 2009 that President Obama committed to locking down all vulnerable nuclear materials in 4 years. That time has passed. The administration has made great strides toward that goal and has further reduced the dangers of nuclear terrorism since that time.

I’ll give you a few examples: removal of over 3,800 kilograms of plutonium and highly enriched uranium; removal of 42,000 high-priority radioactive sources, such as cesium and kobalt, that can be used in a dirty bomb; conversion of 23 reactors from use of highly enriched uranium to low-enriched uranium; and installation of more than 400 fixed and mobile detectors in 43 countries. I congratulate you, and that’s very important to me. And yet, even with these accomplishments, nuclear material is still obtainable and attractive to criminals and terrorists.

A recent article by the Center for Public Integrity brings some information on nuclear smuggling out of the shadows. There have been 20 reported nuclear material interdictions in Europe and Russia since the fall of the Soviet Union. In some cases, smugglers were attempting to move significant quantities of highly enriched uranium, and in others, it appears to just be small samples with the promise of bigger things. It has been openly reported that a cache of highly enriched uranium went missing in Russia after the end of the Cold War. The substantial success in securing border crossings around Russia is helping to prevent this material from making its way to the United States. The worsening economy in Russia, the rise of the Islamic State in particular, and I deal with a lot of that on the Intelligence Committee, and the fear that one group or another gets some form of dirty bomb, and the chaos spreading from the Middle East into Europe tells me now is not the time to let down our guard on nuclear security.

But on the weapons side of NNSA, all I see is unrestrained growth. I understand that the nuclear weapons complex needs to improve its infrastructure. No problem. NNSA reports a \$3.2 billion facility maintenance backlog, and the \$400 million increase in its fiscal year 2017 budget request is largely dedicated to halting the growth of that maintenance back deficit, as I understand, and obviously, I think we both support that.

But the budget for nuclear weapons just seems to keep growing. A 45 percent head—excuse me—increase since 2001. I almost said “hedge” because I very much believe that it’s very wasteful to have a hedge at 3 to 1, and one day we have to have the courage to do something about that. But there is more to come. Warhead life extension programs, construction of the Uranium Processing Facility, the Plutonium Facility, the reactor for the *Ohio*-class replacement submarine, will all demand higher spending levels in the next 5 to 10 years, and this doesn’t include projects for which NNSA has not budgeted for, such as new component manufacturing facilities or new science facilities.

According to your budget request, spending on weapons is projected to grow another \$1.3 billion over the next 5 years to \$10.5 billion. I’m really going to have a great deal of trouble supporting that. By comparison, the nonproliferation spending is projected to grow only \$300 million. Importantly, that assumes that MOX, funded out of nonproliferation, is stopped, deemed to be too costly to continue to proceed with. So the question comes, What is the alternative and that cost?

In the area of warheads and new facilities, NNSA’s management record, candidly, although I think it’s better, does not inspire confidence. Rather, the history of cost growth and schedule slippages suggests that even more money will be required than currently projected. So where does it end and how much is enough? Outside of MOX, I don’t see tough choices being made. I just see more money for weapons and less money for everything else.

Since it met its 2013 goals for locking down nuclear materials, NNSA has pushed out the goals and milestones for their nonproliferation efforts. For example, work in securing 4,400 radiological facilities that was to be completed by 2022 now won’t be done until 2033, obviously extended by 10 years. In some cases, the

work has become more technically and diplomatically difficult, and we understand that, but it's also true that the nonprobudget has seen a steady decline since 2012.

Now, I don't believe we should or can sacrifice our ongoing efforts in nuclear security on the altar of our nuclear weapons stockpile. So I look forward to discussing this issue with you and our witnesses today. And I hope I can count on you to take a measured and reasonable approach to these matters.

So, General, thank you, and I welcome you.

Senator ALEXANDER. Senator Udall, would you like to make an opening statement?

STATEMENT OF SENATOR TOM UDALL

Senator UDALL. Yes, just briefly. And I don't think I'll take all my time, but I just want to welcome and greet General Klotz for being here.

I really enjoyed visiting with you in my office within the last week or so about many of the big issues facing the NNSA and the other witnesses here today, Deputy Administrator Harrington, Brigadier General Davis, and Admiral Caldwell. Thank you for being here and thank you for your service to the country. I think it's terrifically important the work that you do. And as you know, New Mexico's two national labs are a critical part of the NNSA's infrastructure and provide indispensable support for your mission to keep the Nation's stockpile safe, reliable, and secure.

At Sandia National Laboratory, they've hired 35 percent of their current staff in the last 5 years to support the life extension projects that are going on there. And at Los Alamos, the lab is embarking on plans to revitalize Cold War era infrastructure. And I couldn't agree more with both the chairman and the co-chairman that we need to keep our costs under control, but we also need to do the job right. I don't think there's any doubt about that.

I'm going to focus my questions today on when we talk about cost control, the big project they're working on at Sandia is the B61. The B61, the trend has been to keep it within budget and to do it on time, and I'm wondering, what are the lessons there? Because I think that we have done a good job in that respect.

And then I would like to ask about how much NNSA budgets need to increase to address the aging stockpile. You all know that that's an issue that's out there. And then there is a GAO report on the plutonium infrastructure strategy, and they raised some issues there, and I'm going to ask about that and where we're headed on that plutonium infrastructure strategy.

All of this costs money. We need to keep the budgets under control, but as I said, we need to do it right. And I thank you again for your service.

Mr. Chairman.

Senator ALEXANDER. Thanks, Senator Udall.

At this time, we'll turn to General Klotz, who will present testimony on behalf of the National Nuclear Security Administration.

General Klotz.

SUMMARY STATEMENT OF LIEUTENANT GENERAL FRANK G. KLOTZ

General KLOTZ. Thank you, sir.

Chairman Alexander, Ranking Member Feinstein, Senator Udall, thank you for the opportunity to present the President's fiscal year 2017 budget request for the Department of Energy's National Nuclear Security Administration. We value this committee's leadership in national security as well as its robust and abiding support for the missions and the people of NNSA.

As you rightly pointed out, our budget request, which comprises more than 40 percent of DOE's budget, is \$12.9 billion, an increase of nearly \$357 million, or 2.9 percent, over the fiscal year 2016 enacted level. The budget request continues the administration's unwavering commitment to NNSA's important and enduring missions. These missions are defined in the NNSA's Strategic Vision, which we released last year and which is available on our website, and they include to maintain a safe, secure, and effective nuclear weapons stockpile without nuclear explosive testing, to prevent, counter, and respond to the threat of nuclear proliferation and nuclear terrorism, and to support the capability of our nuclear-powered Navy to protect American and allied interests around the world.

To succeed, NNSA must maintain crosscutting capabilities that enable each of our core missions. These crosscuts focus on advancing science, technology, and engineering, supporting our people in modernizing our infrastructure, and developing a management culture focused on safety, on security, and on efficiency, adopting the best practices in use across the government as well as in the commercial world.

The budget materials and briefings that we have provided describe NNSA's major accomplishments in 2015 as well as the underlying rationale for our budget proposal for fiscal year 2017.

Let me just briefly highlight a few of the points here.

NUCLEAR WEAPONS STOCKPILE

First and foremost, the United States has maintained, as I said, a safe, secure, and effective nuclear weapons stockpile without nuclear explosive testing now for over 20 years. As a result of the funding provided by this Congress and supported by this subcommittee, and the significant improvements NNSA has made in program management over the past 2 to 3 years, all of our life extension programs, or LEPs, and major alterations are on schedule and within budget.

NNSA's science and technology base also continues to yield critical modeling and simulation data and to deploy increasingly capable high-performance computing in support of stockpile stewardship. Last year, for example, the National Ignition Facility at Lawrence Livermore Laboratory increased its shot rate, its experiment rate, from 191 in 2014 to 356 in 2015, an 86 percent increase. Our budget request also supports the recapitalization of NNSA's aging research and production infrastructure, most notably at the facilities where we perform our major uranium, plutonium, tritium, and other commodity operations. Of significance, NNSA completed the first sub-project for the Uranium Processing Facility at Oak Ridge, Tennessee, on time and millions of dollars under budget.

DEFENSE NUCLEAR NONPROLIFERATION

This year's request for the defense nuclear nonproliferation account, as has already been pointed out, is 6.8 percent lower than the fiscal 2016 enacted level, for two reasons. First, prior year carryover balances are available to execute several programs in this mission space. And secondly, we propose terminating the Mixed Oxide Fuel, or MOX, Fabrication Facility project.

While the administration remains firmly committed to disposing of surplus weapons grade plutonium, it is clear from independent analyses that the MOX fuel approach is unsustainable given the enormous costs involved. The already proven Dilution and Disposal alternative would enable the plutonium to be disposed of decades sooner than the MOX approach and at less than half the cost and with far fewer risks. In fact, 4.8 metric tons of plutonium have already been diluted and disposed of in this manner, demonstrating beyond doubt the feasibility of this approach.

The new approach will enable us to be more responsible stewards of taxpayer dollars while upholding our commitment to dispose of surplus weapons grade plutonium more quickly. That's why the President's fiscal year 2017 budget request proposes that the Department pursue the Dilution and Disposal approach as the path forward and begin termination of the MOX project.

In addition, the Department could dispose of all the surplus plutonium in South Carolina using the Dilute and Dispose approach under its current authorizations, getting the plutonium out of the State decades earlier than under the MOX approach.

NAVAL REACTORS PROGRAM

The request for our third appropriations, the Naval Reactors program keeps pace with mission needs and continues NNSA's commitment to three major initiatives: the *Ohio*-class reactor plant system development, the Land-Based S8G Prototype refueling overhaul in upstate New York; and the spent fuel handling recapitalization project in Idaho. And, of course, Admiral Caldwell is far better prepared than I to answer any questions that you may have in this area.

MANAGEMENT AND GOVERNANCE

For each of these missions, NNSA is driving improvements in management and governance. For all of our programs, we have instituted rigorous analyses of alternatives, defined clear lines of authority and accountability for Federal and contract program management, improved cost and schedule performance, and ensure that Federal project directors and contracting officers have the appropriate skill mix and professional certifications to effectively manage NNSA's work. Our budget request for Federal salaries and expenses reflects an increasing emphasis on improving program and project management across all of our mission pillars.

So in closing, the nuclear security enterprise continues to make significant process—progress. Through disciplined careful planning, consistent funding, and your continued strong support, we believe we can make smart investments to build on that progress and to meet new challenges in the future.

Again, thank you for the opportunity to appear before you today, and we look forward to addressing your questions.
[The statements follow:]

PREPARED STATEMENT OF LIEUTENANT GENERAL FRANK G. KLOTZ

Chairman Alexander, Ranking Member Feinstein, and Members of the Subcommittee, thank you for the opportunity to present the President's fiscal year 2017 budget request for the Department of Energy's (DOE) National Nuclear Security Administration (NNSA). It is a pleasure to be here this afternoon. We value this Committee's strong support for the nuclear security mission, and for the people and institutions that are responsible for executing it.

The President's fiscal year 2017 budget request for NNSA is \$12.9 billion, this is an increase of \$357.5 million or 2.9 percent over the fiscal year 2016 enacted level. The request is approximately 43 percent of the DOE's total budget, and 67 percent of DOE's total 050 budget.

The NNSA has a unique and special responsibility to maintain a safe, secure, and effective nuclear weapons stockpile for as long as nuclear weapons exist; to prevent, counter, and respond to evolving and emerging nuclear proliferation and terrorism threats; to provide nuclear propulsion to our Navy as it protects American and Allied interests around the world; and to support our outstanding NNSA Federal workforce. By supporting overall growth, this budget request represents a strong endorsement of NNSA's vital and enduring missions, and is indicative of the Administration's unwavering commitment to a strong national defense.

NNSA's missions are accomplished through the hard work and innovative spirit of a highly talented Federal and Management and Operating (M&O) workforce committed to public service. To provide this team the tools they need to carry out their complex and challenging task, both now and in the future, we must continue to modernize our scientific, technical, and engineering capabilities and infrastructure. In doing so, we are mindful of our obligation to continually improve our business practices, and to be responsible stewards of the resources that Congress and the American people have entrusted to us.

The fiscal year 2017 budget request also reflects the close working partnership between NNSA and the Department of Defense (DoD). NNSA works closely with DoD to meet military requirements, support our Nation's nuclear deterrence capabilities and modernize the nuclear security enterprise. I would also note, that as in previous years, DoD is carrying in its fiscal year 2017 budget request separate funding in fiscal year 2018 and beyond that will be reallocated annually to NNSA's Weapons Activities and Naval Reactors.

I want to thank the committee for its support of the fiscal year 2016 budget request and look forward to your continuing support in fiscal year 2017. We have made some tough decisions and tradeoffs to meet both military commitments and nuclear security priorities. Without congressional support, modernization of our nuclear enterprise, implementation of our long-term stockpile sustainment strategy, and sustainment of our nonproliferation and prevention and response capabilities could be at risk. The program we have proposed is highly integrated and interdependent across the four accounts.

Details of the fiscal year 2017 budget request for the NNSA follow:

WEAPONS ACTIVITIES APPROPRIATION

For the Weapons Activities account, the fiscal year 2017 budget request is \$9.2 billion, an increase of \$396.2 million, or 4.5 percent above the fiscal year 2016 enacted levels. This account provides funds for the Defense Programs portfolio, which is responsible for all aspects of the stockpile stewardship, management, and responsiveness programs; the enterprise-wide infrastructure sustainment activities managed by our Office of Safety, Infrastructure, and Operations; NNSA's physical and cybersecurity activities; and the secure transportation of nuclear materials.

Maintaining the Stockpile

Last year, the work of the science-based Stockpile Stewardship Program (SSP) allowed the Secretaries of Energy and Defense to certify to the President for the 20th time that the American nuclear weapons stockpile remains safe, secure, and reliable, without the need for underground explosive nuclear testing. This achievement is made possible each year by essential investments in state-of-the-art diagnostic tools, high performance computing platforms, and modern facilities, which are staffed by NNSA's world-class scientists, engineers, and technicians.

For *Directed Stockpile Work* (DSW), the fiscal year 2017 budget request is \$3.3 billion, a decrease of \$57.3 million, or 1.7 percent below the fiscal year 2016 enacted levels. These reductions will not restrict NNSA's ability to annually assess system performance and reliability or maintain the schedule for Life Extension Programs (LEP).

The major LEPs are a fundamental part of this account. The \$222.9 million requested for the W76-1 warhead LEP directly supports the Navy and will keep the LEP on schedule and on budget to complete production in fiscal year 2019. We continue to make good progress on the B61-12 LEP, which will consolidate four variants of the B61 gravity bomb and will improve the safety and security of the oldest weapon system in the U.S. nuclear arsenal. With the \$616.1 million requested, we will remain on schedule to deliver the First Production Unit (FPU) in fiscal year 2020.

NNSA is responsible for the refurbishment of the nuclear explosives package and new bomb electronics, while the Air Force will provide the tail kit assembly under a separate acquisition program. When fielded, the B61-12 bomb will support both Air Force strategic long-range nuclear-capable bombers and dual-capable fighter aircraft, providing extended deterrence to our allies and partners, and allow retirement of the last megaton class weapon in the inventory, the B83 gravity bomb.

In July 2015, we began Phase 6.2 (Feasibility Study and Design Options) for the W80-4 cruise missile warhead LEP. The fiscal year 2016 budget request included \$195 million to accelerate the FPU by 2 years to fiscal year 2025, a decision made by the Nuclear Weapons Council (NWC) in late 2014. The fiscal year 2015 budget request included \$10 million to start the program. We had initially planned a ramp-up of Phase 6.2 study activities beginning in fiscal year 2016 to support the NWC FPU decision. However, as a result of the fiscal year 2016 continuing resolution, we were unable to begin the planned ramp-up activities until just recently. Furthermore, because of the delay in receiving fiscal year 2016 funding, the program cannot execute the full fiscal year 2016 enacted amount this year. As a result, a significant amount of the program's fiscal year 2016 funding will carry over into fiscal year 2017. Consequently, the fiscal year 2017 budget request is \$25.3 million over the fiscal year 2016 budget request, rather than \$117 million over the fiscal year 2016 budget request, as previously projected. While this delayed start will affect planned technology maturation activities in Phase 6.2A (Design Definition and Cost Study), we still fully expect to meet the planned FPU date in fiscal year 2025 to support the Air Force Long Range Stand Off (LRSO) program.

In fiscal year 2015, the NWC approved additional scope for the W88 Alteration (ALT) 370 to meet an emerging requirement. NNSA is now accelerating the new Conventional High Explosive (CHE) refresh work to match the original ALT schedule. As a result, we are synchronizing the full program to transition seamlessly to the Production Engineering phase in February 2017. In preparation for that phase transition, NNSA will publish a baseline cost report by the end of this fiscal year. This budget request reflects these efforts and includes \$281.1 million in fiscal year 2017 to support the FPU in fiscal year 2020.

Also within DSW, the fiscal year 2017 budget request includes \$1.3 billion for Stockpile Systems and Stockpile Services. These programs sustain the stockpile pursuant to the direction given in the President's Nuclear Weapon Stockpile Plan (NWSP). In doing so, the programs deploy unique skills, equipment, testers, and logistics to enable the daily operations of the nation's nuclear deterrent. Specifically, these programs produce and replace limited life components (LLCs) such as neutron generators and gas transfer systems, conduct maintenance, surveillance, and evaluations to assess weapons reliability, detect and anticipate potential weapons issues such as the recent CHE refresh issue mentioned above, and compile and analyze information during the Annual Assessment process.

The pursuit and application of technological advancements to enhance safety and security while reducing life cycle costs of the stockpile runs through all of these activities. The development of Integrated Surety Architectures enhancing transportation safety and security is an example of these efforts.

Within DSW, the fiscal year 2017 budget request also includes \$577.8 million for the Strategic Materials account to maintain NNSA's ability to produce the nuclear and other materials needed to support the enduring stockpile. This program includes Uranium Sustainment, Plutonium Sustainment, Tritium Sustainment, Domestic Uranium Enrichment (DUE), lithium and other strategic materials. Funding for Uranium Sustainment will enable enriched uranium operations in Building 9212, a Manhattan Project-era production facility at the Y-12 National Security Complex in Oak Ridge, Tennessee, to end in fiscal year 2025, and allow the bulk of this obsolete building to shut down. The sustainment and modernization of en-

riched uranium capabilities and the acceleration of Area 5 de-inventory will reduce safety and mission risks in the near term.

Plutonium Sustainment funds replacement and refurbishment of equipment and the critical skills needed to meet the pit production requirements as outlined in the National Defense Authorization Act (NDAA) for fiscal year 2015.

Tritium Sustainment ensures the Nation's capability and capacity to provide the tritium necessary to meet national security requirements, either through production at Tennessee Valley Authority nuclear power plants or by recovering and recycling tritium from returned gas transfer systems.

The DUE program continues its efforts to ensure that we have the necessary supplies of enriched uranium for a variety of national security needs.

The fiscal year 2017 budget request also includes \$69 million for Weapons Dismantlement and Disposition, an increase of \$16.9 million, 32.7 percent above the fiscal year 2016 enacted level, which includes funds to support the President's goal to accelerate the dismantlement rate of previously retired weapons by 20 percent. This will enable NNSA to dismantle the weapons retired prior to fiscal year 2009 by 2021, rather than the original goal of 2022. It will also result in increased Management and Operating staff at both the Pantex Plant in Amarillo, Texas and the Y-12 National Security Complex.

For *Research, Development, Test, and Evaluation* (RDT&E), the fiscal year 2017 budget request is \$1.9 billion, an increase of \$36.2 million, 2 percent above the fiscal year 2016 enacted level. This includes \$663.2 million for the Advanced Simulation and Computing (ASC) Program, an increase of \$31 million for the Advanced Technology Development and Mitigation (ATDM) subprogram that supports high performance computing on the path to exascale, and \$87.1 million for Advanced Manufacturing Development (AMD), a decrease of \$43 million. The decrease reflects a realignment from technology development investments to address higher NNSA priorities. The budget request focuses on continued investment in advanced manufacturing opportunities and improving the manufacturing processes for components that support multiple weapons to maximize the benefits of these investments. Advanced Manufacturing invests in technologies that will reduce the time and cost of current manufacturing methods, replaces obsolete processes, and supports manufacturing developments for future weapon upgrades. Additive Manufacturing, also known as 3-D printing, aids in developing and manufacturing components for stockpile and weapon technology applications. The overall RDT&E request reflects small increases for the Science Program (\$442.0 million, an increase of \$18.9 million) to achieve two subcritical experiments per year before the end of the FYNSP, and begin alterations to U1a tunnel complex at Nevada to prepare for these experiments: Inertial Confinement Fusion Ignition and High Yield Program (\$523.9 million, an increase of \$11.9 million) and the Engineering Program (\$139.5 million, an increase of \$8.1 million).

The Inertial Confinement Fusion Ignition and High Yield program has spearheaded ongoing improvements in management and operational efficiencies at NNSA's major high energy density (HED) facilities, including the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL) in California and the OMEGA facility at the University of Rochester in New York. In fiscal year 2015, NIF markedly improved its shot-rate efficiency with over 350 key experiments performed (compared to 191 in fiscal year 2014) in support of the SSP. This level of effort represents an 85 percent increase over the previous year and an 18 percent increase over its goal for 2015.

NNSA has taken major steps in high performance computing to deliver on its missions and play a leading role to support the President's Executive Order on the National Strategic Computing Initiative (NSCI). In 2015, Los Alamos National Laboratory (LANL) and Sandia National Laboratories (SNL) received the first hardware delivery for NNSA's next generation high performance computer, Trinity. This computer will initially have eight times more applications performance than the Cielo machine it is replacing. NNSA also continued its CORAL collaboration with LLNL, the DOE Office of Science national laboratories at Oak Ridge and Argonne, IBM, and other vendors. CORAL will help develop next generation computing platforms to dramatically improve our ability to run increasingly complex codes and will be a significant step on the path to exascale computing.

NNSA collaborates with the DOE Office of Science while making these much needed investments in exascale computing. The fiscal year 2017 budget request includes \$95 million from NNSA for the development of capable exascale systems.

Defense Programs also maintains the vitality of the broader National Security Enterprise. An important aspect of this effort is investing in Laboratory-, Site- and Plant-Directed Research and Development (LDRD/PDRD). Independent reviews have consistently affirmed the importance of the program to the long-term vitality

of the labs. LDRD/PDRD provides basic research funding to foster innovation and to attract and retain young scientific and technical talent and is critical to the long-term sustainment of our national laboratories. Congressional support is essential to ensuring that we have both the workforce and the new developments necessary to support the nation's security into the future.

Improving Safety, Operations and Infrastructure

NNSA's ability to achieve its mission is dependent upon safe and reliable infrastructure. The age and condition of NNSA's infrastructure will, if not addressed, put the mission, the safety of our workers, the public, and the environment at risk. More than half of NNSA's facilities are over 40 years old while 30 percent of them date back to the Manhattan Project era. The fiscal year 2017 budget request for Infrastructure and Operations is \$2.7 billion, an increase of \$442.8 million, 19.4 percent above the fiscal year 2016 enacted level. This funding will help NNSA modernize and upgrade aging infrastructure and address safety and programmatic risks through strategic investments in both general purpose infrastructure and program-specific capabilities that directly support our nuclear weapons and nonproliferation programs.

To support critical programmatic activities, we are making important strides in recapitalizing our aging infrastructure and capabilities. In fiscal year 2015, NNSA funded new and continuing projects to enhance or replace programmatic capabilities and address the risks posed by the aging infrastructure. NNSA's investment in these projects is vital to the revitalization of the NNSA enterprise. The fiscal year 2017 budget request provides funding for more than 70 recapitalization projects. The request will also support general purpose infrastructure and program-specific capabilities through Line Item Construction projects. These projects include, for example, the Uranium Processing Facility (UPF), the Chemistry and Metallurgy Research Replacement (CMRR) project, the U1a Complex Enhancements Project (UCEP) in support of the Enhanced Capabilities for Subcritical Experiments (ECSE) portfolio, the Albuquerque Complex Project to replace the current inadequate facilities, and a project to expand the electrical distribution system at LLNL.

One of the most worrisome of the NNSA infrastructure challenges is the excess facilities that pose risks to our workers, the environment, and the mission. While many of these facilities will ultimately be transferred to the DOE Office of Environmental Management for disposition, NNSA is focusing on reducing the risk where it can. In fiscal year 2015, NNSA successfully demolished our second non-process contaminated building at Y-12 within the past two calendar years. The fiscal year 2017 budget request supports a number of activities to continue to address excess facilities. These activities include the transition of the Kansas City Bannister Federal Complex to the private sector for environmental remediation and redevelopment, risk reduction activities at Alpha-5 and Beta-4 at Y-12—both of which are highly process-contaminated—and disposition of more uncontaminated facilities across the NNSA enterprise.

Our *Secure Transportation Asset* (STA) program provides safe, secure movement of nuclear weapons, special nuclear material, and weapon components to meet projected DOE, DoD, and other customer requirements. The fiscal year 2017 budget request of \$282.7 million includes an increase of \$45.6 million, 19.2 percent above the fiscal year 2016 enacted levels, to continue asset modernization and workforce capability initiatives. These initiatives include: (1) restoration of Federal agent strength levels to meet the goal of 370; (2) the Safeguards Transporter (SGT) Risk Reduction Initiatives to manage the SGT beyond its design life; (3) development and testing of the selected alternative for the SGT replacement, the Mobile Guardian Transporter (MGT); and (4) replacement of vehicles and tractors.

The *Office of Defense Nuclear Security* (DNS) develops and implements sound security programs to protect Special Nuclear Material (SNM), people, information, and facilities throughout the nuclear security enterprise. The fiscal year 2017 budget request is \$670.1 million, a decrease of \$12.8 million, or 1.9 percent below the fiscal year 2016 enacted level of \$682.9 million due to one-time dedicated increases in fiscal year 2016. After adjusting for an fiscal year 2016 one-time \$30 million designated plus up and \$13 million dedicated line item construction amounts for each year, the remaining fiscal year 2017 operating request of \$657.1 million is an increase of \$17.2 million, or 2.7 percent above the fiscal year 2016 enacted operating level of \$639.9 million. The request manages risk among important competing demands as NNSA continues to face the challenges associated with an aging physical security infrastructure that must be effectively addressed in the coming years. To this end, DNS is conducting a Site Condition Review (SCR) of the physical security systems at all locations to facilitate the development of an enterprise-wide security systems upgrade and refresh strategy. This effort will identify and manage current

and future security improvements and upgrades on a 10-year planning cycle and includes determining the condition of critical security equipment and infrastructure. A final report of this effort will provide DOE/NNSA leadership and Congressional stakeholders with consolidated and up-to-date information to enable informed decisions for fiscal planning and programming.

The SCR is being conducted within the context of important organizational improvements and management strategies published in the June 2015 Security Roadmap. The document establishes a clear vision and path forward to correcting identified security issues and promoting sustained performance within the NNSA security program. The Security Roadmap is a multi-year effort that implements key recommendations for improvement identified in past assessments; it includes a total of 57 strategic initiatives covering culture, process, infrastructure, and workforce challenges. As of the end of 2015, DNS has completed six of the initiatives and is currently working on another 20 initiatives. The remaining 31 initiatives are pending formal initiation.

For *Information Technology and Cybersecurity*, the fiscal year 2017 budget request is \$176.6 million, an increase of \$19 million, or 12.1 percent above fiscal year 2016 enacted levels. This increase will fund much needed improvement to the Information Technology and Cybersecurity program, including Continuous Diagnostic and Mitigation (CDM), Telecommunications Security, infrastructure upgrades for the Enterprise Secure Computing Network (ESN), Public Key Infrastructure (PKI), Energy Sciences Network (ESnet) program, and an increased Information Technology budget. This cybersecurity program continuously monitors enterprise wireless and security technologies (e.g., identity, credential, and access management) to meet a wide range of security challenges. In fiscal year 2017, NNSA plans to continue the recapitalization of the Enterprise Secure Network, modernize the cybersecurity infrastructure, implement the Identity Control and Access Management project at NNSA Headquarters and site elements, and implement all Committee on National Security Systems and PKI capabilities.

DEFENSE NUCLEAR NONPROLIFERATION APPROPRIATION

The Defense Nuclear Nonproliferation (DNN), fiscal year 2017 budget request is \$1.8 billion, a decrease of \$132.4 million, 6.8 percent below the fiscal year 2016 enacted levels. This appropriation covers NNSA's nuclear threat reduction mission. DNN addresses the entire nuclear threat spectrum by helping to prevent the acquisition of nuclear weapons or weapon-usable materials, technologies, and expertise, countering efforts to acquire such weapons, materials, and technologies, and responding to nuclear and radiological incidents. The fiscal year 2017 budget request funds two mission areas under the DNN appropriation: the Defense Nuclear Nonproliferation Program and the Nuclear Counterterrorism and Incident Response (NCTIR) Program.

Nonproliferation Efforts

NNSA made significant progress in nuclear threat reduction in 2015. Working with foreign partners, the Office of Defense Nuclear Nonproliferation removed approximately 170 kilograms of highly enriched uranium (HEU) and plutonium from several civilian sites; successfully down-blended additional HEU to achieve a cumulative total of 150 metric tons of U.S. excess, weapons-usable HEU (approximately 6,000 nuclear weapons worth of material); recovered more than 100,000 curies of disused or orphaned radioactive material; ensured the United States remains on track to fulfill the commitments made at the 2014 Nuclear Security Summit; and supported the Secretary of Energy's efforts to develop the Joint Comprehensive Plan of Action (JCPOA) by providing scientific expertise and technical options to the United States negotiating team.

The *Material Management and Minimization* (M³) program provides an integrated approach to addressing the threat posed by nuclear materials through a full cycle of materials management and minimization. The primary objective of the program is to achieve permanent threat reduction by minimizing and, when possible, eliminating weapons-usable nuclear material around the world. The fiscal year 2017 budget request is \$341.1 million, an increase of \$24.5 million, 7.7 percent above the fiscal year 2016 enacted levels. This funding increase will accelerate reactor conversions in Kazakhstan and in the United States, as well as initiate the critical decision process to support the dilute and dispose program for domestic plutonium disposition.

The *Global Material Security* (GMS) program works with partner nations to increase the security of vulnerable nuclear and radiological materials and improve their ability to detect, interdict, and investigate illicit trafficking of these materials. The fiscal year 2017 budget request for this program is \$337.1 million, a decrease

of \$89.6 million, 21 percent below the fiscal year 2016 enacted level. This decrease is possible because GMS is completing its work to protect the remaining International Atomic Energy Agency (IAEA) Category I radiological sources in the United States to meet our 2014 Nuclear Security Summit commitment, and because GMS is committed to reducing its prior year carryover balances.

The *Nonproliferation and Arms Control* (NPAC) program supports the non-proliferation and arms control regimes by developing and implementing programs to strengthen international nuclear safeguards; control the spread of nuclear and dual-use material, equipment, technology and expertise; verify nuclear reductions and compliance with nonproliferation and arms control treaties and agreements; and address other nonproliferation and arms control challenges. The fiscal year 2017 budget request will fund safeguards and export control activities, including efforts specifically in support of JCPOA implementation. This funding also supports statutorily mandated activities such as technical reviews of export licenses and interdiction cases, technical support for the negotiation and implementation of civil nuclear cooperation agreements (123 Agreements), and upgrades to the 10 CFR 810 authorization process. The fiscal year 2017 budget request for this program is \$124.7 million, a decrease of \$5.5 million, 4.2 percent below the fiscal year 2016 enacted level. This decrease primarily reflects a return to baseline funding following the one-time increase of \$3.5 million by Congress in the fiscal year 2016 budget for improvements in the export control process, as well as cost-savings in export licensing activities achieved through operational efficiencies.

The *DNN Research and Development* (DNN R&D) program supports innovative unilateral and multi-lateral technical capabilities to detect, identify, and characterize (1) foreign nuclear weapons programs, (2) illicit diversion of special nuclear materials, and (3) nuclear detonations. To meet national and Departmental nuclear security requirements, DNN R&D leverages the unique facilities and scientific skills of DOE, academia, and industry to perform research, including counterterrorism-related R&D. The fiscal year 2017 budget request for this program is \$393.9 million, a \$25.4 million or 6.1 percent decrease below fiscal year 2016 enacted levels. The decrease in funding reflects projected savings resulting from a reduction in planned activities for arms control-related R&D and a return to the baseline Nuclear Detonation Detection (NDD) program after development of an initial mitigation path for supply chain interruptions.

Nonproliferation Construction consolidates construction costs for DNN projects. Currently, the MOX Fuel Fabrication Facility (MFFF) is the only project in this program; however, the fiscal year 2017 budget request terminates the MOX project. The Department will complete pre-conceptual design for the dilute and dispose approach to establish Critical Decision-0 (CD-0), Approve Mission Need, and begin conceptual design in late fiscal year 2017. The fiscal year 2017 budget request of \$270 million will be used to bring an orderly and safe closure of the MFFF. The scope and costs will be refined in subsequent budget submissions when the termination plan for the MFFF project is approved.

Nuclear Counterterrorism and Emergency Operations

DOE has adopted an enterprise-wide approach to strengthen overall preparedness to respond to a broad spectrum of potential emergencies. These emergencies include natural phenomena, such as adverse weather events or earthquakes, and man-made events, such as accidents or acts of terrorism. To better accomplish this mission, in November 2015, NNSA reorganized the Office of Emergency Operations and the Office of Counterterrorism and Counterproliferation.

Both of these organizations are supported under the Nuclear Counterterrorism and Incident Response (NCTIR) Program. In fiscal year 2016, the NCTIR program transitioned to the DNN account in order to align all NNSA funding to prevent, counter, and respond to nuclear proliferation and terrorism. The fiscal year 2017 budget request includes \$271.9 million to support the NCTIR program, an increase of \$37.5 million, 16 percent above the fiscal year 2016 enacted level. Within NCTIR, NNSA continues to work domestically and around the world to prepare for and improve our ability to respond to radiological or nuclear incidents.

Our counterterrorism and counterproliferation programs are part of broader U.S. Government efforts assessing the threat of nuclear terrorism and to develop technical countermeasures. The scientific knowledge generated under this program ensures that NNSA's technical expertise on nuclear threat devices, including improvised nuclear devices (INDs), supports and informs broader U.S. Government nuclear security policy and guides nuclear counterterrorism and counterproliferation efforts, including interagency nuclear forensics and DoD contingency planning.

NNSA's emergency response teams must deploy and respond with the most up to date equipment. The current equipment is aging, increasing maintenance expenses,

and has started to impact NNSA's ability to perform its emergency response mission. The Radiological Assistance Program (RAP) remains the nation's premier first-response resource to assess a radiological incident and advise decision-makers on necessary steps to minimize hazards, but its effectiveness is beginning to be compromised by obsolete equipment. To ensure that NNSA is able to execute its radiological emergency response mission, RAP's equipment must be recapitalized regularly. Additionally, NNSA is acquiring state-of-the-art, secure, deployable communications systems that are interoperable with our Federal Bureau of Investigation and DoD mission partners, ensuring decision makers receive real-time technical recommendations to mitigate nuclear terrorist threats.

The Office of Emergency Operations is now aligned to focus on its core Department-wide all-hazards and complex-wide emergency management mission. The fiscal year 2017 budget request for this office is \$34.7 million, an increase of \$9.6 million, or 38 percent above the fiscal year 2016 enacted level. This will improve the emergency management system through an enterprise-wide approach that effectively increases the Department's all-hazards emergency preparedness and response capability during complex, cascading, or enduring incidents, and more effectively calls upon and leverages the assets, resources, and skills across the DOE complex. The Emergency Operations Center (EOC) will continue to be the 24/7/365 single-point-of-contact for Departmental and interagency notifications regarding situations requiring centralized management such as, national emergencies, heightened international tension, Departmental emergencies, natural disasters, or acts of terrorism. The program also manages the Emergency Communications Network, and Continuity Programs for all of DOE, including NNSA. The Office of Emergency Operations will continue to work within the DOE to develop plans to replace the existing EOC and to improve the Department's capabilities to respond to emergencies.

NAVAL REACTORS APPROPRIATION

Advancing Naval Nuclear Propulsion

NNSA supports the U.S. Navy's ability to protect and defend American interests across the globe. The Naval Reactors Program remains at the forefront of technological developments in naval nuclear propulsion and ensures a commanding edge in warfighting capabilities by advancing new technologies and improvements in naval reactor performance and reliability.

In 2015, Naval Reactors enabled U.S. nuclear powered warships to operate for another year safely and effectively, steaming more than two million miles in support of national security missions. Initial reactor start-up was achieved in the lead reactor plant of pre-commissioning unit (PCU) *Gerald R. Ford* (CVN 78), the first new design aircraft carrier propulsion plant in 40 years. This historic milestone represents the culmination of almost 20 years of dedicated and sustained effort by Naval Reactors and its field activities, our Department of Energy laboratories, nuclear industrial base suppliers, the Navy design team and the nuclear shipbuilders. This is the first step in fully testing the integrated operations of the propulsion plant, culminating in sea trials this spring. Finally, we continued our reactor plant design and reactor core manufacturing development efforts in support of the new design *Ohio*-class Replacement reactor plant, including the life-of-ship core.

The *Naval Reactors* fiscal year 2017 budget request is \$1.42 billion, an increase of \$45 million, 3.2 percent above the fiscal year 2016 enacted level. In addition to supporting today's operational fleet, the requested funding will enable Naval Reactors to deliver tomorrow's fleet by funding three national priority projects, and recruiting and retaining a highly skilled work force committed to the Navy and the nation. The projects include (1) continuing design of the new reactor plant for the replacement of the *Ohio*-class SSBN, which will feature a life-of-ship core and electric drive; (2) refueling a Research and Training Reactor in New York to facilitate *Ohio*-class Replacement reactor development efforts and provide 20 more years of live reactor based training for fleet operators; and (3) building a new spent fuel handling facility in Idaho that will facilitate long term, reliable processing and packaging of spent nuclear fuel from aircraft carriers and submarines.

Naval Reactors has requested funding in fiscal year 2017 to support these projects, and to fund necessary reactor technology development, equipment, construction, maintenance, and modernization of critical infrastructure and facilities. By employing a small but high-performing technical base, the teams at our four Program sites—the Bettis Atomic Power Laboratory in Pittsburgh, the Knolls Atomic Power Laboratory and Kesselring Site in greater Albany, and our spent nuclear fuel facilities in Idaho—we can perform the research and development, analysis, engineering and testing needed to support today's fleet at sea and develop future nuclear-powered warships. Importantly, our labs perform the technical evaluations

that enable Naval Reactors to thoroughly assess emergent issues and deliver timely responses that ensure nuclear safety and maximize operational flexibility. This technical base supports more than 15,000 nuclear-trained Navy sailors, who safely maintain and operate the 98 nuclear propulsion plants in the fleet 24 hours per day, 365 days per year around the globe. It will also facilitate delivery, as directed by Congress, of our conceptual plan for potential naval application of low enriched uranium.

NNSA FEDERAL SALARIES AND EXPENSES APPROPRIATION

The NNSA *Federal Salaries and Expenses* (FSE) fiscal year 2017 budget request is \$412.8 million, an increase of \$49.1 million, 13.5 percent above the fiscal year 2016 enacted level. The fiscal year 2017 budget request provides funding for 1,715 full-time equivalents (FTE) and support expenses needed to meet mission requirements. We are actively engaged in hiring to that number in a thoughtful and strategic manner. The fiscal year 2017 budget request will support 1,715 FTEs, an increase of 60 FTEs (25 above the authorized 1,690) above the anticipated number of FTEs in fiscal year 2016, and request an additional 25 for a total of 1,740 FTEs in fiscal year 2018 and the outyears. The exact number of FTEs will be determined following a detailed staffing review. It also provides for a 1.3 percent cost of living increase and a 5.5 percent increase for benefit escalation. In addition, the request provides funding for additional Federal Background Investigations for security clearances and provides additional funding to the Department's Working Capital Fund, primarily for Office of Personnel Management (OPM) credit monitoring and the Department's accounting systems (iMANAGE).

In fiscal year 2017, NNSA will continue its efforts to meet current and future workforce needs by analyzing how evolving missions are affecting job requirements. Reshaping of the workforce over the next several years will be essential, including identifying the right staffing size and skill sets and implementing professional development plans now and in the future. NNSA will also continue to streamline its operations, particularly in travel and support services, to provide a lean and efficient organization.

MANAGEMENT AND PERFORMANCE

To enhance our ability to carry out our mission and execute this budget request, we will continue to focus on improving our project management and cost estimating capabilities. In keeping with the Secretary of Energy's increased focus on Management and Performance, NNSA is committed to managing its operations, contracts and costs in an effective and efficient manner. The NNSA's Office of Acquisition and Project Management (APM) is driving continued improvement in contract and project management practices. APM is leading NNSA's effort to institute rigorous analyses of alternatives, provide clear lines of authority and accountability for Federal and contractor program and project management, improve cost and schedule performance, and ensure Federal Project Directors and Contracting Officers with the appropriate skill mix and professional certifications are managing NNSA's work. NNSA participates in the Secretary of Energy's Project Management Risk Committee as a means to institutionalize and share best practices across the Department. NNSA established the Office of Project Assessments, reporting directly to the Principal Deputy Administrator, ensuring senior leadership visibility and accountability throughout the Enterprise for project performance. This office generated \$33 million in cost avoidances as a result of their independent project peer reviews.

Since 2011, NNSA has delivered approximately \$1.4 billion in projects, a portion of NNSA's total project portfolio, \$70 million (or 5 percent) under original budget. Significant examples in the last year include the Uranium Processing Facility (UPF) Site Readiness Subproject, which delivered \$20 million under budget; Y-12's Nuclear Facility Risk Reduction Project, which delivered \$6 million under budget and 11 months ahead of schedule; and LANL's Transuranic Waste Facility Project, which is on track to complete \$3 million under budget. Using the Department's best practices, the UPF and Chemistry and Metallurgy Research Replacement Facility Projects were restructured into smaller more manageable subprojects, significantly reducing project delivery risk.

NNSA is committed to encouraging competition and increasing the universe of qualified contractors, by streamlining its major acquisition processes. The most significant example was the competitive award of the Kansas City National Security Campus M&O contract, awarded without protest, saving taxpayers \$150 million and increasing the use of small businesses. As an affirmation of the quality of NNSA's acquisition management team, only four out of 103 competitive procurements were protested, with NNSA winning all protests. Finally, NNSA exceeded its small busi-

ness goal by over 20 percent, awarding \$233 million to small business in fiscal year 2015.

NNSA will continue to focus on delivering timely, best-value acquisition solutions for all of our programs and projects. NNSA will use a tailored approach to contract structures and incentives that is appropriate for the unique missions and risks at each site. Our M&O contractors are responsible for disparate activities, ranging from research and development to industrial production. Accordingly, we will work to develop the right incentives for each circumstance and for each of our contracts.

COST ESTIMATING AND PROGRAM EVALUATION

The Office of Cost Estimating and Program Evaluation (CEPE) continues to develop its capabilities to provide trusted independent cost and resource analysis of NNSA's programs and projects. As detailed in its implementation plan, the number of CEPE Federal staff will grow from a target of 15 in fiscal year 2016 to 18 in fiscal year 2017. CEPE will conduct independent cost estimates on the B61-12 LEP and W88 Alt 370 in fiscal year 2016 and the W80-4 LEP in fiscal year 2017. CEPE is also institutionalizing best practices for analysis of alternatives and leads the corporate process to build the NNSA budget.

CONCLUSION

The NNSA performs vital activities at home and throughout the world in support of the nuclear security mission. Its success in addressing 21st century challenges hinges upon the technology, capabilities, and infrastructure entrusted to the organization.

Again, thank you for the opportunity to appear before you today.

PREPARED STATEMENT OF ADMIRAL JAMES F. CALDWELL

A strong Navy is crucial to the security of the United States. Navy warships are deployed around the world every hour of every day to provide a credible "forward presence." With over 45 percent of the Navy's major combatants being nuclear powered, including 10 aircraft carriers, 14 ballistic missile submarines, 55 attack submarines, and 4 guided missile submarines—it is vital that these ships are ready when and where our Nation needs them. In addition to supporting these nuclear powered combatants, Naval Reactors has also safely maintained and operated two nuclear powered land-based prototypes—both over 38 years old—to conduct research and development and two Moored Training Ships—both over 51 years old—the oldest operating pressurized water reactors (PWRs) in the world. These land-based prototypes, Moored Training Ships, and Naval Nuclear Power Training Command train over 3000 sailors per year to operate our naval nuclear propulsion plants.

Our ballistic missile submarine force remains on patrol, marking over 60 years of peacekeeping capability through strategic deterrence. The Navy had 34 submarine deployments and 26 strategic deterrent patrols during 2015. In addition, at any given time, there were always at least 56 of 71 submarines deployed or on stand-by to deploy within a few days. Our carriers, USS *Carl Vinson* (CVN 70) and USS *Theodore Roosevelt* (CVN 71) completed successful deployments to the Central Command area of responsibility, and the USS *Ronald Reagan* (CVN 76) turned over with the USS *George Washington* (CVN 73) to serve as the forward-deployed carrier in Japan.

This past year, we also saw the christening of the attack submarine PCU *Illinois* (SSN 786) and keel laying for the PCU *Colorado* (SSN 788) and PCU *Indiana* (SSN 789), our fifteenth and sixteenth *Virginia*-class submarines. We've also added another attack submarine to our force by commissioning USS *John Warner* (SSN 785), and began a program that delivers two *Virginia*-class submarines annually. In 2015, we laid the keel for the second *Ford*-Class CVN, PCU *John F. Kennedy* (CVN 79). We currently have 12 submarines and one next generation aircraft carrier in various phases of construction at our shipyards. Initial reactor start-up was achieved in the lead reactor plant of PCU *Gerald R. Ford* (CVN 78), the first new design aircraft carrier propulsion plant in 40 years. This historic milestone represents the culmination of almost 20 years of dedicated and sustained effort by Naval Reactors and its field activities, our Department of Energy laboratories, nuclear industrial base suppliers, the Navy design team and the nuclear shipbuilders. This is the first step in fully testing the integrated operations of the propulsion plant, culminating in sea trials this spring. Finally, we continued our reactor plant design and reactor core manufacturing development efforts to support of the new design *Ohio*-class Replacement reactor plant, including the life-of-ship core.

The firm support of this subcommittee last year enabled safe operation of the fleet, Naval Reactors mandatory oversight, and continued progress on key projects. Naval Reactors' budget request for fiscal year 2017 will continue this work. The funding request is for \$1.420 billion, an increase of \$45 million (3 percent) over the fiscal year 2016 enacted funding level. In addition to supporting today's operational fleet, the requested funding will enable Naval Reactors to deliver tomorrow's fleet by funding three national priority projects and recruiting and retaining a highly skilled work force committed to the Navy and the nation. The projects are:

- Continuing to design the new reactor plant for the replacement of the *Ohio*-class ballistic missile submarine, which will feature a life-of-ship core and electric drive;
- Refueling a Research and Training Reactor in New York, to facilitate *Ohio*-class Replacement reactor development efforts and provide 20 more years of live reactor based training for the fleet operators; and
- Building a new spent fuel handling facility in Idaho that will facilitate long term, reliable processing and packaging of spent nuclear fuel from aircraft carriers and submarines.

Naval Reactors has requested funding in fiscal year 2017 to support these projects, and to fund necessary reactor technology development, equipment, construction, maintenance, and modernization of critical infrastructure and facilities. By employing a small but high-performing technical base, the teams at our four Program sites—the Bettis Atomic Power Laboratory in Pittsburgh, the Knolls Atomic Power Laboratory and Kesselring Site in greater Albany, and our spent nuclear fuel facilities in Idaho—we can perform the research and development, analysis, engineering and testing needed to support today's fleet at sea and develop future nuclear-powered warships. Importantly, our labs perform the technical evaluations that enable Naval Reactors to thoroughly assess emergent issues and deliver timely responses that ensure nuclear safety and maximize operational flexibility. This technical base supports more than 15,000 nuclear-trained Navy sailors, who safely maintain and operate the 97 nuclear propulsion plants in the fleet 24 hours per day, 365 days per year around the globe. It will also facilitate delivery, as directed by Congress, of our conceptual plan for potential naval application of low enriched uranium.

The requested increase in funding is also required to support the planned ramp up of design efforts for the new reactor plant for the *Ohio*-class SSBN Replacement—the Navy's number one acquisition priority. Providing unparalleled stealth, endurance, and mobility, our ballistic missile submarine force has delivered more than 60 years of continuous at-sea deterrence, and continues to be the most survivable leg of the nuclear triad. *Ohio*-class Replacement SSBN activity this year includes reactor plant design and component development to support procurement of long lead components starting in fiscal year 2019. Progress in these areas in fiscal year 2017 maintains schedule alignment with the Navy as the program moves forward to construction start in fiscal year 2021 while retiring technical risk and targeting cost reduction.

Related to *Ohio*-class Replacement and the Program's training needs, the fiscal year 2017 budget request will support the land-based prototype refueling overhaul at the Kesselring Site in upstate New York. In fiscal year 2017, Naval Reactors will continue the core manufacturing work needed for the refueling overhaul, which will also enable timely construction of the life-of-ship core for *Ohio*-class Replacement. Further, plant service-life engineering design will be completed in fiscal year 2017 to ensure that the land-based prototype overhaul, performed concurrently with refueling, supports 20 additional years of research, development and training.

The Naval Reactors fiscal year 2017 budget request also contains funds to continue the Spent Fuel Handling Recapitalization Project. After many years of funding reductions, Naval Reactors greatly appreciates Congressional support for this much needed project in fiscal year 2016, where we received the full request of \$86 million. Congressional support in 2016 enabled progress, design, and planning for site preparations and long lead material procurements in fiscal year 2017. We will use the \$100 million requested in fiscal year 2017 to finalize key facility and equipment requirements and advance facility design to support establishing the Performance Baseline in fiscal year 2018 and the start of construction in fiscal year 2019. Continued Congressional support will help ensure that the facility in Idaho is ready to receive spent nuclear fuel from the fleet in fiscal year 2025. Because the new facility's capabilities are required to support aircraft carrier refuelings and defuelings, any delay to the project schedule would require procurement of additional shipping containers to temporarily store naval spent nuclear fuel at a cost of approximately \$150 million for each year the project is delayed.

At the requested funding level, Naval Reactors can safely maintain and oversee the nuclear-powered fleet. Naval Reactors can also continue to advance the *Ohio*-class Replacement and Land-based Prototype Refueling Overhaul, continue progress on the Spent Fuel Handling Recapitalization Project, and meet our environmental responsibilities.

Naval Reactors is committed to executing our projects on time and on budget, and continuing the search for the safest and most cost effective way to support the nuclear fleet. I respectfully urge your support for aligning funding allocations with the fiscal year 2017 budget request.

Senator ALEXANDER. Thanks, General Klotz.

We will now begin a round of questions.

URANIUM PROCESSING FACILITY

I want to ask about the big construction projects. And let me take just a minute on the Uranium Facility before I go to MOX. When do you expect the design to be 90 percent complete?

General KLOTZ. We expect the design for the project to be 90 percent complete at the—towards the end of next year, 2017.

Senator ALEXANDER. So that means you would expect to begin construction of the Uranium Facility toward the end of 2017?

General KLOTZ. We might not actually begin construction at that time. I would have to give you a specific time in terms of which we actually begin construction, but as you know, because, as you rightly pointed out, we meet routinely with you, Senator, and with Senator Feinstein, to go over that. And, in fact, our staffs are working to schedule, as soon as we get past the budget hearings, a discussion on that. But as you know, we have broken the overall project up into several sub-projects, one of which the site rating sub-project, as I mentioned in the opening statement, was completed last year, February of last year, for \$65 million, which was \$20 million under the budget.

Senator ALEXANDER. Well, I congratulate you on that, and I think it's important to point out that over the last 5 years that project has gone from skyrocketing out of control to a managed process. Are you on a path that you believe is on time and on budget, meaning no more than \$6.5 billion by 2025?

General KLOTZ. Yes, sir. As recommended by the Red Team, chaired by Dr. Thom Mason, the director of Oak National Laboratory, we are implementing every one of the recommendations in that, and we are going to deliver that facility at \$6.5 billion by 2025.

MIXED OXIDE FUEL FABRICATION FACILITY

Senator ALEXANDER. Since we're talking about billions, let's go to MOX. You said the Dilute and Dispose procedure could be less than half the cost of the current MOX procedure. What kind of dollars are we talking about?

General KLOTZ. We have conducted several reviews over the past year, one by another Red Team chaired by Dr. Mason, of Oak Ridge National Laboratory, and two congressionally mandated independent assessments by The Aerospace Corporation. Consistently these reviews have concluded that the projected life-cycle cost of the MOX fuel approach for plutonium disposition will be in the range of \$30 to \$50 billion, and possibly even higher, and will re-

quire approximately \$800 million to \$1 billion annually for decades to come for the life of the MOX fuel program.

Senator ALEXANDER. And the cost of the alternative proposal?

General KLOTZ. Half or better.

Senator ALEXANDER. So we're talking about, according to those figures, saving a half billion dollars a year?

General KLOTZ. Yes, sir. Or as the Secretary testified just a week ago at this very same place, perhaps maybe even more.

Senator ALEXANDER. How much excess plutonium is covered under the agreement with Russia?

General KLOTZ. Sir, 34 metric tons.

Senator ALEXANDER. And how much excess plutonium is actually in South Carolina?

General KLOTZ. Approximately 13 metric tons.

Senator ALEXANDER. Can all of those 13 tons in South Carolina be sent to WIPP (Waste Isolation Pilot Plant), that is, in New Mexico, under current law?

General KLOTZ. Yes, sir, that is correct. And, in fact, in December of just last year, DOE issued its preferred alternative for disposing of 6 metric tons at Savannah River, not under the Plutonium Management Disposition Agreement that you were referring to, by diluting it and disposing of it at WIPP. And we are now in the process of finalizing a record of decision, announcing the decision to prepare 6 metric tons for eventual disposal at WIPP, and we can also, under existing statutory authorities, we can put the other 7 metric tons that are at Savannah River into WIPP.

Senator ALEXANDER. So there are 13 tons of plutonium in South Carolina.

General KLOTZ. That is correct.

Senator ALEXANDER. Six of them, six of those tons, have nothing to do with the Russian agreement.

General KLOTZ. Yes, sir.

Senator ALEXANDER. Seven do.

General KLOTZ. Yes, sir.

Senator ALEXANDER. And you're going to take—which tons go first to New Mexico?

General KLOTZ. The six that are not part of the agreement.

Senator ALEXANDER. And under existing agreements, there is room in the New Mexico facility for all 13 tons.

General KLOTZ. That is correct, sir.

Senator ALEXANDER. You have previously stated that nearly 5 tons of plutonium have already been disposed of at WIPP using the same process you plan to use for the 6 tons in South Carolina that have nothing to do with the Russian agreement. So is the process of disposing of plutonium by Dilute and Dispose well understood? Are you comfortable with it? Is it a competent process?

General KLOTZ. Yes, sir. As I said, we have done it before. We understand how to do that process, and it's very well understood.

Senator ALEXANDER. How long will it take to complete the disposal of the 6 tons of material in South Carolina that are not part of the Russian agreement?

General KLOTZ. Well, we'll have to do some things to speed up our capability of doing that. Right now, DOE plans to ramp up operations at Savannah River to dilute a small quantity, perhaps 150

kilograms per year of plutonium, over the next 2 to 3 years. We would also further increase throughput to approximately half a metric ton per year for a relatively small amount of funding, say, \$5 million over 3 years.

Additionally, NNSA has already begun design work with money that was appropriated in the 2016 appropriations bill for two additional glove boxes that will increase our ability to dilute to over 1 metric ton a year, and we expect these glove boxes to be in place during the mid-2020s. So that's when we can really seriously begin moving the 6 metric tons to WIPP.

By comparison, the MOX approach, if we followed that, the first metric ton of plutonium would not be processed until the 2040s, and only if Congress can begin funding the project now at about \$1 billion a year.

Senator ALEXANDER. Well, my time is up, but to summarize, you have testified that in your opinion and based on independent studies, that Congress might spend more than a half billion dollars more pursuing the MOX facility as opposed to Dilute and Dispose, so it's about half the cost or better. And, finally, you've said you could get all 13 tons that are now in South Carolina of plutonium, only 7 of which have anything to do with the Russian agreement, that you can get them out of South Carolina and into the WIPP facility much faster than you could using the current MOX procedure, and that under current authorities, you have permission—you wouldn't have to change the law in order to send those 13 tons to WIPP. Am I correct?

General KLOTZ. Yes, sir. That's all correct.

Senator ALEXANDER. Thank you.

And thanks to my colleagues for letting me go over a little bit.

Senator FEINSTEIN.

Senator FEINSTEIN. Thank you, Mr. Chairman.

NUCLEAR CRUISE MISSILE

General Klotz, I recently met with Admiral Haney, the head of Strategic Command, regarding the new nuclear cruise missile and its refurbished warhead. I came away unconvinced of the need for this weapon. The so-called improvements to this weapon seem to be designed candidly to make it more usable, to help us fight and win a limited nuclear war. I find that a shocking concept. I think this is really unthinkable, especially when we hold conventional weapons superiority, which can meet adversaries' efforts to escalate a conflict. So maybe you can succeed where Admiral Haney did not.

Let me ask you this question, Why do we need a new nuclear cruise missile?

General KLOTZ. Well, thank you very much for the question, Senator, and let me just state at the outset, defining the—but I will answer your question—defining the military requirements is the responsibility of the Department of Defense, which obviously includes the Secretary of Defense, the Joint Chiefs of Staff, and the Commander of Strategic Command.

Senator FEINSTEIN. Don't bucket your view.

General KLOTZ. But we accept the responsibility for building the warhead that goes in it. But let me just say since when I was in uniform, I had command of Air Force Global Strike Command, and,

therefore, of the cruise missiles that the Air Force and the Department of Defense are proposing to replace. My sense at the time, and still is the case, is that the existing cruise missile, the air-launched cruise missile, is getting rather long in the tooth with the issues that are associated with an aging weapons system. It was first deployed in 1982, and, therefore, it is well past its service life.

In the meantime, as you know from your work on the Intelligence Committee, there has been an increase in the sophistication and capabilities, as well as proliferation, of sophisticated air missile defenses around the world. Therefore, the ability of the cruise missile to pose the deterrent—the capabilities necessary to deter is under question. Therefore, I think just based on the aging and the changing nature of the threat, we need to replace a system which we've had, again, for—since the early 1980s with an updated variant.

I guess I didn't convince you any more than Admiral Haney did.

Senator FEINSTEIN. I'm trying to figure out how to say it so that it's polite.

[Laughter.]

Senator FEINSTEIN. No, you didn't convince me because this just ratchets up warfare and ratchets up deaths, and, you know, even if you go to a low kiloton, 6 or 7, it's a huge weapon. And I thought there was a certain morality that we should have with respect to these weapons. And if it's really mutual deterrence, I don't see how this does anything other than it's like the drone. The drone has been invented. It's been armed. Now every country wants one. So they get more and more sophisticated. To do this with nuclear weapons I think is awful. And when I talked when I came here—now, I'm probably the only one here that was a child when those weapons went off, and as the chairman has heard me say before, I was in San Francisco, across the Pacific from where it happened, a small kid, it made a profound difference to me. You know, I remember jumping under the desks, I remember the exploding—Barry Goldwater's campaign of the daisy that exploded with one, and I saw bodies, I saw what happened to people.

I know a little bit about the sophistication of our weapons, not as much as you do, but I think there is a very definite morality in what we have. And I talk to people, well, the size is a deterrent. This is not a deterrent. All this means is that others will be doing the same thing. I don't want North Korea with a 6-kiloton nuclear cruise missile.

And somehow I think we lose our moral authority when we build new nuclear weapons. I don't see any way—you know, there's a certain moral code any way I can vote to support this, and I want you to know it. If you have anything you would like to say, I would love to hear it.

General KLOTZ. Well, first of all, Senator, I obviously respect your opinion, but I think on this, we have a fundamental disagreement. In my view, the moral approach is to develop a deterrent capability which poses the prospect to any potential adversary that they should never use nuclear weapons against the United States or those of our allies across the globe. We maintain the capability of having a deterrent by having systems which cannot be negated, defeated, nullified by any adversary, either by offensive attack or

by defensive capabilities that they may have. And so as we're faced with the prospect of potential adversaries having vastly improved conventional—vastly improved missile and air defenses, then we need to make sure that—

Senator FEINSTEIN. Do you admit, Admiral, that we have very big conventional weapons?

General KLOTZ. Yes, I do.

Senator FEINSTEIN. The biggest in the world?

General KLOTZ. And Air Force Global Strike Command, which I used to command, had responsibility for one of those.

Senator FEINSTEIN. Okay. Isn't that enough?

General KLOTZ. In a world armed with nuclear weapons, regrettably so, I think that in order to deter nuclear attack or the threat of nuclear attack against us or allies, we need a corresponding nuclear deterrent. That's my belief.

Senator FEINSTEIN. Okay. Well, let me go to—can I do one other question quickly?

Senator ALEXANDER. Sure.

Senator FEINSTEIN. What is the cost of the 3 to 1 hedge? Staff has tried to get those numbers, but have been unable to. I would like to ask that you provide it.

General KLOTZ. We will provide that.

[The information follows:]

The U.S. nuclear stockpile is made up of warheads in three categories—deployed warheads, logistics spares, and hedge. The deployed warheads are warheads located at operational bases, and must be fully maintained in a ready-to-use status at all times. Logistics spares are warheads retained (by DoD or DOE) to facilitate the logistics of warhead surveillance, maintenance, and refurbishment to ensure the required number of warheads in the other categories is maintained. Hedge warheads mitigate the risk of technical failure of any single weapon type or delivery system at a given time.

The number and type of warheads in the hedge depends on a number of factors, including the size and composition of the U.S. stockpile and the status of life extension efforts. Additional warheads of a type being refurbished may be retained temporarily (unrefurbished) as risk mitigation for a potential technical issue in the newly refurbished warheads.

By far the largest cost of maintaining this hedge is the cost of refurbishing the warheads that will be retained over the longer term as part of the hedge. Based on current life extension program (LEP) estimates and projections of the future size and composition of the stockpile (as reflected in the Nuclear Weapons Council's current Requirements Planning Document), over the next 25 years the cost of refurbishing warheads for inclusion in the hedge is approximately \$3.5–\$5.6 billion in fiscal year 2016 dollars (or 11–22 percent of the cost of LEPs for the warheads that would comprise the hedge at that time). Strategies that reduce the number of hedge warheads in future stockpile configurations (such as our current 3+2 strategy) will keep this refurbishment cost from rising above this level.

The cost, if any, for specific surveillance and assessment of the hedge would be small since the warheads in the hedge are the same as those being surveilled and assessed in the other stockpile categories.

Some small costs may associated with maintenance of hedge warheads when included in work scope associated with non-hedge counterparts, such as an alteration or modification. In this way they retain technical parity with warheads in other categories.

It is expected that the size of the hedge can be reduced as we implement a 3+2 strategy for the stockpile, with three ballistic missile warheads and two others, one for the LRSO and another for gravity bombs. This strategy will allow the U.S. to minimize the size of the stockpile, consistent with our commitments under the Nuclear Nonproliferation Treaty, while adequately hedging against technical risk.

Senator FEINSTEIN. Thank you very much.

Thanks, Mr. Chairman.

Senator ALEXANDER. Senator Graham, is your schedule such that I can go to Senator Udall since he's been here?

Senator GRAHAM. Absolutely. He can go first.

Senator ALEXANDER. All right.

Senator Udall, why don't you go ahead since you came early?

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

NATIONAL NUCLEAR SECURITY ADMINISTRATION BUDGET

Before we get into some of the details on the upcoming budget, I would like to step back and take a look at the overall funding picture. How does this budget compare to the NNSA's budget request in the year of the previous administration, fiscal year 2008? Where are we in terms of up, down, on that?

General KLOTZ. Well, I think a good round number for how much the overall NNSA budget has increased since then is about 40 percent.

Senator UDALL. 40 percent—

General KLOTZ. Maybe closer to 37 percent.

NUCLEAR WEAPONS STOCKPILE

Senator UDALL. Okay. And my understanding is that there is an incredible amount of scientific and technical work that needs to be done in future years as the stockpile ages and needs further work to keep it safe, secure, and reliable. Do you expect future NNSA budgets to need to increase further to continue to address the aging stockpile?

General KLOTZ. Yes, sir, we do. And in our budget submission for this year, we included our projections for the future years' nuclear security program out through the year fiscal year 2021, and it shows an increase in all of the budget lines each of those years except for 1 year for Naval Reactors.

And I will say right up front that there will probably be some additional costs which we will add there because one of the things we have done, and part of the management improvements, is to be much more rigorous about how we do analysis of alternatives, define mission requirements, and do independent cost reviews, and some of the things that are—we know we're going to have to pay for in the so-called outyears, we still have to baseline those and come in with the costs.

CMR FACILITY

Senator UDALL. Now, I would like to move on to the work to replace the aging CMR Facility at Los Alamos. The GAO report, which was released this month, highlighted the plutonium infrastructure strategy, and I'm quoting from them now, "Uncertain and possibly underestimated," and that, "This uncertainty is due to the fact that NNSA has not yet determined the number of additional modular buildings that may be required," at the Los Alamos Lab. Where are we on this issue? Where do you see this going at this point in terms of the demands that are on you from various agencies?

General KLOTZ. Well, thank you for that question. In fact, that is one of the lines in our future years' budget that will change as

time goes through. And, you know, I agree with the GAO's assessment, but one of the reasons why that's the case is the GAO has been very clear in reports over the past decade or so that the NNSA and the DOE need to do a better job in terms of defining requirements, holding to those requirements, doing analysis of—rigorous analysis of alternatives cost estimations. So we need to do that process with the modules. We are beginning the analysis of alternatives of how we create the additional space at Los Alamos that we need to carry out the congressional mandate to produce—or demonstrate a capability to produce war reserve plutonium pits in the years ahead. So until we have that and until we can baseline the cost of that, we won't know for certain what the costs are.

There's a tendency in Washington, both on the executive side and I would dare say on the congressional side as well, to ask for a number very, very early on in a project. I think until you have done that kind of analysis, any number you have is a guess. We would like to be more precise and more accurate in terms of providing what we think the costs will be.

Senator UDALL. And the budget includes funding for the initial design and development of a trusted strategic radiation hardened advanced microelectronics capability, which Sandia plays an important role supporting through the Trusted Foundry at the Microsystems and Engineering Science Applications, what's called the MESA Complex. Do you agree that the core competency on microsystems design at Sandia is an important national security asset?

General KLOTZ. Absolutely. And, in fact, our only facility for producing radiation hardened microelectronics that can operate in a nuclear environment is MESA, the Microsystems Engineering Science Applications at Sandia National Laboratory. It, too, is another facility which has been around for a while and is a little long in the tooth, but more importantly, the technology in this area continues to evolve. Sandia is still producing chips using 6-inch silicon wafers. Industry has already moved on to 8-inch and projected to go even further. So there are things we need to do to the facility to sustain it. There are things we need to do to the capabilities within MESA to make sure that we can continue to provide this vital capability.

Senator UDALL. Thank you very much, General.

I yield back, Mr. Chairman.

Senator ALEXANDER. Thanks, Senator Udall.

Senator Graham.

EXCESS PLUTONIUM DISPOSITION

Senator GRAHAM. Thank you, General. The agreement with the Russians covers how much plutonium?

General KLOTZ. 34 metric tons.

Senator GRAHAM. Where is the 34 metric tons located?

General KLOTZ. 7 of those metric tons are at Savannah River now. The remainder is primarily in storage at Pantex near Amarillo, Texas.

Senator GRAHAM. So when you talk to Senator Alexander about 13 tons at the Savannah River site, 6 of it was not covered by the agreement. Is that correct?

General KLOTZ. That's correct. Yes, sir.

Senator GRAHAM. So what are we going to do with the material in Texas?

General KLOTZ. The material in Texas would ultimately be slated for being turned into—being processed in a way that it could be diluted and then ultimately disposed of —

Senator GRAHAM. Where is that going to be done at?

General KLOTZ. We expect it would be done in Savannah River.

Senator GRAHAM. Do you require any legal changes to get it to the WIPP program?

General KLOTZ. We do not require—we have statutory, sufficient statutory, authority to dispose of all 13 metric tons that are currently at Savannah River.

Senator GRAHAM. That's not my question. Does the statutory authority cover the 21 tons in Texas?

General KLOTZ. We expect that we would probably have to do some work on statutory authorities associated with that.

Senator GRAHAM. Do you expect probably maybe?

General KLOTZ. Probably.

Senator GRAHAM. No, absolutely you would.

General KLOTZ. Absolutely.

Senator GRAHAM. Good. Do you have any agreement with the Russians to change course?

General KLOTZ. We do not have an agreement with the Russians to change course, but, as you know, there is a provision within the agreement to—for the parties to—

Senator GRAHAM. Where are we at in that agreement?

General KLOTZ. As the Secretary has testified just a week ago—

Senator GRAHAM. So what do the Russians say?

General KLOTZ. The Russians are saying when you have a solid way forward—first of all, they have—the technical people I have talked with indicate an understanding of why we would want to do this and the technical aspects of it. Basically they've said—

Senator GRAHAM. So what do the Russians want in return?

General KLOTZ. Well, when they—when you are ready to go forward—

Senator GRAHAM. So let's see if I got this. We're going to change the entire program, then we're going to go to the Russians and see if they're okay with it? Is that the plan?

General KLOTZ. I—that is the—

Senator GRAHAM. That's the plan. That's a lousy plan. That is absolutely the dumbest friggin' plan I could think of, to change course and hope the Russians would agree and not know what they're going to charge you for it. Now, other than that, things are going great.

Now, in 2001, we made a decision about MOX, to reject the dual strategy. 2014, or 2010, I guess it was, we signed an agreement with the Russians that we're going to MOX out 34 metric tons. In 2016, we got a building, \$5 billion worth, 90 percent, 70 percent complete, and we're going to stop and start all over again. Is that the plan?

General KLOTZ. Well, you know, we don't agree that it's 70, 80, 90 percent.

Senator GRAHAM. Well, you can come and look at the damn thing.

General KLOTZ. I have.

Senator GRAHAM. Okay. Is it big?

General KLOTZ. It is big.

Senator GRAHAM. Well, it cost \$5 billion, I can promise you that. And I think it's 70 percent. What are we going to do with the building?

General KLOTZ. We would have to see what—what—if we—

Senator GRAHAM. Have you talked to anybody from New Mexico about their view of taking all this material?

General KLOTZ. As the Secretary told you last week, he has informally approached—

Senator GRAHAM. Well, have you—

General KLOTZ. Have I personally? I have talked—

Senator GRAHAM. Excuse me. We've informally talked to New Mexico. We now admit that you absolutely have to have a statutory change to cover the 21 metric tons. We're talking informally to the Russians. We're going to change the entire scope of the program and hope they agree with it. Is that pretty much where we're at? And we have no clue what we're going to do with this building.

Thank you.

Senator ALEXANDER. General Klotz, I've got some questions on another subject. This—the MOX subject is one that Senator Feinstein and I, Senator Graham, as well as Senator McCain and Senator Reed, are going to continue to address in the next few weeks.

INTERIM STORAGE OF USED NUCLEAR FUEL

Let me ask you and maybe Admiral Caldwell and maybe Ms. Harrington, the interim storage for used Navy fuel, building a new storage site for used fuel, but Admiral Klotz, that's temporary storage, right?

Admiral CALDWELL. Sir, I think that question is directed to me, sir.

Senator ALEXANDER. Okay, sir. That's temporary.

Admiral CALDWELL. The fuel that we're storing in Idaho is stored for interim—

Senator ALEXANDER. That means temporary.

Admiral CALDWELL. Yes, sir; it does.

Senator ALEXANDER. So you'll need somewhere to put it, an additional site. Would that fuel be eligible for Yucca Mountain?

Admiral CALDWELL. Yes, sir; it would be. The fuel we have out there today is packaged for interim storage, and it's packed in steel containers with concrete overpacks. Those steel containers are designed to last up to 10,000 years in the environment that we did the calculations for. And then the overpacks are designed to last at least 100 years.

Senator ALEXANDER. Yeah. But to reiterate, your site is a site for temporary storage.

Admiral CALDWELL. That's correct, sir.

Senator ALEXANDER. And it needs a permanent repository such as Yucca Mountain.

Admiral CALDWELL. That's absolutely correct, sir.

Senator ALEXANDER. Yeah. Senator Feinstein and I are working on as many paths as we can toward places for safe storage of used nuclear fuel.

General Klotz, you proposed work on a separate repository for defense waste separate from Yucca Mountain, they would only be able to accept waste from our defense sites, which doesn't include used fuel from commercial power reactors like the reactors that are closed in California with what we call stranded fuel. This would have to be built with funds that could be used for life extension programs or other infrastructure. Why would we build a separate repository for defense waste? Why wouldn't we just put all that stuff in Yucca Mountain?

General KLOTZ. Senator, I know the proposal, but to be perfectly honest, that is a project, a program, which resides elsewhere within the Department of Energy, not within NNSA. So I would have to get back to you on any specifics as far as—

Senator ALEXANDER. But if we spent money on a separate defense waste repository, it would have to come out of some of your funds—

General KLOTZ. It would depend on which—again, whether it's 050 money or not, and I just don't have the granularity of knowledge to respond to that.

LOW-ENRICHED URANIUM NAVAL CORES

Senator ALEXANDER. Let me ask one of you on a different question. You've done some good work on the last several years converting research reactor fuel from highly enriched uranium to low-enriched uranium, and you're down now I think to about six high-performance reactors that are still fueled with highly enriched uranium. Why don't you spend your time and money developing a way to have low-enriched fuel for the Navy vessels instead of worrying about the last six high-performance reactors?

Admiral CALDWELL. Sir, thanks for the question. Low-enriched uranium, from a military standpoint, there is no advantage to using that in a naval reactor plant. We use highly enriched uranium today, we've used it for decades, because it allows us to put the energy that we need to into a reactor core so that we can operate those ships for conceivably the life of the ship or for very long periods of time.

The reason why one might consider pursuing a low-enriched uranium naval core would be for the United States to be able to take a leadership role in development of low-enriched uranium and to be able to do that from a nonproliferation standpoint.

The other reason why one could consider it is because we need to sustain the workforce, the highly skilled workforce, that does this work for naval nuclear propulsion plants. That workforce is heavily taxed right now with the development of the *Ohio* replacement. Once that work tapers off, we're going to need some work to keep that workforce active and viable for future reactor plants.

So where we are today is we are continuing our work on highly enriched uranium. If I was to go to low-enriched uranium, it would require me to refuel ships more frequently than I do today. It would require us to take ships offline and remove them from the operational availability. To give you some example of that, we're

developing the *Ohio* Replacement to last for 42 years without refueling. A low-enriched uranium core would require at least one refueling. The Ford reactor plant for the new carrier is designed to have one refueling. A low-enriched uranium core might take two or more, at the cost of maybe \$1 billion apiece. With the *Ohio* Replacement program, the fact that we don't refuel it saves the Nation \$40 billion total ownership cost for that class of submarine.

So from a military standpoint, we want to have the ships operating more, we want to have—reduce the time that they're in the yards. If you use low-enriched uranium, we would have to deal with even more waste, we would have to deal with different types of waste, because the waste generated from low-enriched uranium is different from highly enriched uranium. And, additionally, the Navy might have to go purchase more ships to make up for the lost operational availability. So from a military standpoint, highly enriched uranium does what we need it to do.

Now, that all said, we were asked to develop a conceptual plan for developing a low-enriched uranium core for naval use. We have a draft report that's working its way through the Navy and through the Department of Energy; we're coordinating that. It lays out a program that would take 10 to 15 years at the cost of \$1 billion to simply develop a low-enriched uranium core. Beyond that, it would take another 10 years to deploy that core, actually build it. So you're talking about technology that would take 25 years or so before it would come to fruition. Success could not be guaranteed, but if the conceptual plan lays out a plan to go look at that for consideration in a carrier plant, a larger plant, where you can put more fuel in it, probably not viable for a submarine plant, which is small.

So that conceptual plant is working its way through. Success could not be guaranteed. It costs a substantial amount of money. And if I was directed to go do that kind of work, I would need money above and beyond what I have today to support today's Navy.

Senator ALEXANDER. Thank you. I get the impression you think the idea of low-enriched uranium fuel for the Navy vessels isn't such a hot idea.

Admiral CALDWELL. I think there is some value in being able to sustain my workforce, so let me amplify that.

Senator ALEXANDER. Yeah, well, my time is about up, but I think that was a good complete answer—

Admiral CALDWELL. There is one aspect of this, though, sir. To go to low-enriched uranium, I have to develop an advanced fuel system. That advanced fuel system could have benefit for a low-enriched uranium core or a highly enriched uranium core. So there could be some benefit in going down the path to sustain my workforce and expand the technology that we have.

Senator ALEXANDER. Thank you, Admiral.

Senator FEINSTEIN, I don't have any other questions, so I'll let you ask whatever you would like.

DEFERRED MAINTENANCE

Senator FEINSTEIN. I have one because I mentioned in my opening remarks that \$3.2 billion in deferred maintenance of facilities,

a huge sum, I don't think I need to say that, actually. So, General Klotz, in your plans, to what extent is NNSA looking at alternative approaches for addressing the problem, such as reducing the number of facilities or consolidating functions?

General KLOTZ. Thank you very much. You're right, we have a very substantial backlog of deferred maintenance. Again, referring to my previous military career, I found that the first dollar usually goes to the pointy edge of the spear, or for the men and women who carry the spear, and then every year a decision is made to accept risk on facilities and infrastructures, and, you know, defer it one more year. Well, one more year becomes two more years, becomes 10 more years, and then ultimately you get to a tipping point in terms of our facilities, and I think that's where we are in NNSA and in other parts of the deal, in the laboratories that are out there with some facilities dating back to the Manhattan Project that you referred to earlier.

So Secretary Moniz laid down a—threw down the gauge a couple years ago and said that he wanted to arrest the halt in the growth of deferred maintenance for the Department of Energy as a whole, including NNSA. So with the fiscal year 2016 budget that thankfully you all enacted at the end of last year, we've essentially halted it at the 3 point I think 7, is what I would say, \$3.7 billion level, and with 2017, we actually start to go down.

Now, we're exploring alternative ways of financing new facilities to get out of these old facilities that include using third-party financing. We have an enormous successful example of that in the Kansas City National Security Campus, which we reduced, got out of an old building that dated back to World War II, reduced our footprint from 3 million down to 1 million square feet. We've asked for money in this budget to demolish that particular facility.

So we're serious about looking for, whether it's a capital construction project or a third-party financing or an operating lease approach to do that, we're looking for new facilities to get our people in, and at the same time, to reduce the footprint and to demolish the buildings that are there now.

The one problem we do have with demolishing some of our buildings is if they are contaminated, we have to go through a very long tedious and expensive process of cleaning up the contamination before we can turn it over to that part of DOE that does the demolition.

Senator FEINSTEIN. Well, let me—what are your estimates? How—the \$3.2 billion in deferred maintenance, did you have specific plans for meeting that, or are you just going to ignore it?

General KLOTZ. No, we have a specific plan, and we'd be happy to share that plan for you in terms of—

Senator FEINSTEIN. I would appreciate it.

General KLOTZ. Yes, ma'am. I'd be delighted to do it.

Senator FEINSTEIN. And your staff.

General KLOTZ. Yes, absolutely.

Senator FEINSTEIN. That would be just fine.

General KLOTZ. Yes, ma'am.

Senator FEINSTEIN. Thank you. That's it, I think, unless we want to debate a nuclear cruise missile more, which I don't think you do. [Laughter.]

General KLOTZ. I'd love to come up and just sit down with you in your office and pursue that further.

Senator FEINSTEIN. Sure. I'd be happy to, actually.

Senator ALEXANDER. I might come watch.

[Laughter.]

General KLOTZ. I'll invite Admiral Haney to come over.

Senator ALEXANDER. It would be better than the Republican debates.

[Laughter.]

Senator ALEXANDER. Probably more informative.

Senator FEINSTEIN. I don't belittle people.

Senator ALEXANDER. No, no, no, you don't. I'm not getting into this with—I'm sorry—I'm sorry I even brought it up.

The hearing record will remain open for 10 days. Members may submit additional information or questions for the record within that time. The subcommittee requests all responses to questions for the record be provided within 30 days.

SUBCOMMITTEE RECESS

I want to thank General Klotz, Admiral Caldwell, Ms. Harrington, and General Davis, I want to thank all four of you for being here and thank you for the work you do for our country. We'll look forward to following up with you.

The committee will stand adjourned.

[Whereupon, at 3:35 p.m., Wednesday, March 16, the subcommittee was recessed, to reconvene subject to the call of the Chair.]