

## ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2020

WEDNESDAY, APRIL 3, 2019

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

The subcommittee met at 3:29 p.m. in room SD-138, Dirksen Senate Office Building, Hon. Lamar Alexander (chairman) presiding.

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

### DEPARTMENT OF ENERGY

#### NATIONAL NUCLEAR SECURITY ADMINISTRATION

#### STATEMENT OF HON. LISA E. GORDON-HAGERTY, UNDER SECRETARY FOR NUCLEAR SECURITY ADMINISTRATOR

#### ACCOMPANIED BY:

**DR. CHARLES P. VERDON, DEPUTY ADMINISTRATOR FOR DEFENSE  
PROGRAMS**

**DR. BRENT K. PARK, DEPUTY ADMINISTRATOR FOR DEFENSE NU-  
CLEAR NONPROLIFERATION**

#### OPENING STATEMENT OF SENATOR LAMAR ALEXANDER

Senator ALEXANDER. At the request of Senator Feinstein, we jointly apologize to our distinguished witnesses for keeping you waiting. We work for a somewhat inefficient organization. And we've been voting. And we will have to go back and vote some more, but we think we have a period of time that will permit us not only to hear the testimony, but hopefully to make our opening statements and then have some questions back and forth.

But with Senator Feinstein's approval, the hearing will come to order. And we're going to reverse order a little bit, and what we'd like to do, Administrator Gordon-Hagerty, is to begin with you, and then go to Admiral Caldwell, I believe the two of you are the ones who are going to testify. And we'd like to take your testimony first. Then Senator Feinstein and I will make our opening statements, and then we'll ask questions. So welcome.

And, Administrator Lisa Gordon-Hagerty, on behalf of the National Nuclear Security Administration, welcome. We look forward to your testimony. Please begin.

#### PREPARED STATEMENT OF SENATOR LAMAR ALEXANDER

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

Today's hearing will review the administration's fiscal year 2020 budget request for the National Nuclear Security Administration.

First, I would like to thank our witnesses for being here today, and also Senator Feinstein, with whom I have the pleasure to work with again this year to draft the Energy and Water Appropriations bill.

Our witnesses today include: Ms. Lisa Gordon-Hagerty, the Administrator of the National Nuclear Security Administration (NNSA); Dr. Charles Verdon, Deputy Administrator for Defense Programs; Dr. Brent Park, Deputy Administrator for Defense Nuclear Nonproliferation (Dr. Park is a former Associate Laboratory Director from Oak Ridge National Laboratory); and Admiral Frank Caldwell, Deputy Administrator for Naval Reactors.

Our subcommittee has a good record of being the first of the appropriations bills to be considered by the Committee and by the Senate each year. For each of the past 4 years, Senator Feinstein and I have been able to have our bill signed into law.

Last year, we worked together in a bipartisan way on the fiscal year 2019 Energy and Water Development Appropriations bill that was signed into law before the start of the fiscal year—the first time that happened since 2000.

In last year's appropriations bill we provided \$15.2 billion for the National Nuclear Security Administration, including \$1.9 billion for the six life extension programs, which fix or replace components in weapons systems to make sure they're safe and reliable.

We also funded the Uranium Processing Facility at the Y-12 National Security Complex at \$703 million, which will continue to keep this project on time and on budget, with a completion year of 2025 at a cost no greater than \$6.5 billion.

I look forward to working with Senator Feinstein on another strong bill this year.

We're here today to review the administration's fiscal year 2020 budget request for the National Nuclear Security Administration (NNSA), the semi-autonomous agency within the Department of Energy that is responsible for a vital mission—maintaining our nuclear weapons stockpile, reducing the global dangers posed by weapons of mass destruction, and providing the Navy with safe and effective nuclear power.

The president's fiscal year 2020 budget request for the NNSA is \$16.5 billion, an increase of \$1.3 billion (or 8 percent) over last year (the fiscal year 2019 enacted level).

Today, I'd like to focus my remarks and questions on three main areas: Effectively maintaining our nuclear weapons stockpile; keeping critical projects on time and on budget; and supporting our nuclear Navy.

When the Senate agreed to ratify the New Start Treaty in December 2010, we also agreed to support funding to modernize and maintain our nuclear weapons stockpile, plus the facilities to do the work.

A vital part of NNSA's mission is completion of the five ongoing life extension programs, which fix or replace components in weapons systems to make sure they're safe and reliable.

The budget request includes \$2.1 billion to continue the life extension programs. I want to make sure we are spending taxpayer dollars effectively.

Completing all of the work that needs to be done for these weapons systems will result in a higher workload than the weapons program has had in any time since the height of the Cold War, and it will require a large number of highly-trained experts at the production sites, like Y-12 in Oak Ridge Tennessee, the weapons laboratories, and the Federal employees that work for NNSA.

I'd like to hear more today about whether NNSA has enough qualified people to do this work.

I would also like to discuss today whether NNSA will be able to keep the life extension programs on time and on budget.

The NNSA is responsible for some of the largest construction projects in the Federal Government.

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.

First we focused on our oversight on the Uranium Processing Facility in Tennessee. We held routine meetings with the Department's leadership to discuss the project—particularly how the Department implemented the recommendations of a Red Team review, completed in 2014, to get the project on track.

After completing more than 90 percent of the design for the nuclear facilities, NNSA began construction of the Uranium Processing Facility last year.

I'd like to hear more about the progress on construction from the witnesses today.

Senator Feinstein and I also worked with the Department on ways to get excess plutonium out of South Carolina more quickly and for less cost. Last year, Secretary Perry canceled the MOX project in favor of the Dilute and Disposal alternative, which the Department of Energy estimated will save taxpayers more than \$20 billion.

I'd like to hear more today on the progress NNSA is making at removing the plutonium from South Carolina.

Lastly, the NNSA is restarting our ability to make plutonium pits for the stockpile. The budget request includes \$712 million for plutonium sustainment, which is 97 percent more than the current funding level. This difficult, but important work, will be done in New Mexico and South Carolina.

The NNSA has decided to use existing facilities and expertise in New Mexico to make some pits, and repurpose the MOX facility in South Carolina to make the remainder.

That's a good plan and I support it.

I want to hear from Administrator Gordon-Hagerty today how NNSA is applying the lessons we learned from UPF and MOX to make sure we get the pit production restart done on time and on budget.

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 for nuclear waste from defense activities.

Admiral Caldwell and I had an opportunity talk about the new spent fuel processing facility earlier this week. It is a part of the Navy's consolidated interim storage for its used nuclear fuel.

The Navy's program shows that it can be done safely and effectively, but that does not replace the need for a permanent repository at Yucca Mountain. That used nuclear fuel will still need to go to Yucca Mountain once it is built.

I look forward to Admiral Caldwell's comments today on the progress he's making on his important work, and particularly how Naval Reactors stores used nuclear fuel.

I'd also like to hear what is being done to keep the new Columbia-Class submarine design on track.

The NNSA needs to complete a lot of important work, and this work is going to require good planning and effective oversight.

I look forward to working with Administrator Gordon-Hagerty as we begin putting together our Energy and Water Appropriations bill for fiscal year 2020, and also with Senator Feinstein, who I will now recognize for her opening statement.

#### SUMMARY STATEMENT OF HON. LISA E. GORDON-HAGERTY

Ms. GORDON-HAGERTY. Chairman Alexander, Ranking Member Feinstein, thank you for the opportunity to submit—to present the President's fiscal year 2020 budget request for the Department of Energy's National Nuclear Security Administration. It's an honor to appear before you today with Admiral Caldwell, Dr. Verdon, and Dr. Park.

We are representing a truly extraordinary team at NNSA (National Nuclear Security Administration), a team that is indispensable to our Nation's nuclear security. A written statement has been provided to the subcommittee, and I respectfully request that it be submitted for the record.

Senator ALEXANDER. So ordered.

Ms. GORDON-HAGERTY. Thank you.

Since I last testified before the committee, NNSA has been diligently executing our three enduring missions: one, ensuring the safety, security, and effectiveness of the U.S. nuclear weapons stockpile; two, reducing the threat of nuclear proliferation and nuclear terrorism around the world; and, three, providing nuclear propulsion for the U.S. Navy's fleet of aircraft carriers and submarines.

The President's fiscal year 2020 budget request for NNSA is an investment in these missions and in our infrastructure and our people. My priorities with this crucial funding are to revitalize the U.S. defense plutonium capabilities and other essential infrastructure to keep our stockpile life extension programs on schedule and on budget, and to recruit the workforce for the future. My focus is on setting the conditions today for a resilient, responsive nuclear security enterprise for the next 50 years and beyond.

The 2018 Nuclear Posture Review provided a realistic assessment of the world. With an evolving and uncertain geopolitical landscape, the NPR (Nuclear Posture Review) stated that there is no margin for further delay and in recapitalizing the nuclear security enterprise, an enterprise that is comprised of eight laboratories, plans, and sites, and a dedicated workforce of 44,000 employees.

And NNSA's \$16.5 billion budget request is a necessary investment when you consider the stakes. Russia and China are pursuing completely new nuclear capabilities. North Korea's intentions remain unclear. And we face the most complex and demanding global security environment since the end of the Cold War.

Accordingly, the fiscal year 2020 budget request represents the largest increase for our nuclear nonproliferation, counterproliferation, and nuclear counterterrorism program in the last 5 years. The 2018 NPR reaffirmed the need for effective arms control measures and treaty verification. With this funding, NNSA will continue to apply its technical expertise to reducing nuclear threats around the world.

During my nomination hearing last year, I stated that my highest priority was plutonium pit manufacturing, and that has not changed. For the next several decades, NNSA will rely on a combination of newly manufactured pits and a judicious reuse of existing pits to modernize our existing nuclear weapons stockpile. A modest pit manufacturing capability is necessary to ensure the safety and security of refurbished warheads while maintaining high confidence in stockpile effectiveness. The deliberate, methodical replacement of pits is the most prudent way to mitigate the uncertainty of plutonium aging and its impact on weapons performance.

Consistent with the NPR, NNSA is committed to producing no fewer than 80 pits per year by 2030 to meet military requirements. Last May, the Nuclear Weapons Council endorsed NNSA's path forward to recapitalize a production capability that was shuttered in the early 1990s. Our two-site approach calls for pit production at both Los Alamos National Laboratory in New Mexico and Savannah River Site in South Carolina. Following this strategy, the fiscal year 2020 budget request includes \$410 million for conceptual design activities for the Savannah River Plutonium Processing Facility. Our request also calls for a nearly \$500 million investment in plutonium pit production capabilities at Los Alamos.

NNSA is not only investing in plutonium pit mission thanks to the strong support of Congress, we are making significant progress in modernization across our enterprise. We started construction on the main processing buildings at the Uranium Processing Facility at the Y-12 National Security Complex. And I'm proud to report

that this vital undertaking remains on budget and on schedule to be delivered by the end of 2025 for \$6.5 billion.

And in New Mexico, we've broken ground on a new Albuquerque complex which will provide a modern safe workspace for approximately 1,200 dedicated personnel. All of NNSA's enduring missions are underpinned by the state-of-the-art scientific capabilities, and as these capabilities become more important during this time of renewed great power competition, NNSA is working to stay ahead of the technology curve. A future gap in high-performance computing is being addressed through a joint effort between the Department of Energy's Science—Office of Science and NNSA, and our contribution to that effort will be undertaken at Lawrence Livermore National Laboratory, and we will deliver an exascale computing platform to the enterprise in 2023.

From the earliest days of the Manhattan Project, the dedicated men and women of the nuclear security enterprise have answered our Nation's call. What our team is accomplishing today is remarkable. We completed the W76-1 Life Extension Program under budget and ahead of schedule. We have five warhead modernization programs underway, all of which are on schedule and on budget. We've helped 33 countries plus Taiwan to become free of highly enriched uranium. We routinely deploy nuclear security experts to major events, such as the Super Bowl, to keep our public safe from a radiological threat. And we are lending unparalleled expertise to the U.S. Navy's new Columbia-class program to ensure sea-based deterrence capabilities for decades to come.

Finally, I would like to emphasize that regardless of the investments we make to modernize our enterprise, the United States must continue our investments in our world-class workforce, as requested by the President's fiscal year 2020 budget. We face stiff competition from the private sector for the top talent in highly technical fields. With an aging workforce, NNSA has launched an integrated effort to recruit the next generation of scientists, engineers, and technicians so that we can continue to answer the Nation's call and meet tomorrow's challenges. No other government or civilian agency can accomplish these unique missions on behalf of the American people, and I couldn't be prouder to represent NNSA.

Thank you for your strong consistent support and the opportunity to testify before you today. And I look forward to answering your questions. Thank you.

[The statement follows:]

#### PREPARED STATEMENT OF LISA E. GORDON-HAGERTY

Chairman Alexander, Ranking Member Feinstein, and Members of the Subcommittee, thank you for the opportunity to present the President's fiscal year 2020 budget request for the Department of Energy's (DOE) National Nuclear Security Administration (NNSA). NNSA appreciates the Committee's strong support for our nuclear security mission and for the workforce and organizations that are responsible for executing it every day.

NNSA's enduring missions are to protect our Nation by maintaining a safe, secure, and effective nuclear weapons stockpile, reducing global nuclear threats, and providing the United States (U.S.) Navy's submarines and aircraft carriers with militarily effective nuclear propulsion.

NNSA has numerous strategic partners that enable, contribute to, and benefit from our efforts, yet no other government or civilian organization can accomplish our unique mission on behalf of the American people.

The U.S. nuclear deterrent has been the cornerstone of our national security and global stability for more than 70 years, and its credibility serves as the ultimate insurance policy against a nuclear attack. While the ultimate goal of eliminating nuclear weapons has been an aspiration for generations, we must recognize the reality that foreign nuclear threats are growing. It is imperative that we modernize the U.S. nuclear deterrent and enterprise; our credibility assures our friends and allies and deters those who wish us harm.

Thanks to continued strong support from this Administration and Congress, NNSA is transforming the nuclear security enterprise to be more responsive and resilient. The following highlights: (1) NNSA's accomplishments in calendar year 2018; (2) the budget request for NNSA; (3) Weapons Activities Appropriation; (4) Defense Nuclear Nonproliferation Appropriation; (5) Naval Reactors Appropriation; and (6) NNSA Federal Salaries and Expenses Appropriation.

#### NNSA'S ACCOMPLISHMENTS IN CALENDAR YEAR 2018

*Plutonium Pit Production.*—The highest NNSA infrastructure priority is re-establishing a plutonium pit production and fabrication capability to meet the Department of Defense's (DoD) military requirements. Our national requirement, supported by numerous studies and analyses, requires no fewer than 80 war-reserve pits per year by 2030. Last May, the Nuclear Weapons Council (NWC) endorsed NNSA's recommended alternative calling for plutonium pit production at Los Alamos National Laboratory (LANL) and the Savannah River Site (SRS). This two-site approach bolsters the nuclear security enterprise's responsiveness and resiliency.

*NNSA's Life Extension Programs (LEPs), Modifications, and Alteration.*—In January 2019, NNSA completed the program of record for the W76-1 LEP, extending the warhead's service life from 20 years to 60 years. The B61-12 LEP, W80-4 LEP, W88 Alteration 370, W87-1 Modification, and the W76-2 Modification continue to remain on budget and schedule. These achievements are a testament to NNSA's ability to deliver on our commitments we have made to DoD and Congress.

*Infrastructure Investments.*—NNSA commenced construction of the main buildings of the Uranium Processing Facility (UPF) at the Y-12 National Security Complex (Y-12). UPF remains on budget and on schedule for delivery by the end of 2025 for no more than \$6.5 billion. NNSA also broke ground on the new Albuquerque Complex, which will house 1,200 employees when complete.

*Highly Enriched Uranium (HEU).*—Working with the International Atomic Energy Agency (IAEA), China, and Nigeria, NNSA was instrumental in the conversion of a Nigerian research reactor from HEU to low-enriched uranium (LEU) fuel. This marks NNSA's 74th research reactor or isotope production facility conversion, which was followed by repatriation of the HEU fuel to China, making Nigeria the 33rd country plus Taiwan to become HEU free.

*Nuclear Material Removal.*—NNSA removed or confirmed disposition of more than 280 kilograms of HEU from four countries, enough material for more than 11 nuclear weapons.

*Counterterrorism.*—NNSA's technical experts were deployed to numerous widely attended public events such as the Super Bowl and the Boston Marathon to provide radiation detection, identification, and technical advice, helping to protect the public from acts of nuclear and radiological terrorism. This level of support requires NNSA's response assets to maintain full operational readiness at all times.

*Naval Nuclear Propulsion.*—NNSA's Office of Naval Reactors continued its record of safe and reliable nuclear propulsion and nuclear fleet support, while contributing expertise to the U.S. Navy's new Columbia-Class program. This next generation nuclear-powered submarine will ensure required sea-based deterrence capabilities for decades to come.

*Supercomputing.*—Lawrence Livermore National Laboratory (LLNL) unveiled the Sierra supercomputer, ranked the second-fastest in the world according to the Top 500 list.

For more than 70 years, from the early days of the Manhattan Project to the height of the Cold War, the dedicated men and women of the nuclear security enterprise have overcome every obstacle in their way, all while accomplishing a complex and enduring national security mission. With Congress' continued support, NNSA will similarly overcome the nuclear security threats that face us today and into the future.

#### NNSA'S FISCAL YEAR 2020 BUDGET REQUEST

The 2018 Nuclear Posture Review (2018 NPR) calls for the United States to have modern, flexible, and resilient nuclear capabilities that are safe and secure until such a time as nuclear weapons can prudently be eliminated from the world. All

previous NPRs highlighted the need to maintain a modern nuclear weapons infrastructure, yet the United States has fallen behind in sustaining a modern infrastructure that is resilient and has the capacity to respond to unforeseen threats. Additionally, the 2018 NPR reiterates the United States' commitment to effective non-proliferation and arms control measures, both of which are equally important as having a credible deterrent.

For the Nation to retain a credible deterrent and prevent, counter, and respond to global nuclear security threats, NNSA will require significant and sustained investments in its nuclear security mission. In pursuit of these goals, the President's fiscal year 2020 budget request for NNSA is \$16.5 billion. This is an increase of \$1.3 billion, or 8.3 percent, over the fiscal year 2019 enacted level.<sup>1</sup>

#### WEAPONS ACTIVITIES APPROPRIATION

The fiscal year 2020 budget request for the Weapons Activities account is \$12.4 billion, an increase of \$1.3 billion, or 12 percent, over fiscal year 2019 request levels. The programs funded in this account support the Nation's current and future defense posture and the associated nationwide infrastructure of science, technology, engineering, cybersecurity, and production capabilities.

The majority of weapons in today's stockpile have surpassed their intended design life, thereby accumulating increasing risk. The United States has reduced its stockpile by 25 percent since 2010, while potential adversaries have increased their numbers of nuclear weapons and significantly modernized their nuclear capabilities.

#### *Maintaining the Stockpile*

In fiscal year 2019, the science-based Stockpile Stewardship Program supported certifying to the President for the 23rd consecutive year that the U.S. nuclear weapons stockpile remains safe, secure, and reliable without the need for nuclear explosive testing. This remarkable scientific achievement is made possible through the work accomplished by NNSA's world-class scientists, engineers, and technicians, and through investments in state-of-the-art diagnostic tools, high performance computing platforms, and modern facilities.

For Directed Stockpile Work (DSW), the fiscal year 2020 budget request is \$5.4 billion, an increase of \$768 million, or 16.5 percent, over the fiscal year 2019 enacted level. Included within this request is funding to support the LEPs, modifications, and a major alteration. These modernization efforts are aligned with the needs outlined in the 2018 NPR and approved by the NWC.

**W76-1 LEP.**—The W76-1 LEP, which directly supports the sea-based leg of the nuclear triad, completed its production run in December 2018. Close-out activities in fiscal year 2020 include archiving production tooling and program records, and completing component overbuilds to support hardware provisioning for the life of the warhead system.

**W76-2 Modification Program.**—The W76-2 is currently on schedule and on budget. The First Production Unit (FPU) was completed in February 2019. By providing the U.S. an assured ability to respond in kind to a low-yield nuclear attack, the W76-2 discourages an adversary from pursuing such an attack and therefore strengthens deterrence. Having credible response options to a nuclear attack of any magnitude ensures no adversary mistakenly believes the U.S. would be deterred from responding to a low-level nuclear attack for fear of escalation.

**B61-12 LEP.**—The B61-12 LEP will consolidate four variants of the B61 gravity bomb and improve the safety and security of the weapon. Currently in Phase 6.4, Production Engineering, this LEP has demonstrated system performance in over 60 integrated ground and flight tests, including eight joint flight test drops. The B61-12 LEP will enter Phase 6.5, First Production, in the fourth quarter of fiscal year 2019, following completion of system qualification and Pantex Plant production readiness activities.

**W88 Alteration 370.**—The FPU is on track for completion by December 2019. This program, which also supports the sea-based leg of the nuclear triad, is currently in Phase 6.4, Production Engineering, and will enter Phase 6.5, First Production, in September 2019.

**W80-4 LEP.**—In February 2019, the NWC approved the W80-4 LEP to transition into Phase 6.3, Development Engineering. The fiscal year 2020 request for \$899 million will allow the W80-4 LEP to remain on track to achieve FPU completion in fiscal year 2025 in support of the Air Force's Long-Range Stand-Off (LRSO) cruise missile.

<sup>1</sup> Amounts do not reflect the transfer of funds from Naval Reactors to the Office of Nuclear Energy for maintenance and operation of the Advanced Test Reactor in fiscal year 2019.

*W87-1 Modification Program.*—The W87-1 program will replace the aging W78 warhead, with planned first production in 2030 to support fielding on the U.S. Air Force's Ground Based Strategic Deterrent (GBSD) missile system. In September 2018, the NWC authorized restart of Phase 6.2, Program Feasibility Study, activities on the W78 replacement warhead and renamed it the W87-1. The W87-1 Modification Program will improve the warhead's safety and security, addressing design, material obsolescence, performance, and survivability considerations.

Within DSW, the fiscal year 2020 budget request includes \$636 million for Stockpile Systems, an increase of \$36 million, or 6.1 percent above the fiscal year 2019 enacted level. This program sustains the stockpile in accordance with the Nuclear Weapon Stockpile Plan by producing and replacing limited-life components such as neutron generators and gas transfer systems; conducting maintenance, surveillance, and evaluations to assess weapon reliability; detecting and anticipating potential weapon issues; and compiling and analyzing information during the annual assessment process.

The DSW request also includes \$1.1 billion for Stockpile Services, an increase of \$76 million, or 7.2 percent, above the fiscal year 2019 enacted level, to support the modernization of capabilities to improve efficiency of manufacturing operations to meet future requirements. This request supports all DSW operations by funding programmatic and infrastructure management, and maintaining the core competencies and technologies essential for reliable and operable stewardship capabilities.

The fiscal year 2020 budget for Strategic Materials is necessary to maintain NNSA's ability to produce nuclear and other strategic materials associated with its weapons programs, as well as refurbish and manufacture components made from these materials. This includes uranium, plutonium, tritium, and lithium.

*Strategic Materials Sustainment.*—The request of \$257 million, an increase of \$41 million, or 18.8 percent, above the fiscal year 2019 enacted level, will develop and implement strategies to maintain the technical base for strategic materials in support of NNSA's nuclear weapons, nonproliferation, and naval nuclear propulsion activities at NNSA's eight sites.

*Uranium Program.*—The fiscal year 2020 budget request of \$909 million for the Uranium Program is comprised of Uranium Sustainment (\$94 million), Process Technology Development (\$70 million), and the UPF project (\$745 million).<sup>2</sup> Uranium Sustainment supports the program to maintain existing enriched uranium capabilities through enhanced equipment maintenance while preparing to phase out mission dependency on Building 9212, a Manhattan Project-era production facility at Y-12. The funding request will enable NNSA to sustain uranium manufacturing capabilities while accelerating planning and execution of the Building 9212 exit strategy to reduce risks associated with transitioning enriched uranium capabilities to the UPF. Process Technology Development supports key capability transitions out of Building 9212, including chip processing, purified metal production, and recovery of low equity material, into enduring nuclear facilities. Funding for UPF will support peak construction activities in fiscal year 2020 and fiscal year 2021. UPF will provide uranium casting, special oxide production, and salvage and accountability capabilities for the enterprise.

*Plutonium Sustainment.*—The fiscal year 2020 budget request of \$712 million, an increase of \$351 million, or 97.2 percent, above the fiscal year 2019 enacted level, supports continued progress to meet pit production requirements. The requested funding would support efforts to begin the long-term plan to develop a capability to produce no fewer than 80 war-reserve pits per year by 2030, as directed in the 2018 NPR.

The time to move forward is now. Repurposing the Mixed Oxide (MOX) Fuel Fabrication Facility and producing plutonium pits at SRS and LANL is the preferred path to achieve the critical DoD requirement of 80 pits per year by 2030. Even though this approach will require NNSA to fund activities at two sites, any interruption or delay to pit production in the future due to the lack of resiliency will have huge cost increases across the entire nuclear security enterprise. NNSA is investing in the Savannah River Plutonium Processing Facility. The agency is executing conceptual design activities for the repurposed MOX Fuel Fabrication Facility and moving forward with National Environmental Policy Act activities.

NNSA is also investing at LANL to provide all the tools necessary for the enterprise to successfully support an enduring plutonium pit production mission to produce 30 pits per year by 2026. NNSA anticipates \$3 billion in total funding over the next 5 years to enable this, and LANL is actively installing pit production equip-

<sup>2</sup> Process Technology Development is funded under the Advanced Manufacturing Development program, and the UPF project is funded under Infrastructure and Operations.

ment and has begun hiring to meet future work scope. As the Nation's plutonium center of excellence for research and development, LANL plays a critical role in early design efforts for pit production.

In addition, NNSA's budget request includes funding for the Chemistry and Metallurgy Research Replacement project at LANL, which supports our plan to cease operations in buildings dating back to the Manhattan Project, in the height of the Cold War, and transition to modern facilities.

*Tritium Program.*—The fiscal year 2020 budget request of \$269 million, a decrease of \$21 million, or 7.3 percent, below the fiscal year 2019 enacted level, will provide the tritium necessary for national security requirements. Tritium must be replenished regularly because it radioactively decays at 5.5 percent per year. Tritium availability is dependent on both the production of new tritium and the recovery and recycling of tritium from returned warhead components. Mission requirements necessitate that tritium production double by the mid-2020s. NNSA's tritium strategy focuses on increasing tritium production in Tennessee Valley Authority reactors and modernizing infrastructure at SRS to support the tritium supply chain.

*Lithium Program.*—The fiscal year 2020 budget request of \$29 million, a decrease of \$335,000, or 1.1 percent below the fiscal year 2019 enacted level, supports a lithium bridging strategy to maintain the production of lithium. The fiscal year 2020 budget request includes \$32 million for the Lithium Processing Facility (LPF), which will replace 1940s infrastructure at Y-12 and house lithium processing capabilities by 2030. NNSA completed an Analysis of Alternatives (AoA) for the LPF and is preparing for Critical Decision 1, establishing the preferred alternative design and estimated budget.

*Domestic Uranium Enrichment (DUE).*—The fiscal year 2020 budget request of \$140 million, an increase of \$90 million, or 180 percent above the fiscal year 2019 enacted level, will continue efforts to make available, when needed, the necessary supplies of enriched uranium for a variety of national security needs. The DUE program schedule is driven by the nearest-term defense need—unobligated low enriched uranium for tritium production. Other Departmental needs for enriched uranium (e.g., research reactors, naval fuel) are supported by this effort as well.

For Research, Development, Test, and Evaluation (RDT&E), the fiscal year 2020 budget request is \$2.3 billion, an increase of \$264 million, or 13.1 percent above the fiscal year 2019 enacted levels.

Increases to the Science Program (\$587 million) provide additional funding to support subcritical experiments for pit reuse and advanced diagnostics for subcritical hydrodynamic integrated weapons experiments that produce data for stockpile certifications.

The Engineering Program (\$234 million) sustains NNSA's capability for creating and maturing advanced toolsets and technologies to improve weapon surety and support annual stockpile assessments.

In fiscal year 2020, the Inertial Confinement Fusion Ignition and High Yield Program (\$481 million) will continue to maintain essential experimental capabilities and expertise in high energy density stockpile science. These efforts continue to provide data to reduce uncertainty in calculations of nuclear weapons performance and improve the predictive capability of science and engineering models in high-pressure, high-energy, high-density regimes.

The fiscal year 2020 request includes \$840 million for the Advanced Simulation and Computing (ASC) Program, which continues NNSA's close collaboration with DOE's Office of Science to implement the Exascale Computing Initiative. The ASC Program supports stockpile stewardship by developing and delivering predictive simulation capabilities for nuclear weapons systems in addition to deploying increasingly more powerful supercomputers at Sandia, Los Alamos, and Lawrence Livermore National Laboratories.

The 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 Office of Secure Transportation has an elite security workforce that performs sensitive and demanding work; our agents are among the most highly trained and dedicated national security personnel operating within the United States. The fiscal year 2020 budget request is \$317 million, of which \$80 million continues our efforts to modernize and replace the existing fleet of transporters with the Mobile Guardian Transporter (MGT). The MGT will be used for the containment and transport of nuclear weapons, weapons components, and/or special nuclear materials.

#### *Improving Safety, Operations, and Infrastructure*

An effective, responsive, and resilient nuclear weapons infrastructure is essential to the U.S. capacity to adapt flexibly to shifting requirements. Such an infrastruc-

ture offers tangible evidence to both allies and potential adversaries of U.S. nuclear weapons capabilities and can help to deter, assure, hedge against adverse developments, and discourage adversary interest in arms competition.

More than half of NNSA's facilities are over 40 years old, and roughly 30 percent date back to the Manhattan Project. It will take sustained, significant resources to modernize NNSA's nuclear weapons infrastructure.

Thanks to the support of the Administration and Congress, NNSA is making progress in repairing, replacing, and modernizing NNSA's facilities and stabilizing deferred maintenance; yet much more remains to be done. The fiscal year 2020 budget request for Infrastructure and Operations is \$3.2 billion, an increase of \$121 million, or 3.9 percent above the fiscal year 2019 enacted level. It includes \$1.1 billion for line item construction and over \$580 million for minor construction and equipment recapitalization needs. Delivering these projects on budget and schedule is contingent upon stable and predictable funding profiles, and support for the President's budget request.

Many of NNSA's excess process-contaminated facilities will ultimately be transferred to DOE's Office of Environmental Management (EM) for disposition. For example, EM commenced efforts to remove Building 280 Pool Type Reactor and ancillary facilities at Lawrence Livermore National Laboratory. NNSA identified five (including Building 280) of the top ten highest risk excess facilities at Lawrence Livermore National Laboratory.

In the interim, NNSA is focusing on reducing risks where possible. NNSA has made critical investments to stabilize high-risk process-contaminated facilities until ultimate disposition, including at Y-12's Alpha 5 and Beta 4 facilities. In fiscal year 2020, NNSA is using the authority Congress provided in the fiscal year 2018 National Defense Authorization Act (NDAA) to pursue disposition of several high-risk process-contaminated excess facilities with a project cost of less than \$50 million. NNSA also remains committed to reducing the risk of non-process contaminated facilities by positioning facilities where possible. For example, NNSA completed the Pantex Drummond Office Building (formerly known as the Administrative Support Complex) at the Pantex Plant outside of Amarillo, Texas in 2018. This building provides 1,000 employees with modern, energy efficient workspace. As a result, NNSA is now disposing of dilapidated, 1950s-era buildings and eliminating approximately \$20 million in deferred maintenance. In fiscal year 2020, NNSA plans to fund the disposition of 24 additional facilities totaling 75,000 gross square feet.

Defense Nuclear Security's fiscal year 2020 budget request is \$778 million, an increase of \$88 million, or 12.7 percent, over the fiscal year 2019 enacted amount. To execute its enterprise security program, DNS provides funding to the sites for: protective forces; physical security systems; information security and technical security; personnel security; nuclear material control and accountability; and security program operations and planning. While NNSA faces challenges replacing and refreshing aging physical security infrastructure, we are making key investments in recapitalizing this infrastructure through the Security Infrastructure Revitalization Program (SIRP). SIRP projects address aging high-priority security systems and related security infrastructure and equipment needs at all NNSA sites. NNSA will continue to execute ongoing line-item security projects as well, including the effort to reduce the Y-12 Protected Area and use security resources more efficiently. In addition, NNSA will sustain counter unmanned aircraft systems implementation and operation at sites possessing Category O/I quantities of special nuclear material.

Information Technology and Cybersecurity enable every element of NNSA's missions. The fiscal year 2020 budget request is \$309 million, an increase of \$88 million, or 40 percent over the fiscal year 2019 request. This increase will continue cybersecurity enhancements, bolster cybersecurity capabilities, and support the continuation of IT modernization efforts. NNSA is making steady progress in enhancing and upgrading the components of the Enterprise Secure Computing environment to ensure that nuclear security enterprise missions can be completed without disruption. As NNSA mission requirements expand in scope, the IT and cyber programs require modernization, expansion, and innovation in a commensurate fashion. Cybersecurity is a defense and deterrence mechanism and a powerful tool. In the current threat environment, NNSA cannot afford to neglect its cybersecurity capabilities, which serve as frontline assets that protect the information, systems, and networks NNSA depends on to execute our mission.

#### DEFENSE NUCLEAR NONPROLIFERATION APPROPRIATION

The fiscal year 2020 budget request for the Defense Nuclear Nonproliferation account is \$2 billion, an increase of \$63 million, or 3.3 percent, above the fiscal year 2019 request. Defense Nuclear

Nonproliferation account activities address the entire nuclear threat spectrum by helping to prevent the proliferation of nuclear weapons, counter the threat of nuclear terrorism, and respond to nuclear and radiological incidents around the world. The fiscal year 2020 budget request funds two program mission areas under this account: the Defense Nuclear Nonproliferation (DNN) Program and the Nuclear Counterterrorism and Incident Response (NCTIR) Program.

#### *Nonproliferation Efforts*

The Office of Defense Nuclear Nonproliferation works to: remove or eliminate vulnerable nuclear material; improve global nuclear security through multilateral and bilateral technical exchanges and training workshops; help prevent the illicit trafficking of nuclear and radioactive materials; secure domestic and international civilian buildings containing high-priority radioactive material; provide technical reviews of U.S. export license applications; conduct export control training sessions for U.S. enforcement agencies and international partners; strengthen the IAEA's ability to detect and deter nuclear proliferation; advance U.S. capabilities to monitor arms control treaties and detect foreign nuclear programs; and maintain organizational readiness to respond to and mitigate radiological or nuclear incidents worldwide.

The Material Management and Minimization (M3) program provides an integrated approach to addressing the risk posed by nuclear materials. The fiscal year 2020 budget request is \$334 million, an increase of \$40 million, or 13.5, percent above the fiscal year 2019 enacted level. The request supports the conversion or shut-down of research reactors and isotope production facilities that use HEU and the acceleration of developing new, non HEU-based molybdenum-99 production technologies in the United States. Additionally, the request for M3 supports the removal and disposal of weapons-usable nuclear material, with priority on expediting the removal of surplus plutonium from the State of South Carolina and continuing the transition to the dilute and dispose strategy for surplus plutonium disposition.

The Global Material Security program works with partner nations to increase the security of vulnerable nuclear and radioactive materials and improve the ability to deter, detect, and investigate illicit trafficking of these materials. The fiscal year 2020 budget request of \$342 million, a decrease of \$65 million, or 15.9 percent, below the fiscal year 2019 enacted level and includes efforts to secure the most at-risk radioactive material in U.S. high-threat urban areas by the end of fiscal year 2020.

The Nonproliferation and Arms Control program develops and implements programs to: strengthen international nuclear safeguards; control the proliferation 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 enduring and emerging proliferation challenges requiring the development of innovative policies and approaches. The fiscal year 2020 budget request for this program is \$137 million, an increase of \$6 million, or 5.8 percent, above the fiscal year 2019 enacted level. This increase serves to advance and complete development of the new Export Compliance Assistance Program to deploy export control training across DOE and NNSA facilities, implement new 10 CFR Part 810 civil penalty authority pursuant to the fiscal year 2019 NDAA, and establish and maintain a nonproliferation enrichment testing and training platform in cooperation with the IAEA and select foreign partners.

The Defense Nuclear Nonproliferation Research and Development program supports innovative unilateral and multilateral technical capabilities to detect, identify, and characterize foreign nuclear weapons programs, illicit diversion of special nuclear material, and nuclear detonations worldwide. The fiscal year 2020 budget request for this program is \$495 million, a decrease of \$80 million, or 13.9 percent, below the fiscal year 2019 enacted level. This decrease is due to shifting the HEU Reactor Conversion program to M3, as it is no longer in the research and development phase.

Nonproliferation Construction consolidates construction costs for DNN projects. The fiscal year 2020 budget request is \$299 million, an increase of \$79 million, or 35.9 percent, above the fiscal year 2019 enacted level. Last year, NNSA terminated activities for the MOX Fuel Fabrication Facility project to pursue the dilute and dispose option to fulfill the U.S. commitment to dispose of 34 metric tons of plutonium. The \$220 million for the MOX Fuel Fabrication Facility will be used to continue termination activities. The request also includes \$79 million for the Surplus Plutonium Disposition project, which supports the dilute and dispose strategy.

#### *Nuclear Counterterrorism and Incident Response (NCTIR)*

The Office of Counterterrorism and Counterproliferation (CTCP) provides effective capabilities to respond to any nuclear or radiological incident in the United States

or abroad by applying the unique technical expertise found in NNSA's nuclear security enterprise. Highly trained personnel with specialized technical equipment maintain readiness to support lead Federal agencies to find and render safe potential nuclear and radiological threat devices, to effectively manage the consequences of nuclear or radiological emergencies, and to support enhanced security operations for National Security Special Events (NSSE).

NNSA's Aerial Measuring System (AMS) provides airborne remote sensing in the event of a nuclear or radiological accident or incident within the continental United States, as well as in support of regularly scheduled NSSE. The AMS fleet consists of three Beechcraft B200 fixed-wing aircraft with an average age of 33 years and two Bell 412 helicopters with an average age of 24 years. The age of the current aircraft leads to unscheduled downtime resulting in reduced mission availability. A 2017 AoA on the AMS aircraft determined that recapitalization of the aging aircraft fleet is necessary to continue to provide Federal, State, and local officials with rapid radiological information following an accident or incident. In fiscal year 2019, the fixed-wing aircraft will be replaced, and the rotary-wing aircraft will be replaced in fiscal year 2020. The fiscal year 2020 budget request for AMS recapitalization is \$35.5 million.

NNSA, in conjunction with the Federal Bureau of Investigation (FBI), supports render safe teams at FBI field offices in 11 major American cities that are specially trained and equipped to identify and mitigate the function of a nuclear or radiological device (i.e., "stabilization"). CTCP will conduct stabilization training and operations and begin transitioning to the Capability Forward initiative, under which lifesaving responses to a nuclear threat device will be accelerated. Under this initiative, NNSA will provide additional training, equipment, and technical support to the current 11 stabilization cities—eventually growing to 14 U.S. cities by fiscal year 2022—to allow FBI teams to execute render safe operations more rapidly. CTCP will also improve and expand NNSA training facilities to accommodate the increased training requirements associated with regional render safe capabilities.

The Nation's nuclear incident response teams require the ability to communicate classified technical assessments in deployed, and often austere, environments using highly secure means. Information requirements encompass both nuclear device design information and intelligence assessments. The equipment used by NNSA's nuclear incident response teams is aging, resulting in increasing maintenance costs and heightened risks to the emergency response mission. This budget includes funding for recapitalization of incident response equipment consistent with lifecycle planning to maintain operational readiness. The budget also includes funding for state-of-the-art, secure, deployable communications systems that are interoperable with FBI and DoD mission partners that will help provide decision makers with real-time technical recommendations to mitigate nuclear terrorist threats.

CTCP maintains an operational nuclear forensics capability in three distinct areas: (1) pre-detonation device disassembly and examination; (2) post-detonation assessment; and (3) analysis and characterization of nuclear materials. The program maintains readiness to deploy device disposition and device assessment teams, conduct laboratory operations in support of analysis of bulk actinide forensics, and deploy subject matter expertise and operational capabilities in support of ground sample collections that support attribution of a nuclear detonation.

The Emergency Operations program's fiscal year 2020 budget request includes \$35.5 million under NCTIR to support NNSA's Office of Emergency Operations. This funding will support NNSA's all-hazard emergency response capabilities that positively impact the Department's emergency management continuity and devolution programs, enhance the ability of the Department to respond to, and recover from, catastrophic emergencies or other man-made hazards or natural disasters.

#### NAVAL REACTORS APPROPRIATION

##### *Advancing Naval Nuclear Propulsion*

Nuclear propulsion for the U.S. Navy's fleet of submarines and aircraft carriers is critical to the security of the United States and its allies as well as the security of global sea lanes. The Office of Naval Reactors remains at the forefront of technological developments in naval nuclear propulsion by advancing new technologies and improvements in naval reactor performance.

This preeminence provides the U.S. Navy with a commanding edge in naval warfighting capabilities.

The Naval Reactors fiscal year 2020 budget request is \$1.65 billion, a decrease of \$140 million or approximately 8 percent, below the fiscal year 2019 enacted level. This request reflects reductions to planned funding levels following additional funding enacted in fiscal year 2018 for the S8G Prototype Refueling Overhaul and Spent

Fuel Handling Recapitalization Project. In addition to supporting today's operational fleet, the requested funding is the foundation for Naval Reactors to deliver tomorrow's fleet and recruit and retain a highly-skilled workforce. One of Naval Reactors' three national priority projects, continuing design and development of the reactor plant for the Columbia-Class submarine, featuring a life-of-ship core and electric drive, will replace the current Ohio-Class fleet and provide required deterrence capabilities for decades. The project to refuel a research and training reactor in New York will enable 20 more years of research, development, and training for fleet operators. Funding will also be used to support construction of 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 2020 to support these projects and 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 Bettis Atomic Power Laboratory in Pittsburgh, Pennsylvania; Knolls Atomic Power Laboratory and Kesselring Site in New York; and the spent nuclear fuel facilities in Idaho can perform the research and development, analysis, engineering, and testing needed to support today's fleet at sea and develop future nuclear-powered warships. These laboratories also perform the technical evaluations that enable Naval Reactors to thoroughly assess emergent issues and deliver timely responses to provide nuclear safety and maximize operational flexibility.

#### *NNSA Federal Salaries and Expenses Appropriation*

The fiscal year 2020 budget request for Federal Salaries and Expenses is \$435 million, an increase of \$25 million, or 6.0 percent, over the fiscal year 2019 enacted level. NNSA's workforce is critical to the success of the Nation's nuclear security enterprise. NNSA must have a sufficient workforce, with the right capabilities, to ensure it can modernize the nuclear deterrent, recapitalize an aging infrastructure, and continue to meet the requirements of our nonproliferation and counterterrorism programs. The 2018 NPR highlighted the need to properly support civilian personnel who protect the United States against nuclear threats. Effective deterrence would be impossible without the vital contributions our personnel make to the United States' nuclear capabilities and deterrence.

If NNSA is to be successful, funding alone will not be enough. NNSA will need to have the necessary human resource authorities to attract and retain the best and brightest workforce from around the country, fostering interest through internships or skilled trade programs, and clearing them for classified work as quickly as possible. This includes jobs not just in science, technology, and engineering but also manufacturing, maintenance, project and program management, and construction.

Meeting NNSA's growing mission requirements, as described in the 2018 NPR will require an aggressive hiring strategy for the next 2 years. Since 2010, NNSA's program funding has increased 50 percent, while staffing has decreased 10 percent. The fiscal year 2020 request increases NNSA staffing to 1,753 full-time equivalents (FTEs), an increase of 95 FTEs from the current on-board level of 1,658 Federal employees. NNSA would benefit from the elimination of the overall cap on FTEs and excepted service personnel.

Last year, two independent studies identified NNSA's unmet critical staffing needs. The Office of Personnel Management (OPM) and NNSA's Office of Cost Estimating and Program Evaluation (CEPE) found that NNSA was understaffed across all functions. The number of additional staff recommended in both studies would exceed the statutory cap on NNSA's full-time equivalent employees. In March 2019, the Government Accountability Office (GAO) endorsed both OPM and CEPE's staffing analyses' conclusions of critical staff shortfalls and needs across multiple NNSA functions. GAO's endorsement supports NNSA's request for additional hiring authorities that would eliminate personnel caps, which would allow us to put significant resources behind our mission priorities. NNSA is focusing on developing a concrete strategic staffing plan based on the information provided by the two independent studies and GAO's report.

#### *Management and Performance*

Since 2011, NNSA has delivered approximately \$2 billion in projects, a significant portion of NNSA's total project portfolio, under budget. We are committed to encouraging competition and increasing the universe of qualified contractors by streamlining major acquisition processes. NNSA will continue to focus on delivering timely, best-value acquisition solutions for all programs and projects, by using a tailored approach to contract structures and incentives that are appropriate for the special missions and risks at each site. NNSA's Office of Acquisition and Project Management

continues to: lead improvements in contract and project management practices; provide clear lines of authority and accountability for program and project managers; improve cost and schedule performance; and ensure that Federal Project Directors and Contracting Officers possess the appropriate skill mix and professional certifications to manage NNSA's work.

*Conclusion*

NNSA's diverse missions are critical to the national security of the United States: maintaining the safety, security, reliability, and effectiveness of the nuclear weapons stockpile; reducing the threat of nuclear proliferation and nuclear terrorism around the world; and providing naval nuclear propulsion to the U.S. Navy's fleet of aircraft carriers and submarines. NNSA is mindful of its obligation to improve acquisition, safety, and security practices continually, and to use in a responsible manner, the resources entrusted to it by Congress and the American people. By investing in our nuclear security enterprise and continuing our efforts to modernize our scientific, technical, and engineering capabilities and infrastructure, NNSA will continue to deliver on its nuclear security mission.

Senator ALEXANDER. Thank you very much, Madam Administrator, and thanks for your service to our country and such a vital mission.

Admiral Caldwell, you're going to provide testimony on Naval Reactors, but I mentioned to Senator Feinstein—Senator Feinstein and I, but especially Senator Feinstein, are very interested in the interim storage of nuclear—of used nuclear fuel. And she, with my support, has proposed in our appropriations bills that we develop interim storage sites for used fuel that is at commercial sites today. Now, of course, you have a noncommercial process, but you come as close to dealing with—taking used nuclear fuel to an interim site as anything that's going on in the country.

And so when you've finish with your comments, if you could take three or four extra minutes and just describe for me and for Senator Feinstein exactly what you do and how you do it, it might be useful to us as we consider our broader responsibilities.

**STATEMENT OF ADMIRAL JAMES F. (FRANK) CALDWELL, JR., USN,  
DEPUTY ADMINISTRATOR FOR NAVAL REACTORS**

Admiral CALDWELL. Yes, sir. Thank you very much.

Chairman Alexander, Ranking Member Feinstein, and distinguished members of this subcommittee, thank you for the opportunity to testify here today. I also thank the subcommittee for consistently supporting Naval Reactors, enabling my team to provide the Navy with propulsion plants that give our nuclear-powered warships incredible advantages of unmatched reliability, speed, and endurance to carry out our national security missions throughout the world.

Our national security strategy, national defense strategy, recognize an increasingly complex global security environment marked by the reemergence of great power competition and an erosion of our military advantage. The Chief of Naval Operations has made it clear that our Navy must become more agile, must compete in ways that are sustainable, and must be prepared to control the high-end maritime conflict. Our nuclear Navy is essential to meeting these objectives. Today, nearly 45 percent of the Navy's major combatants are nuclear powered, including 11 aircraft carriers and 69 submarines.

In 2018, Naval Reactors supported the operations of the nuclear fleet, including 22 submarine fast-attack deployments, 36 strategic deterrent patrols, and five aircraft carrier deployments. At any

given time, at least 47 of our submarines were either deployed or ready to deploy. The Naval Reactors budget request for fiscal year 2020 is a \$1.65 billion request that represents a reduction of \$140 million, or 7.8 percent, from our fiscal year 2019 request.

Our budget fully supports three national priorities. The first project supports the Navy's number one acquisition priority by developing the propulsion plant for the Columbia-class ballistic missile submarine. This ship will feature a life-of-ship reactor core. That core is made possible by the reactor technologies developed over many decades. Because of your support, the Navy has begun procuring the long-lead propulsion plant equipment for the lead ship this fiscal year. And as planned, we will begin manufacturing the Columbia's life-of-ship core this year.

The second project is refueling and overhauling a research and training reactor in New York. There is a dual benefit to this effort. First, it facilitates reactor development for the Columbia-class submarine and it will provide 20 more years of training for new fleet operators.

The third project is constructing the new naval spent fuel handling facility in Idaho, which will enable long-term reliable processing and packaging of spent nuclear fuel from Navy nuclear propulsion plants.

This year's budget request also invests in three key areas. The first is the development of advanced reactor technology for future classes of nuclear-powered warships. The second is recapitalizing vital laboratory facilities and infrastructure. And the third is remediation efforts to reduce environmental liabilities of legacy facilities. I want to assure the committee that our budget planning efforts are done with great rigor. Investments we make today in research and development not only advance Navy warfighting capabilities, but also result in cost savings and improved capability far into the future.

I understand the difficult budget environment in which Congress must craft legislation, and I respectfully request and urge your support of the fiscal year 2020 budget request.

Thank you for this committee's longstanding support of Naval Reactors. And I look forward to answering your questions on other topics.

[The statement follows:]

PREPARED STATEMENT OF ADMIRAL JAMES F. CALDWELL

Chairman Alexander, Ranking Member Feinstein, and distinguished members of the subcommittee, thank you for the opportunity to appear before you today and present the President's fiscal year 2020 budget request for Naval Reactors. Your strong support for the work we do ensures our nuclear Navy has the power and propulsion to carry out missions around the world.

This past year marks the 70th anniversary of the founding of the Naval Nuclear Propulsion Program under the leadership of Admiral Hyman Rickover. In 1955, just 7 years after the creation of our program, the first nuclear-powered warship, USS *Nautilus* (SSN 571) reported "Underway on nuclear power". Since *Nautilus*, follow-on classes of ever more capable nuclear-powered submarines and aircraft carriers have ensured our warfighting edge over potential adversaries. Reactor core lives have increased from just under 2 years to over 40 years. Our ballistic missile submarines have provided the most survivable leg of our nuclear triad for nearly six decades and are essential to our ability to deter major warfare and assure our allies. Our fast attack submarines operate virtually undetected, safeguard vital commercial sea lanes, and stand ready to protect American interests. And, our aircraft car-

riers—4.5 acres of sovereign territory—provide our Nation unparalleled mobility and the sustained ability to project combat power, deter conflict, and protect our interests.

Today's security environment is dynamic and challenging, best characterized as a return to great power competition. In the maritime domain, nuclear propulsion enables the Navy to conduct missions vital to national security by providing unmatched mobility, flexibility, responsiveness, and endurance. These key attributes ensure our nuclear fleet can meet the demands of forward presence and crisis response world-wide. Today, nearly 45 percent of the Navy's major combatants are nuclear-powered (11 aircraft carriers, 14 ballistic missile submarines, 51 attack submarines, and four guided missile submarines).

Last year, with Naval Reactors support, the Navy deployed 22 submarines and conducted 36 strategic deterrent patrols. At any given time, there were at least 47 submarines deployed or ready to deploy within days. Our carriers, USS *Carl Vinson* (CVN 70), USS *Theodore Roosevelt* (CVN 71), USS *John C Stennis* (CVN 74), USS *Harry S Truman* (CVN 75), and USS *Ronald Reagan* (CVN 76) deployed during 2018. This past December, USS *Harry S Truman* (CVN 75) successfully concluded a historic, two-part deployment as part of the implementation of the Dynamic Force Employment plan, demonstrating our Navy's ability to be more agile and operationally unpredictable to potential adversaries.

In submarine shipbuilding, the Navy recently saw the keel laid for the attack submarines Pre-Commissioning Units (PCU) *Montana* (SSN 794) and *Hyman G. Rickover* (SSN 795), and the commissioning of USS *Colorado* (SSN 788), USS *Indiana* (SSN 789), and USS *South Dakota* (SSN 790). This totals 17 *Virginia*-Class submarines.

In aircraft carrier shipbuilding, USS *Gerald R Ford* completed her initial at sea operations and began her Post-Shakedown Availability in July. Construction of the *John F. Kennedy* (CVN 79) is nearing completion, and she is scheduled to be christened later this year. The third carrier of the *Ford*-Class, *Enterprise* (CVN 80), began construction activities this past year and will proceed as part of a two-carrier buy of CVN 80 and CVN 81, which is anticipated to generate substantial savings for the Navy. As these aircraft carriers join the fleet, they will bring unmatched capabilities to our Navy. The propulsion plant for the *Ford*-Class represents the first newly designed aircraft carrier propulsion plant in 40 years. These ships not only match the high speed of our *Nimitz*-Class aircraft carriers but provide 25 percent more energy and three times the electrical generating capacity. Additionally, the propulsion plant design reduces maintenance by 30 percent and manpower by 50 percent. These advances in propulsion plant design are a direct result of the dedicated and sustained effort by Naval Reactors and its field activities, our Department of Energy (DOE) laboratories, nuclear industrial base suppliers, the Navy design team, and the nuclear shipbuilders.

This committee's support has enabled the safe operation of the nuclear fleet, substantial progress on our key projects, and our continued oversight and regulation of all areas across the Naval Nuclear Propulsion Program. Naval Reactors' budget request for fiscal year 2020 is \$1.65 billion, a reduction of \$140.2 million, or 7.8 percent, from our fiscal year 2019 request. The budget request fully supports the requirements for our three major projects—*Columbia*-Class propulsion plant development, the refueling overhaul of a research and training reactor in New York, and the construction of the Naval Spent Fuel Handling Facility in Idaho. The budget request also ensures Naval Reactors can support the operational nuclear fleet, continue research and development efforts for the next generation of nuclear powered warships, and make progress on both the recapitalization of our laboratory facilities and the environmental remediation of our legacy responsibilities.

#### MAJOR PROJECTS

##### *Columbia*-Class Propulsion Plant

The *Columbia*-Class ballistic missile submarine is the Navy's number one acquisition priority. Naval Reactors is on track to support the start of ship construction in fiscal year 2021 and is committed to delivering the life-of-ship reactor core and the electric drive propulsion system necessary for the *Columbia*-Class program. fiscal year 2020 funding of \$75.5 million will continue supporting procurement of the lead ship propulsion plant components. The Navy began procuring long-lead material for the propulsion plant this year, and also will begin manufacturing the life-of-ship reactor core.

#### *S8G Prototype Refueling Overhaul*

The fiscal year 2020 budget request includes \$155 million to support the refueling overhaul of one of the New York land-based prototypes, which will enable an additional 20 years of Naval Reactors' commitment to research, development, and training. As part of this refueling project, we will insert recently manufactured *Columbia*-Class type fuel modules in the prototype reactor as part of testing and demonstrating the manufacturability necessary for production and delivery of the *Columbia*-Class reactor core. The prototype refueling overhaul is scheduled to complete in fiscal year 2021, with a return to training operations shortly thereafter.

#### *Spent Fuel Handling Recapitalization Project*

The fiscal year 2020 budget request includes \$238 million to continue construction of the Naval Spent Fuel Handling Facility, which broke ground in 2017. Full support from Congress has enabled us to keep this project on track. The cost and schedule baselines were approved in September of 2018. Design and site preparation for this facility continues, and it is on track to receive spent nuclear fuel from aircraft carriers in fiscal year 2024 and be fully operational by fiscal year 2025.

### TECHNICAL BASE FUNDING

In addition to our three priority projects, Naval Reactors maintains a high-performing technical base to: (1) execute nuclear reactor technology research and development that supports today's fleet and ensures our Navy maintains its technological advantage over adversaries and, (2) provide the necessary equipment, construction, maintenance, and modernization of critical infrastructure and facilities. The funding required for this base also supports the lean Federal workforce that provides the oversight necessary to carry out this important technical work safely and efficiently. These activities are vital to our ability to provide 24-7 support to the nuclear-powered Navy.

#### *Research and Development*

By employing an effective technical base, the teams of talented and dedicated people at Program sites—the Bettis Atomic Power Laboratory in Pittsburgh, the Knolls Atomic Power Laboratory and Kesselring Site in greater Albany, the Naval Reactors Facility in Idaho, and our Washington, DC headquarters—can perform the research and development, analysis, engineering, and testing needed to support today's fleet at sea and develop more capable nuclear-powered warships for tomorrow's fleet. Advanced nuclear technologies such as those employed in the *Columbia* reactor require extensive development and prototyping, spanning a decade or more to mature the technology to a point where it is ready to incorporate in a ship design. Technology development will receive increased emphasis in the coming years as we complete our major projects and increase our focus on the development of tomorrow's fleet.

Our labs perform the technical evaluations that enable Naval Reactors to thoroughly assess approximately 4,000 emergent issues annually and deliver timely responses that ensure nuclear safety and maximize operational flexibility. Our research and development efforts must continue so that we can provide the Navy more capable propulsion plants in the future. The performance of our reactors is key to maintaining advantages over our potential adversaries. The technological advances that go in our propulsion plants today are a direct result of research and development investments that began decades ago. Continued investment now is vital to the generations of scientists and engineers who will design the propulsion plants of the future.

#### *Facilities and Infrastructure*

Our laboratory facilities and infrastructure are critical in carrying out Naval Reactors' mission. The budget request supports recapitalizing our Naval Nuclear Laboratory facilities and infrastructure systems, many of which have supported the Program since its inception 70 years ago. Without this recapitalization we will be unable to effectively support nuclear fleet operations and advanced research and development efforts at the level required by this complex technology. Our budget request this year also reflects the increase in our efforts in decontaminating and decommissioning (D&D) older facilities that have been in existence since the start of the Program in the early 1950s. We have approximately \$8 billion in environmental liabilities requiring D&D efforts—about one-third of these facilities are no longer in use. We are increasing our emphasis on retirement of these liabilities in an environmentally responsible and cost-effective manner to support best use of our funding.

I want to assure the committee that the planning efforts we execute in budgeting for current and future projects are done with extreme rigor. We conduct comprehensive reviews of our budget to ensure we are making the right investments and

tradeoffs. Our budget profile is consistent with projections in earlier Future Years Nuclear Security Plan submissions. Investments we make today in research and development efforts not only advance capabilities, but will also result in cost savings far into the future. We provide unmatched value to our Nation's defense and have a history of cost-effectively meeting our obligations. I understand the difficult budget environment in which Congress must craft legislation, and I respectfully urge your support for aligning allocations with the fiscal year 2020 Budget Request.

Admiral CALDWELL. And, sir, with your permission, I'll transition to give you a summary of how we handle our nuclear spent fuel.

The naval nuclear spent fuel is loaded into shipping containers and is then transported to—from our nuclear-capable shipyards via rail to the Naval Reactors Facility that's on the Idaho National Lab. Naval Reactors has shipped over 850 containers of naval spent fuel to Idaho since the 1950s. Now, at the Naval Reactors facility, spent fuel is unloaded from the shipping containers and is stored in the water pools at our expended—

Senator ALEXANDER. Did you bring your pictures?

Admiral CALDWELL. I did not bring the pictures, sir, but I regret—maybe my team did, and if—but I can get those and provide those for you.

Anyway, once the spent fuel containers are—once the containers arrive in Idaho, we unload those containers—oh, here we go—and we—we provide—we put the spent fuel in canisters.

I'm going to give you three slides, sir. The first slide is sort of a sequence of events that shows the shipping containers, the facilities, and then shows some of the pictures of the packaging. The second is an artist rendering of the new facility that we're building. And then the third picture represents what that storage looks like when it's packed and ready for this temporary storage that we have.

So we unload the fuel into the pool at the Expended Core Facility. And then once that fuel is there, sir, we do examinations of that fuel. That's to validate the performance of the fuel. That is vitally important to our mission and has allowed us to develop reactor cores with progressively longer lives. That's an important part of our mission. In fact, that's allowed us to take reactor cores from Nautilus days, where we had maybe a core that lasted 18 months to 2 years, to building the Columbia core, which will last over 40 years.

Now, today our fuel spends less than 6 years in the water pool prior to being placed in dry storage. And what we do in the dry storage process is to load that fuel in specialized—I'll describe that in a minute, ma'am—we load that spent fuel into stainless steel baskets. Then those stainless steel baskets are loaded into stainless steel canisters, we call those spent fuel canisters—and then the entire thing is loaded into a concrete overpack.

So that picture that you held up, Senator Feinstein, that's the concrete overpack, and so that's what—there's a stainless steel cylinder that's designed to go into our shipping container and designed to go into a long-term repository, and that goes inside a concrete cylinder.

Yes, sir.

Senator ALEXANDER. And the cylinder goes on a railcar.

Admiral CALDWELL. Yes. The spent fuel canister can fit into that shipping container that's shown on the upper left in those slides.

Senator ALEXANDER. And then the cylinder goes into the cement?

Admiral CALDWELL. The cylinder goes into that cement overpack.

Senator ALEXANDER. In this?

Admiral CALDWELL. Yes, sir, just like that.

Senator ALEXANDER. I'm coming along.

Admiral CALDWELL. And it's designed to be like that to provide the right level of shielding. And it's in an environmentally protected, safe, and secure condition. And then it's there until we're ready to move it to a permanent storage facility. And, again, those spent fuel canisters are designed to go right into the shipping container, and then it's designed to be able to go and take that spent fuel canister and put it in a long-term repository.

Senator ALEXANDER. So just so we take a minute on this——

Admiral CALDWELL. Sure.

Senator ALEXANDER [continuing]. So the canisters are these things, right?

Admiral CALDWELL. The stainless steel spent fuel canisters.

Senator ALEXANDER. Stainless steel. And they go into the thing in the upper left-hand corner.

Admiral CALDWELL. They can fit inside there for shipment.

Senator ALEXANDER. And then it goes into this.

Admiral CALDWELL. No, sir. Before you ship it, we're going to store it in those concrete overpacks until we're ready to ship it to a long-term repository.

Senator ALEXANDER. Oh. Oh, well, these are in Idaho.

Admiral CALDWELL. Yes, sir; that's right.

Senator ALEXANDER. So this is—so you take it out of the submarine, you put it in these, then you put it—then you put this in the—what do you call that? The cylinder?

Admiral CALDWELL. Yes, sir. Can I walk up there and point out what you can see?

Senator ALEXANDER. Yes, why don't you do that.

Admiral CALDWELL. It may be unorthodox, but maybe it's——

Senator ALEXANDER. It's all right. We're not orthodox.

Admiral CALDWELL. So the fuel then is loaded when it leaves the shipyard into one of these containers. That's for aircraft carrier fuel, and that's for submarine type fuel. That's shipped out here to Idaho. And this is where the railhead is. And this is our old facility; it's called the Expended Core Facility. And we are building a new facility over here because this facility is aged and it doesn't handle the full length aircraft carrier fuel.

Now, we put the fuel into the pool. That's an example of the pool. And it will stay there for up to 6 years.

Senator FEINSTEIN. And so water in this——

Admiral CALDWELL. There is no water in this. It is shipped dry.

Senator FEINSTEIN. Oh. So how long is it in dry status?

Admiral CALDWELL. Well, it's in dry status only as long as it takes to package it and then ship it when—and we ship them when we're ready and ship it across country via rail to get to the pool.

Senator FEINSTEIN. And there's no danger?

Admiral CALDWELL. No, sir—no, ma'am. It's packaged with safety in mind and strict rules to make sure that we are doing business the correct way. And then once it comes out to Idaho, we load it

into the pool. And then it will stay in there for up to 6 years. The average is about 3 years.

Senator FEINSTEIN. And these are plutonium rods.

Admiral CALDWELL. No, ma'am. These are spent Navy nuclear fuel. So uranium that's been used in a fission process——

Senator ALEXANDER. Similar to the commercial reactors.

Admiral CALDWELL. Yes, sir. There are fission products in there of all different types that occur from fission——

Senator ALEXANDER. The same kind of stuff you've got in California in your plants that are closed down.

Admiral CALDWELL. And we do examinations of this——

Senator FEINSTEIN. We've got rods in the plants. We have plutonium rods in California, in PG&E (Pacific Gas and Electric Company) and in Southern California Edison.

Senator ALEXANDER. Are they plutonium? They wouldn't be plutonium.

Admiral CALDWELL. Well, no. There are many kinds of products of fission that are inside these—this fuel. Our fuel contains all the fission products.

Senator FEINSTEIN. Maybe we can talk about this more later because the big spent fuel pools that I've seen, like the one at Fukushima that cracked, they go into water, the rods, for a period of time, and then—I don't know what they call them.

Admiral CALDWELL. Well, we put them in this pool, and then when we're ready to package them, we put them in these baskets. Those baskets, in turn, fit into these stainless steel containers. These stainless steel containers were designed to be able to fit in the shipping container. And they're also designed to go with the requirements of a long-term repository. These are designed to last for up to 10,000 years.

Senator FEINSTEIN. Can I ask a quick question?

Admiral CALDWELL. Yes, ma'am.

Senator FEINSTEIN. Is there a difference between handling of uranium and plutonium?

Admiral CALDWELL. I don't handle, as a matter of general practice, plutonium, although I have to handle items with fission products periodically, and it does take special precautions.

Senator FEINSTEIN. So that must be different.

Senator ALEXANDER. Well, but your——

Admiral CALDWELL. [Audio malfunction] that are the product of that. Any of those fission products that we produce are contained within the fuel system.

Senator ALEXANDER. But you're able to take—you take rods——

Admiral CALDWELL. Fuel cells.

Senator ALEXANDER. Fuel cells. You put them in a——

Admiral CALDWELL. Container.

Senator ALEXANDER [continuing]. Container.

Admiral CALDWELL. And then we put them in a concrete overpack.

Senator ALEXANDER. And then——

Admiral CALDWELL. And we store it this way. And then if we get ready to move it to a long-term repository, we take that stainless steel container out of the concrete overpack and we put it into this——

Senator FEINSTEIN. Let me ask you, Can we do that 200 years after we put it in? Can we take it out?

Admiral CALDWELL. I believe so. Yes, ma'am.

Senator FEINSTEIN. Really?

Admiral CALDWELL. Yes, ma'am.

Senator ALEXANDER. Well, by long term, you mean Yucca. So you put it in—

Senator FEINSTEIN. Well, it's forever.

Senator ALEXANDER. But when you take it out of the cell and ship it to Idaho, where's the first place you put it? Here?

Admiral CALDWELL. We put it in the pool first.

Senator ALEXANDER. You put it in the pool. And then where does it go?

Admiral CALDWELL. Then it will stay—then it goes into these baskets.

Senator ALEXANDER. Right. And then where does it go?

Admiral CALDWELL. And then it will go into this.

Senator ALEXANDER. And that goes on the railcar?

Admiral CALDWELL. When we're ready to ship it again, it would go into the railcar.

Senator ALEXANDER. Well, how about the first time? I mean, Idaho is way out here and your sub is way over here. How do you—where do you—

Admiral CALDWELL. We have a process that's to the left of this that prepares the fuel for going into the shipping containers before it goes, and it's not too dissimilar. We have inside of this container there's another basket arrangement that allows us to load fuel cells in here and then ship it out to Idaho.

Senator FEINSTEIN. One quick—is there a difference between handling uranium and plutonium?

Admiral CALDWELL. Yes, ma'am.

Senator FEINSTEIN. So that's good. I'm familiar with what they do in California, which is plutonium.

Senator ALEXANDER. But you mainly handle uranium, right?

Senator FEINSTEIN. He—yes.

Admiral CALDWELL. Well, I handle the uranium, which includes all kinds of spent fuel, which contains all kinds of additional fission products. If I can make a suggestion, can we come back maybe and provide the next level of detail for you on that?

Senator ALEXANDER. Yes, but I thought it's interesting, though, because we—you know, our goal in the commercial side is to get a place to put the used fuel at the reactors like the ones in California. And I guess the example here is you are taking used fuel, you are putting it in an interim site in Idaho, and once the Yucca Mountain is built or some other long-term repository, you put it right back in the same container and send it there.

Admiral CALDWELL. And then we would send it to—

Senator ALEXANDER. Yes. So it's—

Senator FEINSTEIN. Would it be in the cement—

Admiral CALDWELL. [Audio malfunction] and once that is—once we would be ready to ship it to a long-term repository, we take it out of the cement [off microphone].

Senator ALEXANDER. Okay.

Admiral CALDWELL. So if I could—I volunteer to come back and give more detail.

Senator FEINSTEIN. Thank you. We appreciate it.

Admiral CALDWELL. Thank you for the time.

Senator ALEXANDER. No, no, that's very helpful. And I think the main relevance of it is it shows that the interim storage site, which we've included in our appropriations bill for the last few years that Senator Feinstein has suggested is that people know how to do that because you're already doing it, you're already taking spent fuel, safely handling it, putting it on a railcar, sending it to an interim site in Idaho, holding it there until it's ready to go to Yucca Mountain if and when Yucca Mountain is open.

So, now, why don't we go ahead with our opening statements if I can get my correct glasses on here. We'll—we—this is the second of our four budget hearings in the committee. We thank you for coming and for allowing us to take a little diversion there.

We heard from Secretary Perry last week. We'll have two more hearings in the coming week to review the Nuclear Regulatory Commission and the Corps of Engineers and the Bureau of Reclamation budget requests.

First, I want to welcome not only Ms. Gordon-Hagerty and Admiral Caldwell, but, Dr. Verdon, thank you for being here, and, Dr. Park, thank you for being here as well.

Are you here now or are you still at Oak Ridge or—you used—

Dr. PARK. I celebrate 1 year in my position. I was sworn in exactly a year ago today.

Senator ALEXANDER. Yes, okay.

Senator FEINSTEIN. Congratulations.

Senator ALEXANDER. Congratulations.

So our subcommittee has produced a good record of being the first of the appropriations bills to be considered by the committee and by the Senate each year, and that's due to the excellent working relationship that Senator Feinstein and I have, and with the cooperation of both the Democratic and Republican members of this subcommittee. We've been able to work together and get the Senate leaders our bill early, and, as a result, during this last year, you had the advantage of having your appropriations bill signed into law before the year began, which I'm sure saved the taxpayers money and made it possible for you to do your job better. That was the first time that happened since 2000.

Last year's appropriations bill we provided \$15.2 billion for the NNSA, including \$1.9 billion for the six life extension programs, which fix or replace components and weapons systems to make sure they're safe and reliable.

We also funded the Uranium Processing Facility at Y-12 National Security Complex, \$703 million, which will continue to keep this project on time and on budget with a completion year of 2025 at a cost no greater than \$6.5 billion. The Administrator mentioned that in her testimony. In addition to finding a way to get rid of used nuclear fuel, I suppose Senator Feinstein and I have spent more time on trying to work with the Department to get large projects under cost control than any other subject. And we're glad to see the uranium facility on time and on budget, and we are glad

to see the progress that's been made in South Carolina with the MOX (Mixed Oxide) facility.

We're here today to review your request, and the budget request for NNSA is \$16.5 billion, an increase of 8 percent, \$1.3 billion, over the last year enacted level. I'd like to focus my remarks on three main areas: maintaining our weapons stockpile; keeping critical projects on time and on budget, which I just mentioned; and supporting our nuclear Navy.

When the Senate agreed to ratify the New START Treaty in December 2010, which both of us voted for, we also agreed to support funding to modernize and maintain our nuclear weapons stockpile, plus the facilities to do the work. A vital part of NNSA's mission is completion of the five ongoing life extension programs, which fix or replace components and weapons systems to make sure they're safe and reliable. The budget request includes \$2.1 billion to continue the life extension programs. I want to make sure we're spending those dollars effectively. Completing all of the work that needs to be done for these weapons systems will result in a higher workload than the weapons program has had at any time since the height of the Cold War. It will require a large number of highly trained experts at the production sites, like at Oak Ridge and Y-12, the weapons laboratories, and the Federal employees that work for NNSA. I'd like to hear more today about whether you have enough qualified people to do that work.

I would also like to discuss whether NNSA will be able to keep the Life Extension Programs on time and on budget.

You are responsible for some of the largest construction projects. We've mentioned how hard we have worked over the last several years to help you keep those on time and on budget. We focused on the uranium facility. We held routine meetings with the leadership until that was done. We insisted that construction not begin until design was 90 percent completed. That was done. I'd like to hear more about that progress in my questions.

We also worked with the Department on ways to get excess plutonium out of South Carolina more quickly and for less cost. Last year, Secretary Perry canceled the MOX project in favor of the dilute and dispose alternative, which the Department estimates will save taxpayers more than \$20 billion. And I would congratulate Secretary Perry and the Department for taking on a difficult issue and bringing it to—toward, let's say, a conclusion. I'd like to hear more about the progress there.

The NNSA is restarting our ability to make plutonium pits. You mentioned that, Madam Administrator. The budget request includes \$712 million for plutonium sustainment, 97 percent more than the current funding level. This difficult important work is, as you said, in New Mexico and South Carolina. You have decided to use existing facilities and expertise in New Mexico to make some pits and repurpose MOX facility in South Carolina to make the remainder. I support that plan. I want to hear how lessons learned from UPF (Uranium Processing Facility) and MOX can make sure we get the pit production restart done on time and on budget.

Now as to our Navy, Reactors are responsible for all aspects of nuclear power for our submarines and aircraft carriers. I mean Naval Reactors when I say "Reactors." Naval Reactors has a lot on

your plate right now designing a new reactor core for the next class of submarines, refueling a prototype reactor, and building a new spent fuel processing facility for nuclear waste from defense activities, which you just showed us on your—on your chart.

We had an opportunity to talk earlier this week, Admiral Caldwell, which I appreciate, about the new spent processing facility, part of your consolidated interim storage for your fuel. That shows it can be done safely and effectively, and we welcome your advice as we move ahead with consideration of Yucca Mountain. But as you said to me, your interim site in Idaho does not replace the need for a permanent repository at Yucca Mountain. That used nuclear fuel will still need to go to Yucca Mountain once it's built, and I think your contract with the State of Idaho says that by 2035 you're supposed to have it out of there and into somewhere else. I look forward to your comments on that today. I'd like to hear what's being done to keep the new *Columbia*-class submarine design on track.

NNSA needs to complete a lot of important work, and this work is going to require good planning and effective oversight. I look forward to working with the Administrator and her team for the fiscal year 2020, and with Senator Feinstein, who I now recognize for an opening statement.

#### STATEMENT OF SENATOR DIANNE FEINSTEIN

Senator FEINSTEIN. Thanks very much, Mr. Chairman. Thank you for your leadership, thank you for your chairmanship, and thank you for your concern, and thank you for holding this hearing.

As I understand it, the budget request for NNSA totals \$16.5 billion. That's a \$1.3 billion increase over fiscal year 2019. It's an all-time high. The vast majority of this increase is in the weapons account, which sees a 12-percent increase. Meanwhile, the rest of DOE (Department of Energy) sees a \$3.9 billion, or 11-percent, cut to scientific and energy research programs as well as environmental cleanup. Within NNSA, the nonpro program, which has been so successful in reducing nuclear dangers, is basically flat. This is part, as I see it, of a long and troubling trend.

Since 2011, when the Senate approved the New START, the weapons program budget has increased a staggering \$5.5 billion. In that same time, the nonproliferation program has seen a roughly \$300 million decrease. That's very hard for me to accept.

The CBO estimates it will cost \$494 billion over the next decade to modernize our nuclear arsenal. The \$162 billion would need to be appropriated by our subcommittee for the NNSA. In addition, CBO (Congressional Budget Office) estimates that we will spend \$1.7 trillion over the next 30 years updating our nuclear submarines, missiles, and bombers. Gentlemen in uniform, that's an eye-popping number.

I'm not seeing a lot of tough choices being made with this budget request candidly. All I see is more money for weapons and less money for everything else.

Madam Administrator, the NNSA's track record with warheads and new facilities to some extent doesn't really inspire confidence. Rather, their history of rising costs and missed schedules suggests that even more money will be required than currently projected. I

was just delighted to meet with you yesterday, at least have a chance to get to know you, and I very much hope that we can work together and talk about this because I've got to ask the question, Where does it end and how much is enough?

Troublemaking by Russia and nuclear provocations by North Korea say to me now is not the time to let down our guard on non-proliferation nuclear security. The nonpro program has been wildly successful in reducing the dangers of nuclear terrorism.

So you've got—I come from California, where people say there's an earthquake fault within 5 miles no matter where you are, and where I grew up, watching troops ship out under the Golden Gate Bridge, saw the submarine nets going down, saw the Nike gun emplacements going up, and really saw from a nonmilitary person who, as a small child, what war meant.

The nonpro program has been successful because it's removed, as I understand it, more than 7,100 kilograms of plutonium and highly enriched uranium from 47 countries and Taiwan. It has secured 2,200 buildings containing high-priority radioactive sources, such as cesium and cobalt that can be used in a dirty bomb. It has removed and secured more than 80,000 disused or unwanted radioactive sources, and converting or shutting down—well, it has converted or shut down 103 reactors that use highly enriched uranium. And it has deployed more than 600 fixed and mobile radiation detectors at border crossings and ports in 59 countries. And still there's more to do.

NNSA is implementing a cost-sharing program to spur the replacement of medical devices that use radioactive sources and those that do not. There are more than 700 blood irradiation devices that use highly radioactive cesium-137 around the country. The University of California system, with which I am familiar, has 44 of these devices. They've already replaced eight and are poised to replace 12 more. And NNSA has replaced almost half of the 32 devices in New York City, where there is high interest in this program. I see the program as a good example of a small increase of funding having a major impact on nuclear risk.

So I look at this hearing, that we have a great opportunity to reduce the danger of nuclear terrorism right here at home. And how we do this, by maintaining our nuclear prowess, particularly for the Navy—I'm a big Navy person, and going way back, and so it's sort of interesting because you kind of get a beachhead in a specific service. And for me, it's been the Navy in San Francisco.

So, yes, I am very cautious when I say about nuclear warheads, and the pros and cons of them are often brought home to me. So I look forward, Admiral, to your comments in that regard.

And, Madam Administrator, I welcome your testimony, and I very much appreciate your visit yesterday.

Thank you so much.

Senator ALEXANDER. Thank you, Senator Feinstein.

We are delighted to have with us the distinguished Senator from North Dakota.

Would you like to make an opening comment, Senator Hoeven?

Senator HOEVEN. No. Thank you, Mr. Chairman. I'll wait for questions. Thank you.

Senator ALEXANDER. We'll begin questions. Let me start with Administrator Gordon-Hagerty. Let's talk about the uranium facility. I'll just ask you two questions here at once and let you talk about them. One is, as you know, we worked for several years to get a rapidly escalating project on time and on budget, and I just want—this would be a good day for you to reassure us once again that it is, or if it's not, we need to know that, too.

Second, some of the same things we learned in dealing with uranium we applied—for example, we had a red team for both in the Department for the uranium facility and the MOX project, and we applied some of those lessons to the MOX project, and now I believe the Department has that one under—has a plan, that you're moving forward with a plan. We'd like to know how you're doing on that.

And then the third thing is, What have you learned from those two experiences about big construction projects at NNSA? You the red team recommended that you basically set up an office to manage these special projects. I think you did that. What's your experience been?

So those are my questions.

Ms. GORDON-HAGERTY. Thank you, Chairman Alexander. And as I mentioned in my opening statement, I am proud to say that the Uranium Processing Facility is under construction today, and we are 6 years—6—we have seen 6 consecutive years of being on budget and on schedule. So that's a wonderful testament to our acquisition and project management personnel, that we have kept our finger and used rigor, with which we are—in which we are operating. And so we're very pleased with that. We will, complete project with the sustained funding and the adequate funding necessary to complete that project by the end of 2025 for a cost not more than \$6.5 billion.

We also have over 1,000 craftspeople onsite right now. And as you know, it's been a challenge to be able to get qualified staff and workforce, craft workforce in particular, to stay on the job because there are so many other opportunities for them. But we've got a dedicated workforce there. And we are on budget and on schedule this year.

So with regard to that, let me talk for a moment about lessons learned. As Senator Feinstein has correctly pointed out, the history of the Department of Energy has been with such large acquisition projects in the past, we haven't necessarily been successful in all those programs, but as a result of UPF, we have three other major projects under—ongoing right now. We have got the CMRR (Chemistry and Metallurgy Research Replacement) and the RLUOB (Radiological Laboratory Utility Office Building) at Los Alamos, and those are also on schedule and on budget, and we can say that confidently because of the level of rigor with which we are operating.

And because of the red teams and because of the acquisition and project management team person, the leadership reports directly to me. We follow the projects and the lessons learned from UPF and from other major acquisition projects. And we're applying those same lessons learned to what we're doing in terms of repurposing the MOX facility at Savannah River Site into our plutonium processing facility.

So we are absolutely taking stock of all of the lessons learned out of UPF. We've got massive—major project management and processes in place and controls in place. And, in fact, we are undertaking right now, we're looking for the Federal project manager to assign to that project because we are in conceptual design right now. And as you rightly pointed out, we will not baseline the program until conceptual design is 90-percent complete rather than just starting to dig and then hope for the best. We will have 90-percent complete conceptual design before we undertake baselining.

Senator ALEXANDER. Thank you.

Admiral Caldwell, are you on schedule to meet the Navy's submarine construction needs?

Admiral CALDWELL. Yes, sir; I am. Thanks to the support of this subcommittee in previous years, we are on track to procure the reactor plant heavy components this year. That was as planned. That's because the maturity of our design work is to the point where we can do that. And this year we will place the contract for the reactor core, and I will start construction of that reactor core later on this year. The start of construction for that submarine is next October, fiscal year 2021. And we are on track to support requirements to support that construction timeline that delivers the submarine in 2028 and gets it on its first patrol in 2031.

Senator ALEXANDER. Thank you.

Administrator Gordon-Hagerty, what difference did it make in your ability to manage your agency to have a budget-approved in law before the fiscal year started? I think that would help Senator Feinstein, me, and Senator Hoeven as we talk among other Senators to try to give them specific reasons why we don't want to delay. What difference did it make?

Ms. GORDON-HAGERTY. It made a tremendous outcome because we were able to continue to recapitalize and to ensure that we were undertaking the necessary infrastructure improvements that have been long since passed that should have been taking place. For example, in our major construction projects, more than 30 percent of our facilities in the Department of Energy and NNSA are more than 60 years old. We have a massive infrastructure program ahead of us to modernize and recapitalize our infrastructure and to know that we would have the funding to be able to support that. And also with regard to that, the actual programs and the five modernization programs, we know we can undertake that work and they will remain on schedule and on budget.

So, absolutely, that was an incredibly important move, and we thank the Appropriations Committee for that.

Senator ALEXANDER. Thank you.

Senator Feinstein.

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

I want to go and ask something that's a little different. I have become very concerned about talks between Saudi Arabia and the United States for our companies to sell nuclear reactors there. The killing of Jamal Khashoggi has confirmed some of my very deepest of concerns. I supported a resolution last year that called for any agreement with Saudi to adhere to the strongest possible non-proliferation gold standard. What has been your involvement in negotiating a 123 agreement with Saudi Arabia?

Ms. GORDON-HAGERTY. Senator Feinstein, the 123 agreement is led by—the interagency process to get to a 123 agreement with any nation or any entity is undertaken by the Nuclear Regulatory Commission. They lead that process. It's been a very rigorous and ongoing process. Currently, there are 23, 123 agreements with 48 entities or countries around the world. The United States Government has engaged with the Kingdom of Saudi Arabia since 2012. And so we continue to interact with them about a 123 agreement, but no decisions have been made. And, again, the 123 agreement also has rigorous oversight by the Senate and the House Foreign Relations Committees before a 123 agreement can be put in place.

Senator FEINSTEIN. Thank you.

Ms. GORDON-HAGERTY. You're welcome.

Senator FEINSTEIN. Has the United States' withdrawal from the Iranian nuclear deal affected NNSA's nonproliferation programs?

Ms. GORDON-HAGERTY. Our participation in the JCPOA (Joint Comprehensive Plan of Action), or the previous JCPOA, has been to provide rigorous training efforts to the IAEA inspectors and to provide the technical expertise that's resident in our—in the NNSA. We continue to do so. We provide support to the IAEA (International Atomic Energy Agency) and continue to administer that technical training and provide equipment as necessary for the IAEA. So, no, it hasn't changed.

Senator FEINSTEIN. Last year, I wrote to Secretary Mattis and Perry about my concerns of the Trump administration's plan to retain the, and we talked a little bit about this yesterday, B83 megaton nuclear bomber. It's my view that it's dangerous and unnecessary. I'd like to know, what is the current plan for the B83?

Ms. GORDON-HAGERTY. The NPR stated and the Nuclear Weapons Council has made a decision, or the STRATCOM commander has made a decision, that the B83 will remain in the active nuclear weapons stockpile until a replacement unit has been identified. We continue to maintain it and have found cost effective measures to maintain surveillance and keep it in the active stockpile.

Senator FEINSTEIN. Well, I notice there's a \$13 million increase for the B83 in the budget request. What is that for?

Ms. GORDON-HAGERTY. Okay. May I turn to Dr. Verdon and have him answer the specifics on that?

Senator FEINSTEIN. Yes, of course.

Ms. GORDON-HAGERTY. Thank you.

Dr. VERDON. Since it's being retained a little bit longer, we have upped the surveillance on it again in order to meet the annual assessment requirements associated with the warhead, keeping it in the stockpile longer. So that's to bring back up to a certain level the surveillance that we do on the unit to ensure its safety and reliability.

Senator FEINSTEIN. I was very much a supporter of the plan to use the B61 and retire the B83. I guess there are no plans in this administration for retirement of the B83. Is that correct?

Dr. VERDON. As the Administrator said, it's—until we—until the DoD is satisfied that they found a replacement, they want to keep it in—you know, a comparable replacement, they want to keep it in the active stockpile. They're pursuing, you know, looking at replacements, but right now it will stay in.

Senator FEINSTEIN. Is that based on the size of the B83, or is it based on other considerations?

Dr. VERDON. It's based on their need for targeting what they need for targets that they are provided that they have to hold at risk.

Senator FEINSTEIN. How long can NNSA extend the life of B83-1 without a multibillion-dollar life extension program?

Dr. VERDON. That's—so that's probably—it's going to be, depending on the numbers, it will probably be another—let's see, to be careful, I would say probably about another 5 to 7 years before we have to do anything major to it.

Senator FEINSTEIN. And then what is the estimated cost?

Dr. VERDON. We haven't looked at it in terms of the total number. We would have to come up with what the total number is, so I wouldn't have an estimate of the cost right now, ma'am.

Senator FEINSTEIN. I see my time is up, Mr. Chairman. Thank you very much.

Senator ALEXANDER. Thank you, Senator Feinstein.

Senator Hoeven.

Senator HOEVEN. Thank you, Mr. Chairman.

And I would like to thank all of our witnesses for being here.

Ms. Gordon-Hagerty, we're now several years into the W80-4 program, which will extend the life of the warhead that goes on our current air-launched cruise missile. The Air Force is developing the LRSO (Long Range Stand-Off), so obviously you have to coordinate with their timelines.

So your testimony indicates the first refurbished warhead will be completed in fiscal 2025. I think that's consistent with the schedule you have provided for the past few years. My question is, What would be the impact on the W80-4 schedule if it does not receive full funding this year?

Ms. GORDON-HAGERTY. We are currently on schedule and on budget, and we are aligned fully with the Air Force. However, if we don't receive the funding that is necessary to complete the 80-4 LEP, which will align with the LRSO, with the Long-Range Stand-Off missile of the Air Force, we will not—or the platform—we will not be able to continue being aligned with them. So we do need consistent and reliable funding, and we've laid out a strategy for that, and as has the Air Force.

Senator HOEVEN. All right. So you need to—in order to stay on schedule, you need to receive the funding request.

Ms. GORDON-HAGERTY. Absolutely.

Senator HOEVEN. Shifting to the W87 modification program, which will provide the refurbished warhead on the ICBM (intercontinental ballistic missile), are you confident that you can stay on schedule with the funding that you have requested? And based on the expertise NNSA has developed with previous warhead life extension programs, are there any opportunities to accelerate the schedule?

Ms. GORDON-HAGERTY. Well, first of all, I'd like to say all five modernization programs are on schedule and on budget, and—but with the magnitude and complexity of all of those programs, obviously, any slippage in funding or any slippage in any programs could affect the others.

I'd like to ask Dr. Verdon, he can tell you about the plans for the 87-1 replacement.

Senator HOEVEN. Okay.

Dr. VERDON. Yes, sir. Similar to your comments on the LRSO, that warhead is being developed in close coordination with the United States Air Force in terms of their Ground-Based Strategic Deterrent development. So those are again—those two activities are very carefully orchestrated to where we're supporting each other to be able to deliver what they need on time and vice versa. So it's really a very coordinated activity between the two that has to take place.

Senator HOEVEN. Absolutely. Thank you to you both.

Admiral Caldwell, I was up at Annapolis earlier this week. There was a phenomenal Virginia-class submarine in the harbor; it was the USS North Dakota. Amazing crew. Captain Robinson and the entire crew, I mean, I just wish every single person in our State could meet them. So impressive. These guys are doing an incredible job, which is why the Navy had the submarine at Annapolis, so that the cadets could, you know, get a look at it. And obviously you bring your top performer up for a look, not your average performer. So we were very pleased. And obviously I'm bragging on them, but they absolutely deserve it.

Talk to me about the Naval Reactors program. You know, your submarine fleet is just beyond belief, the capability, just untouchable. A great example of where we truly are ahead of everybody else with the technology, which is where we need to be with all of our weapons systems. But talk about the resources, the capacity, and whether you have what you need to continue that incredibly important technological advantage.

Admiral CALDWELL. Well, sir, thank you first off for the compliments about the North Dakota crew. I agree with you, a fine crew. I got to attend the submarine birthday ball with the commanding officer and the team with the Naval Academy midshipmen last weekend, and it was a tremendous event, and we're glad to have the chance to get out there.

Our submarine force is an excellent force. We have the—over many decades have created these phenomenal submarines, and they're manned by just tremendous people. My role in that is to provide the safe, reliable, effective nuclear propulsion that enables everything that our nuclear submarines do. To do that, I have a budget request before—that's submitted through DOE every year that supports my four Navy nuclear labs, DOE facilities, that are really the technical backbone to everything that we do. And my budget request this year supports three major projects that allow us to continue supporting the submarine force; that is, the development of the Columbia-class propulsion plant, the refueling of a reactor up in New York, as well as the—the recapitalization of a spent fuel handling facility in Idaho.

The budget also supports recapitalization of very important laboratory facilities that allows me to have the scientists, the technologists, and the engineers that are the engine that drives all of our technical excellence, that solves current problems today, and builds the fleet for the future. And so what—the enabler there is

the support of this subcommittee that allows me to deliver what I need to for the nuclear Navy.

Senator HOEVEN. They're absolutely modern marvels, just amazing. And so again thanks to all of you for being here and for your important work.

Thank you, Mr. Chairman.

Senator ALEXANDER. Thank you, Senator. Were all the crewmembers from North Dakota, too?

[Laughter.]

Senator HOEVEN. Some of the really outstanding crewmembers. But I tell you, regardless of where they're from, they are just—they are great Americans.

Senator ALEXANDER. Good.

Senator Udall.

Senator UDALL. Thank you, Mr. Chairman.

And thank you to all the witnesses for being here today with us.

Infrastructure investment is incredibly important for continuing the nuclear security work at our labs. Sandia National Laboratory, in the long term, is in need of investments for new spaces to accommodate new hires and to meet the requirements for microelectronics and pulsed power, especially if we hope to keep up with the Chinese investments and avoid a technological surprise. Is NNSA planning to increase its investments at Sandia, particularly with regard to pulsed power? And how can my office help with these efforts?

Ms. GORDON-HAGERTY. Senator Udall, so first, as we've spoken about before, the SiFab facility in Mesa are an integral component to producing trusted microsystems for our nuclear weapons stockpile. And with regard to that, we think that the life of that program, as we make—continue to make investments in that to modernize that is through about 2040. However, that's yet another example of our infrastructure requirements. We are now taking stock of that facility and what we will do to modernize it even in the future. We are working with our colleagues in DoD and IC (Intelligence Community) to see what investments they need, too. So we are sharing ideas with them because they also need future trusted microelectronics.

With regard to pulsed power and some other programs, we are working closing with the Sandia National Laboratory leadership to talk about what investments we need in the future for our science-based stockpile programs, and that is a critical component to that.

I'd like to ask Dr. Verdon, if possible, to—if he has any other insights into pulsed power and other specific issues at Sandia.

Senator UDALL. Sure.

Dr. VERDON. So yes. The existing Z platform is an extremely important experimental platform. The platform and the program are actually increasing funding, proposing to increase funding, to that this year to support some important experiments that we'd like to conduct. And with regards to the future, as was mentioned, we are working closely with Sandia, but also the intelligence community to do a broader assessment of where the entire world is going with pulsed power and what our response should be to that.

Senator UDALL. Great. Thank you. Artificial intelligence and machine learning capabilities are growing at an increasing rate in

both the public sector and the private sector. To my knowledge, both Sandia and Los Alamos are adopting uses for this new technology, as are Oak Ridge, Lawrence Livermore, and others. For NNSA applying machine learning to the immense amount of data acquired for the Stockpile Stewardship Program could greatly improve the efficiency and accuracy of work done at the labs and could result in private sector spinoffs as well. Would NNSA benefit from a long-term plan outlining its efforts and budget for implementing and developing AI (Artificial Intelligence) and machine learning?

Ms. GORDON-HAGERTY. Senator Udall, Secretary Perry has undertaken this—this specific issue with great gusto, and so he is looking across the entire DOE focused with leadership in the Office of Science in AI and machine learning. And, yes, we are absolutely part and parcel of that discussion and actually are providing some resources to the larger endeavors to basically make use of being more efficient. And, yes, we could absolutely support and be—and machine learning and artificial intelligence could help us inform our stockpile.

Senator UDALL. Thank you for that answer.

The New Mexico congressional delegation is still waiting for a report on the plutonium mission mandated by law last year.

Ms. GORDON-HAGERTY. Yes.

Senator UDALL. Can we expect this report to be finished soon?

Ms. GORDON-HAGERTY. Yes.

Senator UDALL. Yes. And as I mentioned to Secretary Perry, you've offered a strong budget for the National Nuclear Security Administration and the labs, and New Mexico very much appreciates that. However, I continue to be concerned with NNSA's insistence that it move forward with a plan to send more nuclear waste to WIPP (Waste Isolation Pilot Plant) than the State had originally agreed to accept and split the plutonium missions between Los Alamos and South Carolina.

More waste, higher costs, and fewer jobs does not sound like a good deal. The NNSA proposal to split the plutonium missions would close to double the life-cycle costs. NNSA's own engineering report confirms this. The State of New Mexico and our new Governor, who I believe you've talked with, Madam Secretary, will have to review DOE's permit to operate WIPP, which is up in 2020.

If DOE expects New Mexico to cooperate about WIPP when no other State in this country is doing its part on nuclear waste, then DOE must treat New Mexico fairly. We need strong cleanup funding to finish the job at Los Alamos; we need improved support for technology, commercialization to diversify our economy; and we need to keep the labs' missions stable and strong and not subject to political moves. I hope DOE and NNSA will rethink their plan.

And I'm out of time here, but I had just one more question if that's all right. I know Lindsey is waiting here, so I'll keep it to be a short one here.

Last week Secretary Perry committed—it's related to just what I said—last week Secretary Perry committed to ensuring that Los Alamos remain the plutonium center of excellence right sitting in the chair where you are, and that future budgets support the labs'

efforts to meet the first requirement of 30 pits per year. Do you also support this commitment?

Ms. GORDON-HAGERTY. Absolutely.

Senator UDALL. Yes. Thank you.

Thank you, Mr. Chairman, very much.

Senator ALEXANDER. Thank you, Senator Udall.

Senator Graham, welcome.

Senator GRAHAM. Thank you. So what about the next 50? Where are they going to be built?

Ms. GORDON-HAGERTY. The next 50, under our plan, will be built at the Savannah River Plutonium Processing Facility.

Senator GRAHAM. Are you okay with that, Senator Udall?

Senator UDALL. Well, I just put it out there. Senator Graham, I put in a very specific statement that I thought——

Senator GRAHAM. Yes. I mean, you say it doubles the cost.

Senator UDALL. We have two things going on here.

Senator GRAHAM. Yes. I think we've got a bunch of things going on.

Senator UDALL. And the cost issue is one that you and I agree on very much——

Senator GRAHAM. Yes, I know. I know exactly where you're coming from.

Senator UDALL [continuing]. Of doubling close to the cost.

Senator GRAHAM. Let's get back to MOX. In 2002, we passed a law that says if you don't have—if MOX production has not been achieved as of January 2016, it owes South Carolina \$1 million a day, up to \$100 million a year. We really don't want the money, but this thing has been going a long—a long time. Now you've got till 2020 to get 1 ton out. Do you think you'll get it out by 2020?

Ms. GORDON-HAGERTY. Yes, I'm confident that we are, and we are undertaking that. And has been noted in the paper——

Senator GRAHAM. How much of that—of that 1 ton, how much is dilute and dispose?

Ms. GORDON-HAGERTY. Of that? None. This is not defense waste, defense——

Senator GRAHAM. Okay. So the rest of it, where is it going to go?

Ms. GORDON-HAGERTY. For the—we are going—we're undertaking the surplus plutonium project, the dilute and dispose strategy that is known and proven technology, which we've already——

Senator GRAHAM. So where is it going to go?

Ms. GORDON-HAGERTY. It's going to go to WIPP.

Senator GRAHAM. Are you okay with that?

Senator UDALL. I—in my statement, I——

Senator GRAHAM. Well, I missed that statement, but——

Senator UDALL. No, no, no, no, but—well, if you want me to answer your question, I don't know if——

Senator GRAHAM [continuing]. I don't mean to get you involved with this —

Senator UDALL. Chairman, if it's all right, but—but, Senator Graham, the point on WIPP is we accepted this where no other State——

Senator GRAHAM. I'm with you, pal. I'm not——

Senator UDALL [continuing]. In terms of nuclear waste—no other State is doing anything. And we said for the mission—this is a

whole new mission—that she’s describing and that Secretary Perry has described and we just want——

Senator GRAHAM. Is your Governor on board, or do you know?

Senator UDALL. Well, I’ve just said the Governor is reviewing this. It has to be reviewed in 2020. And as far as I know the—now, she’s spoken with the Governor, too. The Governor is very skeptical at this point from my sense of talking to her.

Senator GRAHAM. So let me——

Senator UDALL. Now, she doesn’t——

Senator GRAHAM. Let me put myself in your shoes. We were willing to do something nobody else wanted to do called the MOX program. They were looking around, “Who will take all this weapons-grade plutonium?” Not a lot of people raised their hand, but we did, thought it was, you know, turning a sword into a plowshare, and about 15 or 20 years later, the thing is like 70-percent built, and now we’re going to shut it down and come up with a new idea that has not been well thought through.

So to my good friend from New Mexico, I’m sorry you’re leaving.

Senator UDALL. Well——

Senator GRAHAM. You’re a great Senator, and I need to talk to the people in Mexico because I want to tell the people—New Mexico—the people of South Carolina, you’ve promised to get this stuff out, and I’m going to hold you to it. I have no confidence you’ve got a plan. I think you’re making this up as you go. I have no confidence we’re going to have two pit production facilities unless somebody can figure this out better than we have today. So the one thing I am focused on is to make sure that now that the MOX program has been canceled, this stuff leaves my State.

And this little exchange we had proves to me beyond a shadow of a doubt you’re making this up as you go. And we shut down one project to start a new one, and apparently we’ve learned nothing. We’re starting a whole new idea without the real stakeholders being bought in. We’re putting a bunch of money out for dilute and dispose, not so sure where we’re going to dispose it. You might dilute it, but you’ve got to dispose it, and it’s not going to be in South Carolina.

So, Mr. Chairman, I look forward to working with New Mexico and this committee to give certainty to the people of South Carolina and New Mexico and the country as a whole that we know what the hell we’re doing because I don’t think we do.

Senator UDALL. Senator Graham, if I could just have one more exchange with you. The last time we accepted the mission, we had a group of 13 scientists that were working in New Mexico on the project specifically. We don’t have that capability now. And if they want us to take a whole new mission like that, we need to have that kind of capability to review what this whole dilute and dispose means and what it means for the characterization and what’s happening——

Senator GRAHAM. Just reclaiming my time, we should think about all this stuff before we stop one program.

Senator UDALL. I agree.

Senator ALEXANDER. Right.

Administrator Gordon-Hagerty, Senator Graham’s question is, Can you get the stuff—do you want to answer the question? Can

you get it out of South Carolina? And how are you going to do it? That's what he's asking.

Ms. GORDON-HAGERTY. Our plan is to get the material out of South Carolina, Senator Graham.

Senator GRAHAM. Yes. And I'm just telling you, it ain't well thought out because nobody in New Mexico seems to be signing up, and that's where it's headed, and I don't blame them for being skeptical. You've got a lot of talking to do with New Mexico. We want to help you if we can. But this is not much of a plan so far. I hope it works out.

Senator ALEXANDER. Do you have any more specific information about how and when the material from South Carolina will be taken wherever it's going?

Ms. GORDON-HAGERTY. Yes. It's—

Senator ALEXANDER. Well, why don't you say what that is.

Ms. GORDON-HAGERTY. Yes. We're using the surplus—surplus Plutonium Disposition Plan, it's called Dilute and Dispose, it's a known technology. We've already diluted and disposed more than 5 metric tons of material, the same defense waste. It will eventually go to WIPP. And, regardless, that's—that's the planned path forward.

I caution everyone, though, that, as we've discussed, WIPP is important because it's where we put defense nuclear waste, transuranic waste, and we generate transuranic waste at Los Alamos. In fact, it's the largest generator in the NNSA complex. So even setting aside the Dilute and Dispose program, we need to make sure that we've got the adequate capacity at WIPP so that we can continue our 30 pits per year and our plutonium center of excellence at Los Alamos because we've got waste being generated there as well as Lawrence Livermore National Laboratory and the waste that we have currently at Idaho—

Senator ALEXANDER. So you're saying you don't have room for South Carolina's waste?

Ms. GORDON-HAGERTY. We absolutely have room for South Carolina's waste at WIPP.

Senator ALEXANDER. Well, how soon can you start taking it out?

Ms. GORDON-HAGERTY. We're undertaking the plans right now. We're in conceptual design for the additional glove boxes to—conduct this, and we'll start in—in the 2020s.

Senator ALEXANDER. Well, the argument that was made to us last year was that if we adopted Dilute and Dispose, which I supported, that it would get the material out of South Carolina faster than if we didn't.

Ms. GORDON-HAGERTY. Absolutely.

Senator ALEXANDER. Is that true?

Ms. GORDON-HAGERTY. That is true. And the mixed oxide fuel fabrication process was that that facility was not going to be completed by—until 2048. This program will be less than 50 percent of the cost, and it will do it in a far faster and quicker and more safe way.

Senator GRAHAM. Mr. Chairman, if I could, I'm sorry.

Senator ALEXANDER. Sure.

Senator GRAHAM. Go ahead. So here's the deal. We've been studying this thing since the late '90s. We picked MOX over every-

thing else, including dilute and dispose and shooting it in space and putting it in the bottom of the ocean and every idea you could think of, of how to get 34 metric tons of weapons-grade plutonium out of the inventory so it could never be used again. Three administrations looked at it and picked MOX. We're about 70 percent through. Now they say it takes—I've never bought into all the analysis, but we are where we are. The program has been basically terminated, and now we're going to come up with a new alternative that has been poorly thought through, if at all.

It seems to me that you wouldn't stop one program until you knew you had a pathway forward. If I've learned nothing from this hearing, it's you've got a new Governor in New Mexico, you've got a Senator who says we're not so sure about this, and you're talking about two pit facilities, and I'll believe that when I see it. We've been talking about building a pit facility since 2004, and now all of a sudden we're going to build two.

So the bottom line is this is problematic and it's not a way to run a railroad, and I'm going to be all over this. I'm going to make sure it gets out of my State. I hope the people in New Mexico will take it. That will be up to you all. But if you don't take it, I don't know what we're going to do with it.

Senator ALEXANDER. Madam Administrator, several years ago when Senator Feinstein and I were working on projects that were not on time and on budget, we found it useful to meet on a regular basis with the administrators and see if they were on time and on budget. I think it is clear that I think a good idea would be for you, if you're not doing it, to meet with Senator Graham and this subcommittee on a regular basis and give us a report on, your plan for getting the material out of South Carolina, when you plan to do it, how much it's going to cost, and are you on time and on budget and pursuing it? And from Senator——

Ms. GORDON-HAGERTY. Will do.

Senator ALEXANDER [continuing]. Udall's point of view, I think he wants to make sure, as Senator Graham does, that the two-location plutonium program is on time and on budget. And I think it's a part of our responsibility to make sure that both are on time and on budget. If they're not, we need to know why.

Ms. GORDON-HAGERTY. I welcome that opportunity. Thank you.

Senator ALEXANDER. Senator Feinstein.

Senator FEINSTEIN. Chairman——

Senator ALEXANDER. Senator Graham, did you have——

Senator GRAHAM. No, I just think that's a great idea. I would just ask that we include Senator Udall in the conversation about dilute and dispose.

Senator UDALL. I'm happy to be in the conversation.

Senator GRAHAM. Because if you're going to be the dispose part, you need to be in the conversation.

Senator UDALL. I will be glad.

Senator ALEXANDER. Senator Feinstein.

Senator FEINSTEIN. Are you saying you don't want the pit plan that's there in your State?

Senator GRAHAM. Ma'am, I'm saying that we've been talking about building pit facilities for a long time. Now the plan is to build 30 in New Mexico and 50 in South Carolina. It's not that I'm

against, I'm a pretty hawkish guy, I just am very skeptical of what's going on because Senator Udall claims that to do it this way is twice what it would cost if you did it in one place. People who are experts say you need redundancy. That makes some sense. I don't know who is going to be President in 2020, but they are likely to revisit this. If it's not President Trump, I know they will. If it is, I don't know what he'll do.

I'm just saying about before I get into the pit deal, I want to know what happens to this waste. Before you tell me you're going to do something with the MOX facility that's 70 percent complete, convert it into something new, tell me what you're going to do with the material I've got. And I am more skeptical today than I was before I came here that there's a pathway out. With MOX, there was pathway out. Now I don't know if there is. If New Mexico doesn't come along and agree to this, I don't know what happens.

Senator ALEXANDER. I think what we've concluded, if Senator Graham and Senator Udall would like, is within—within, say, the next few months, a plan on how to get the material out of South Carolina, when it's going to go, where it's going to go, how much it's going to cost, and then come to us with a proposal—

Senator FEINSTEIN. That would be helpful.

Senator ALEXANDER. And then we'll review it every 6 months or so and see if it's on time and on budget.

Senator Feinstein.

Senator FEINSTEIN. Well—

Senator GRAHAM. It sounds like a plan.

Senator FEINSTEIN [continuing]. This, for me, is a big surprise because my understanding is that you were for the facility.

Senator GRAHAM. Here's—yes, ma'am.

Senator ALEXANDER. He's just skeptical.

Senator GRAHAM. I am—

Senator ALEXANDER. He's not going to believe anything—

Senator GRAHAM [continuing]. Okay with pit production being done at AE. I'm okay with South Carolina being in the mix. What I'm not okay with is bypassing the issue that I've been talking about, the weapons-grade plutonium in my State. I want it out. I don't want to buy another pig in the poke, and I want to make sure that we're making a good decision about two pit production facilities. I'd love to have the business.

But, Senator Udall, I'd like to talk to you about, how does this make sense? I mean, two facilities? I think it makes sense. Maybe it doesn't. I don't know. I just want to know, can you take this material?

If our friends in New Mexico do not—does not take— if they do not take the material, Senator Feinstein, there's no path out. That's what I'm worried about. I don't want to mix the two conversations.

Senator UDALL. Senator Feinstein, the issue for the WIPP facility, the way—the way I see it, is the WIPP facility was designed for transuranic waste, and much of that waste is intermediate and lower. Okay? And it's things like gloves and production of being around plutonium and all of that. That's what it was designed for. And there was a certain cubic feet level, and this is where that's what it was for.

Now, as Senator Graham is saying very accurately, we're talking about weapons-grade plutonium, which has come in—a lot of it from Russia is my understanding. We don't have the capability now to evaluate like we did at the early part of the WIPP process as to what is this waste, what is dilute and dispose——

Senator FEINSTEIN. Right.

Senator UDALL [continuing]. How it's going to work. And the Governor for the State of New Mexico has a say in terms of accepting this under the Environment Department in New Mexico.

So all of the issues and skepticisms Senator Graham has raised I have the same skepticism here at this point.

Senator GRAHAM. So I would say, in fairness, the dilute part of it's going to make it at a level that's not weapons-grade plutonium. I get that. But you—they say that the space is—the other Governor said, "We'll make room for it," but you've got a new Governor, and if she wants to reconfigure the regulation, then we're stymied.

All I'm saying is that we stop one program, and we really haven't thought through, Does the other program work? It only is half the cost if it works. If it doesn't work, then I'm stuck with the stuff. I don't mind doing pits, love to do pits, but I don't want to talk about pits until we can figure out, do we have a viable plan to get it out of South Carolina?

Senator FEINSTEIN. Could I ask a question?

Senator ALEXANDER. Well, yes, but before I say, one, they've called two roll call votes.

Senator GRAHAM. Oh, okay.

Senator ALEXANDER. So we'll have those in a moment. And, second, the subcommittee would like to help make sure that the material comes out of South Carolina on schedule and that the plutonium production moves ahead as planned. So we look forward to a discussion with you, an update, of which both Senator Graham and Senator Udall are perfectly welcome to come, and Senator Feinstein will be interested as well.

Senator Feinstein.

Senator FEINSTEIN. I remember when we had those meetings in Senator Alexander's office on the studies that have been done on that facility. My understanding was that you were for them and now—it was always going to be weapons-grade. I never thought it was anything below that.

Senator GRAHAM. Senator Feinstein, what I was advocating for was making the MOX program more cost efficient, keeping the program in place, not withdrawing from the treaty with Russia, which we have. It's the biggest nonproliferation agreement in the history of mankind that's just been completely voided. Now we don't have a certain pathway out of South Carolina. Our friends in New Mexico have questions that are legitimate that need to be answered.

But I think Senator Alexander has proposed a great solution, which is for us to continue to talk, make sure that we do have a viable plan to get it out of South Carolina and take it off the market if possible, and then we'll, you know, see if the pit thing makes sense and is working.

I can't ask anything more than that, Senator Alexander, just to stay on top of it.

Senator ALEXANDER. Well, we'll do that if Senator Feinstein will join me in staying on top of both these projects.

Senator FEINSTEIN. Well, I may fall off, but I'll try to stay on top of it.

[Laughter.]

Senator ALEXANDER. Now, do you have other questions, Senator Feinstein? We've interrupted you.

Thank you, Senator Graham and Senator Udall. And we commit to pay attention to both projects.

Senator Feinstein, we'll let you wrap the hearing up so we can go vote.

Senator FEINSTEIN. I don't—the MOX facility has been so difficult. And sometimes I listen to people, and I think I know what they're saying, and then I find out I don't. But let me just thank everybody for being here. It's clear that we need to all be clear that we're on the same page, Madam Administrator—

Ms. GORDON-HAGERTY. Yes.

Senator FEINSTEIN [continuing]. With respect to MOX, and that it doesn't change every 6 or 8 months because we have to make a commitment one way or another. I mean, as I understand it, the construction is underway and moving along.

Senator ALEXANDER. On dilute and dispose.

Senator FEINSTEIN. On dilute and dispose.

Ms. GORDON-HAGERTY. So I look forward to that and I look forward to your offer, and I welcome that opportunity. Thank you.

Senator FEINSTEIN. Thank you.

Senator ALEXANDER. We would appreciate it. Will you signal to us when you're ready—

Ms. GORDON-HAGERTY. Yes.

Senator ALEXANDER [continuing]. Within the next few months—

Ms. GORDON-HAGERTY. Absolutely.

Senator ALEXANDER [continuing]. To meet with Senator Feinstein and me and the two Senators who are here to discuss each of those. What's the plan for getting the material out of South Carolina? And what's the plan, in specifics, for the plutonium? You did address some of that earlier, but I think to be as specific as possible will be interesting to them and to us.

Ms. GORDON-HAGERTY. Absolutely. Thank you for that opportunity.

Senator ALEXANDER. I don't have any other questions unless you do, Senator Feinstein.

Senator FEINSTEIN. I do not. Thank you, Mr. Chairman.

Thank you, everybody.

Senator ALEXANDER. This has been a very useful, free-wheeling discussion here for the hearing. The record will remain open for 10 days. Senators may submit additional information or questions for the record within that time if they would like. The subcommittee requests all responses to questions be provided within 30 days of receipt.

SUBCOMMITTEE RECESS

Thank you for being here. The committee will stand adjourned.  
[Whereupon, at 4:51 p.m., Wednesday, April 3, the subcommittee  
was recessed, to reconvene subject to the call of the Chair.]