Testimony Statement of
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U.S. Department of Energy
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Chairman Inhofe, Ranking Member Reed, and Members of the Committee, thank you for the opportunity to personally appear before you, with my colleagues Under Secretary Lord and Admiral Richard, to discuss the budget request for the Department of Energy's (DOE) National Nuclear Security Administration (NNSA). NNSA greatly appreciates the Committee's bipartisan support for our nuclear security missions and the people who execute our missions every day, the dedicated men and women who make up our 50,000-strong NNSA workforce.

The Department's top priority is to support the President's agenda and direction for defending the Nation. NNSA's diverse and enduring missions are vital to the national security of the United States: maintaining a safe, secure, and effective nuclear weapons stockpile, reducing global nuclear threats, and providing the U.S. Navy's submarines and aircraft carriers with militarily effective nuclear propulsion. NNSA is the only organization that can accomplish these unique missions on behalf of the American people. The COVID-19 pandemic has presented a series of truly unprecedented challenges for the nuclear security enterprise and its workforce. Despite these challenges, NNSA has not missed any major deliverables or milestones.

The U.S. nuclear deterrent is the foundation of our national defense, 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 of today's evolving and uncertain international security environment. China and Russia are advancing their nuclear capabilities, which challenge our advantages directly. The United States must be responsive to the increasing desire for state and non-state actors to reshape the world in their favor, doing so at the expense of our Nation, allies, and partners, and at times in contravention of international norms and rules.

The NNSA and Department of Defense (DoD) are inextricably linked. To execute the Nation's nuclear weapons programs, NNSA, in partnership with DoD through the Nuclear Weapons Council (NWC), conducts activities in a joint nuclear weapons acquisition process, also known as the Joint Nuclear Weapon Lifecycle process. Using this process, the DoD and NNSA partnership manages weapons modernization needs from concept assessment to full scale production, and finally to retirement. With four warhead modernization activities underway, NNSA is executing an unprecedented variety of complicated component development and production projects through this process and continues to make progress across all four programs. NNSA and DoD remain in complete schedule alignment. However, sustained funding and support are critical to remain in alignment while meeting milestone and delivery targets.

Recognizing the benefits of a collaborative approach to strengthen our national defense, NNSA supports joint budget planning with DoD. In May 2020, the NWC adopted the Planning Guidance and Budget Certification Process, which will ensure the planning of the annual budget is formally coordinated between the NNSA and DoD.

While the U.S. nuclear weapons stockpile and its supporting infrastructure are currently safe, secure, effective, and reliable, they are aging. Competing interests over the past thirty years postponed weapon and infrastructure modernization programs, which directly contributed to erosion of our critical capabilities, infrastructure, and capacity to ensure the deterrent's viability into the future.

The need to now modernize our nuclear weapons stockpile and recapitalize the supporting infrastructure needed to produce and maintain that stockpile has reached a tipping point. Sixty percent of NNSA's facilities are more than 40 years old and nearly forty percent are in poor condition. Assessments of facilities throughout the enterprise have identified numerous single-point failures. If not appropriately addressed, the age and condition of NNSA's infrastructure will put NNSA's deterrence mission, and the safety of its workforce, the public, and the environment, at risk.

With support from the Administration and Congress, NNSA is undertaking a risk-informed, complex, and time-constrained modernization and recapitalization effort. NNSA relies on its own industrial base within our nuclear security enterprise (NSE). NNSA manages eight government-owned, contractor-operated facilities throughout the country. This includes national security laboratories, production plants, and sites that perform the research, development, production, and dismantlement necessary to maintain and certify a safe, secure, reliable, and effective nuclear stockpile.

NNSA's Recent Accomplishments

NNSA has made tremendous progress across the NSE with several notable accomplishments. The President's FY 2021 budget request of $19.8 billion demonstrates the Administration's strong commitment to ensuring the Nation has a safe, secure and effective nuclear deterrent; reducing the threat posed by nuclear proliferation and terrorism; and safely and effectively powering the Nuclear Navy. Reductions from the FY 2021 budget request such as those proposed in the House of Representatives will threaten NNSA's progress on its nuclear modernization and infrastructure programs as many of them are reaching critical stages.

Plutonium Pit Production: Los Alamos National Laboratory (LANL) completed fabrication of five developmental plutonium pits, a key component of nuclear weapons, in support of NNSA's strategic effort to revitalize U.S. pit production capability.

NNSA's Life Extension Programs (LEPs), Modifications, and Alteration: NNSA completed the final weapon refurbishment for the W76-1 LEP, extending the warhead's service life an additional 30+ years. NNSA also delivered W76-2 warheads to the U.S. Navy. A modification of the W76-1, the W76-2 provides a low-yield, submarine-launched ballistic missile warhead capability as directed in the 2018 Nuclear Posture Review (NPR).

Infrastructure Investments: Construction of the Uranium Processing Facility (UPF) continued unabated. Despite COVID-19 challenges, NNSA remains on track to complete on budget. UPF has been on budget and schedule for seven years due to Congress's continued support of the budget request; however, funding below the FY 2021 budget request could jeopardize the track record if additional construction risks are realized. Additionally, the Albuquerque Complex was "topped out" – meaning the highest and last piece of structural steel was placed. This state-of the-art facility is anticipated for delivery in 2021, providing modern and efficient workspace for approximately 1,200 employees. Of significant note, NNSA completed four other line-item capital construction projects valued at $170 million under budget and ahead of schedule.

Highly Enriched Uranium (HEU) Minimization: NNSA completed two of its largest ever, multiyear removal campaigns to the U.S. by transporting approximately 700 kilograms of excess HEU from the United Kingdom for downblending and over 200 kilograms of HEU spent nuclear fuel from Canada. Additionally, U.S. industry producers were awarded $60 million in FY 2019 to support the establishment of domestic supplies of the critical medical isotope molybdenum-99 produced without the use of HEU in support of NNSA's goal to minimize the use of HEU in civilian applications. NNSA also completed the Repurposed Enriched Uranium campaign to downblend over 12 metric tons of HEU, resulting in a cumulative total of over 163 metric tons of HEU downblended to low enriched uranium.

Space-Based Nuclear Detonation Detection: In support of DoD and Department of State mission requirements, NNSA completed deliveries, in accordance with U.S. Air Force schedules, of two nuclear detonation detection sensor suites for space vehicle integration in preparation for future launches. NNSA also provided technical support and early on-orbit testing of two other sensor suites on Global Positioning System III navigation satellites.

Nuclear Incident Response: NNSA provided nuclear incident response capabilities in support of numerous major public events such as the Super Bowl, Boston Marathon, Macy's Thanksgiving Day Parade, and the Pan-American Games in Peru. Last year, NNSA's Nuclear Emergency Support Team (NEST) took delivery of three new fixed-wing Aerial Measuring System aircraft, improving the program's reliability and range in providing rapid, wide-area assessments of radiological or nuclear events anywhere in the United States.

Naval Nuclear Propulsion: Contracts were placed by Naval Reactors for reactor plant heavy equipment, including the lead ship reactor core, for the COLUMBIA-Class ballistic missile submarine. This milestone helps ensure the Navy remains on track to construct, test, deliver, and deploy the vessels on schedule.

Supercomputing: NNSA signed a $600 million contract for its first Exascale supercomputer, El Capitan, slated to be delivered in 2022 and operating in 2023 at Lawrence Livermore National Laboratory (LLNL) to support NNSA's nuclear weapons programs. As a world leader in supercomputing, NNSA's acquisition of El Capitan is a critical addition to its next generation supercomputing systems.

Educational Partnerships: NNSA funded over $100 million in grants and cooperative agreements with top universities across the country, through programs such as the Stewardship Science Academic Alliances Program and the Minority Serving Institution Partnership Program

to recruit the next generation of scientists and engineers for our NSE and to conduct cutting-edge science in national security and nonproliferation.

COVID-19

This year, the COVID-19 crisis presented a series of truly unprecedented challenges for the nuclear security enterprise and our workforce. The health and safety of our employees is the Department's main focus. Due to our critical national security missions, NNSA could not and cannot temporarily cease operations and wait until the crisis is over.

NNSA adopted a policy of maximum telework and social distancing to safeguard the health and welfare of our workforce, while also identifying a number of mission-critical activities that could not be performed remotely and needed to continue on site. NNSA worked with its sites to set priorities and relied on them to make decisions based on the local situation and regulations to protect the workforce.

The crisis created significant disruptions, but the workforce adapted and remained productive. Thanks to the steadfast commitment and perseverance of the nuclear security enterprise, NNSA has not missed any deliverables to the DoD during the COVID-19 crisis. Despite the impact of the pandemic on international travel, NNSA has maintained strong relationships with foreign partners through the implementation of virtual engagements for technical exchanges, training, and coordination to further enhance international nuclear security and nonproliferation efforts.

At the outset of the pandemic, NNSA directed the management and operating (M&O) teams to continue production of the essential components and assemblies required to maintain critical missions. NNSA worked with the M&O leadership team across the nuclear security enterprise to quantify the costs of operating in the COVID-19 environment. These costs include:

- Extra shifts to afford social distancing where possible
- Associated additional guard force shifts to provide security
- Associated additional bus/shuttle transportation to work sites
- Associated time-costs for donning/doffing Personal Protective equipment (PPE)
- Additional costs for PPE
- Additional costs for Weather and Safety leave, etc.

Carryover

NNSA ended FY 2019 with $8 billion in carryover balances, of which $384 million were unobligated. As part of prudent management practices operating the nuclear security enterprise, some carryover is a reasonable expectation while executing our nuclear modernization programs, and complying with multi-year international nonproliferation commitments.

Carryover balances reflect the complexity of executing multi-billion dollar projects, many of which require schedules of five years or more. Carryover balances can accrue in earlier years as procurement and contract management decisions are executed. Throughout execution of these multi-billion dollar projects, carryover balances provide contingency and responsiveness needed

to keep projects on schedule. For example, NNSA's recovery plans for the B61-12 LEP and W88 Alt 370 are being executed without slowing down these programs and without requesting additional significant appropriated funds ($100 million or more) by using management reserve and contingency carryover funding.

As another example, during FY 2019, NNSA used carryover balances to pay incentives to bring on craft laborers to support construction of UPF to help maintain project schedules.

NNSA's uncosted balances in some Defense Nuclear Nonproliferation (DNN) programs are expected, given implementation of multi-year international and domestic agreements. It takes several years to execute international work. Most agreements also require obligating dollars many years in advance to ensure work is completed. DNN closely examines all balances to ensure funding is being responsibly set-aside. As a result of this closer scrutiny, since FY 2014, overall DNN carryover balances have declined by 10 percent.

NNSA's FY 2021 Budget Request

The President's FY 2021 budget request for NNSA is $19.8 billion. This is an increase of $3.1 billion, or 18.4 percent, over the FY 2020 enacted level. 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. We are mindful of the sustained financial commitment and gratefully recognize the ongoing support of the American people and Congress for this important mission.

Weapons Activities Appropriation

The FY 2021 budget request for the *Weapons Activities* account is $15.6 billion, an increase of $3.14 billion, or 25.2 percent, over FY 2020 enacted levels. This budget request supports the Administration's goals to modernize the Nation's nuclear weapons stockpile and infrastructure to meet DoD deterrent requirements.

The FY 2021 request is presented in a new proposed structure that consolidates various funding sources, aligns current and future workload, and improves transparency for interaction with Congress regarding program execution and funding requests. The major programs include Stockpile Management; Production Modernization; Stockpile Research, Technology, and Engineering; Infrastructure and Operations; Secure Transportation Asset; Defense Nuclear Security; and Information Technology and Cybersecurity. Funding comparisons between FY 2020 and FY 2021 are done on a "comparable" basis as if the new structure was in place in FY 2020.

These programs support the Nation's current and future defense posture and the associated nationwide infrastructure of science, technology, engineering, cybersecurity, and production capabilities. This account provides for the maintenance and refurbishment of nuclear weapons to continue sustained confidence in their safety, security, reliability, and performance; continued investment in scientific, engineering, and manufacturing capabilities to enable certification of the enduring nuclear weapons stockpile; continued manufacturing of nuclear weapon components;

and continued maintenance and investment in the nuclear security enterprise to be more responsive and resilient.

Stockpile Management

In FY 2020, the science-based Stockpile Stewardship Program supported informing the President for the 24th consecutive year that the U.S. nuclear weapons stockpile remains safe, secure, reliable, and effective 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 the investments made in state-of-the-art diagnostic tools, high performance computing platforms, and modern facilities.

For Stockpile Management, the FY 2021 budget request is $4.3 billion, an increase of $604.2 million, or 16.4 percent, over the FY 2020 enacted level. Included within this request is funding to maintain a safe, secure, and effective nuclear weapons stockpile. Activities include extending the expected life of weapons; maintenance, surveillance, assessment, development, and program planning related to the existing weapons stockpile; providing safe and secure dismantlement of nuclear weapons and components; and providing sustainment of needed manufacturing focused on increased efficiency of production operations.

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. The B61-12 LEP achieved first production unit (FPU) for 105 of 112 weapon components, including all nuclear components. A lifetime reliability concern with base metal electrode capacitors necessitated a delay in delivery of the system level FPU. Out of an abundance of caution and to ensure weapons components meet the necessary long-term resiliency standards, delivery of the system level FPU is now scheduled for the first quarter of FY 2022. The revised warhead FPU has received concurrence by the USAF and NWC. After discovery of this technical issue, NNSA conducted two internal reviews in addition to a third congressionally mandated Independent Review Team (IRT) review. The IRT completed their report, which was submitted to Congress in August. All other major components, unaffected by the capacitor failures, are continuing with production and readiness activities. The program is in Phase 6.4, Production Engineering, and is on track to the system-level FPU in the first quarter of FY 2022. Program completion is planned for FY 2026.

W88 Alteration (Alt) 370: This program, which supports the sea-based leg of the nuclear triad, is currently in Phase 6.4. This program has completed its System-Level Final Design Review, 20 system-level qualification tests, including the Commander's Evaluation Test 2 and Demonstration and Shakedown Operation 29 flight tests. The same technical issue impacting the B61-12 LEP also impacted the W88 Alt 370. NNSA is aggressively managing the FPU for this program. NNSA's revised FPU date is scheduled for the fourth quarter of FY 2021. All other major components, unaffected by the capacitor failures, are continuing with production and readiness activities.

W80-4 LEP: Currently in Phase 6.3, Development Engineering, NNSA is continuing activities in support of the USAF Long Range Standoff (LRSO) program. Funding in FY 2021 represents the planned ramp-up of production agency activities in conjunction with design activities as the

program transitions towards Phase 6.4, Production Engineering. NNSA remains tightly integrated with the DoD cruise missile program—through the NWC—to deliver on schedule.
W87-1 Modification Program: The W87-1 Modification Program will replace the aging W78 warhead using a modification of the existing legacy W87-0 design with planned first production in 2030 to support fielding on the USAF's Ground Based Strategic Deterrent missile system. The W87-1 Modification Program will deploy new technologies that improve safety and security, address antiquated design and material obsolescence, and improve warhead manufacturability. In FY 2020, NNSA is continuing Phase 6.2, Feasibility Study and Design Options, activities. The FY 2021 budget request for this program will support its transition from Phase 6.2 to Phase 6.2A, Design Definition and Cost Study. Phase 6.2A activities include continuing feasibility study of design options, beginning development of the Weapon Design and Cost Report, and an independent cost estimate conducted by NNSA's Office of Cost Estimating and Program Evaluation (CEPE).

W93/Mk7: NNSA is requesting $53 million in FY 2021 to initiate the warhead acquisition portion of the W93 program beginning with Phase 1, Concept Study and refinement activities to include study of future Navy ballistic missile warhead options and requirements in collaboration with the U.S. Navy. The W93 will incorporate modern technologies to improve safety, security, and flexibility to address future threats—and will be designed for ease of manufacturing, maintenance, and certification. All of its key nuclear components will be based on currently deployed and previously tested nuclear designs, as well as extensive stockpile component and materials experience. It will not require additional nuclear explosive testing to certify. Starting this effort in FY 2021 is essential to maintain synchronization with the Navy's program to design and build the new Mk7 reentry body.

Within Stockpile Management, the FY 2021 budget request includes $998.4 million for *Stockpile Sustainment*, an increase of $35.6 million, or 3.7 percent above the FY 2020 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 the information required to conduct the annual assessment process.

The request for Stockpile Management also includes $569 million for *Production Operations*, an increase of $25 million, or 7.2 percent, above the FY 2020 enacted level. Included in this request is funding to support continued growth of base capabilities, both workforce and equipment, required to support the increased LEP workload as these programs reach full-scale production rates.

Production Modernization

For Production Modernization, the FY 2021 budget request is $2.5 billion, an increase of $892.4 million, or 57 percent over the FY 2020 enacted level. Included in this request is funding that focuses on the production of capabilities of nuclear weapons, including primaries, secondaries, and radiation cases, and non-nuclear components which are critical to weapons performance.

Primary Capability Modernization: NNSA's highest infrastructure priority is to reconstitute plutonium pit production. Since the closure of the Rocky Flats facility 30 years ago, the Nation has not had a reliable pit production capability and has not produced a war reserve pit for almost a decade. The Nation must be able to produce no fewer than 80 pits per year within 2030 to support improving warhead safety and to avoid the risk of plutonium aging causing a loss in confidence in the performance of the U.S. nuclear stockpile. The FY 2021 budget request of $1.44 billion includes funding for plutonium operations and the plutonium pit production projects at LANL and Savannah River Site (SRS). This level of funding is required for NNSA to produce no fewer than 80 pits per year during 2030, consistent with federal law, national policy, and DoD requirements.

NNSA's two-site plan to achieve plutonium pit production at LANL (30 pits per year) and the SRS (50 pits per year) is prudent and necessary. This approach will require NNSA to fund activities at two sites, and will provide necessary, critical, resilience against an outage at a single site at moderate capacity.

NNSA continues to invest in Plutonium Facility-4 capabilities at LANL to support an enduring 30 pit production capacity during 2026. LANL has demonstrated progress in meeting production realization efforts by fabricating 10 development pits over the last two years. During FY 2020 and FY 2021, LANL is transitioning to the product realization process prove-in phase.

In FY 2021, NNSA will continue to design, procure long lead materials, and plan for demolition and equipment removal at the proposed Savannah River Plutonium Processing Facility (SRPPF), which will produce no less than 50 pits per year during 2030. Currently, 285 project designers and support staff are working on the project. That number is expected to increase significantly as SRS is required to begin to hire and train the technical workforce needed to produce pits at SRPPF. Training requires multiple years to meet the 2030 goal of 50 pits per year at SRPPF, and it must begin in FY 2021. The SRPPF Project is on schedule to receive Critical Decision-1 approval in FY 2021.

Secondary Capability Modernization: The FY 2021 budget request of $457 million for Secondary Capability Modernization represents a 55.7 percent increase over the FY 2020 enacted budget. This funding supports NNSA's uranium, depleted uranium and alloys, and lithium modernization efforts.

NNSA's uranium strategy invests in the reliability of key systems to sustain casting, assembly, and analytical chemistry, which supply the current stockpile with purified enriched uranium metal. It also seeks to decrease mission dependency on the seventy-five year old Building 9212 at the Y-12 National Security Complex (Y-12) by relocating the facility's enriched uranium processing capabilities into UPF and other existing facilities. In FY 2021, nuclear construction at UPF will reach its peak. The project has successfully completed the first three subprojects under budget.

NNSA's Depleted Uranium (DU) Program will restart and modernize lapsed DU alloying and component manufacturing capabilities at Y-12 and invest in key new technologies to improve efficiency and reliability and reduce lifecycle costs. The DU Modernization Program is also re-establishing a reliable supply of purified DU metal by installing and operating a DUF6 to DUF4

conversion process and re-establishing the DUF4 to metal process. Funding in support of DU is also critical to reestablishing component production capabilities at Y-12 needed to support on-going warhead acquisition programs. These capabilities have not been in operation for almost 20 years and are time urgent.

NNSA's Lithium Strategy supports the sustainment of existing infrastructure and ensures the lithium processing needs of the nuclear security enterprise are met through 2035. It also funds activities in support of the Lithium Processing Facility (LPF) to meet NNSA's lithium needs beyond 2035 by replacing the existing at-risk Lithium Processing Building located at Y-12. Loss of this capability prior to programmatic usability of LPF will impact on-going warhead acquisition programs.

Tritium Modernization and Domestic Uranium Enrichment: The FY 2021 budget request of $457 million is an increase of $10.6 million, or 2.4 percent, above the FY 2020 enacted level. The mission of Tritium Modernization is to establish and operate a domestic source of tritium to meet national security requirements, recycle tritium gas to maintain required inventories, and sustain reliable supply chain infrastructure and equipment to ensure delivery goals. Since 2003, tritium production has met all production, delivery, and schedule requirements. Currently, NNSA is ramping up production levels at the Tennessee Valley Authority Watts Bar 1 and 2 reactors and is confident that current tritium production plans will meet future tritium delivery requirements. By early FY 2021, two reactors will be producing tritium with a combined total of 2,336 TPBARs, the highest numbers to date. Beyond FY 2021, NNSA will continue the ramp up of tritium production to meet mission requirements. Funding for the Tritium Finishing Facility is critical to managing risk by modernizing our capabilities to finish, package, and ship gas reservoirs.

This funding request will also continue efforts to make available, when needed, the necessary supplies of enriched uranium for a variety of national security needs. The *Domestic Uranium Enrichment* (DUE) program schedule is driven by the nearest-term defense need—unobligated low enriched uranium for tritium production. Other needs for enriched uranium (e.g., research reactors, naval fuel) are supported by this effort as well. NNSA is currently executing an Analysis of Alternatives examining a wide range of options for meeting the unobligated enriched uranium need. These options include an AC100 centrifuge and a smaller centrifuge being developed by Oak Ridge National Laboratory, as well as other enrichment technologies and non-construction options. The analysis has been impacted by COVID-19, but NNSA looks forward to sharing the results with Congress as soon as the analysis is complete.

Stockpile Research, Technology, and Engineering

The FY 2021 budget request for Stockpile Research, Technology, and Engineering (SRT&E) is $2.8 billion, an increase of $229 million, or 9 percent above the FY 2020 enacted levels. This program provides the foundation for science-based stockpile decisions, tools, and components; focuses on the most pressing investments the nuclear security enterprise requires to meet DoD warhead needs and schedules; enables assessment and certification capabilities used throughout the enterprise; and provides the knowledge and expertise needed to maintain confidence in the nuclear weapons stockpile without additional nuclear explosive testing.

Assessment Science ($773 million) requests additional funding to support subcritical experiments used to assess the state of the current stockpile and certify warhead modernization programs and advanced diagnostics for subcritical hydrodynamic integrated weapons experiments that produce data for stockpile certifications.

Engineering and Integrated Assessments ($337.4 million) sustains NNSA's capability for creating and maturing advanced toolsets and technologies to improve weapon surety and support annual stockpile assessments.

Weapons Technology and Manufacturing Modernization ($298 million) develops the materials, technology and manufacturing solutions that will significantly reduce the time and cost of planned and future warhead modernization programs and manufacturing processes. This area has already provided great benefits to the current stockpile and is instrumental to a more responsive and resilient nuclear enterprise.

Inertial Confinement Fusion ($554.7 million) will continue to maintain essential experimental capabilities and expertise in high energy density 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 FY 2021 request includes $732 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 first NNSA Exascale computer will be located at Lawrence Livermore National Laboratory. 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. Improvements in high performance computing and artificial intelligence are essential for NNSA next-generation simulation capabilities to support weapons design and science-based stockpile stewardship.

The *Academic Programs* ($87M) of Stockpile Research, Technology, and Engineering are designed to support academic programs in science and engineering disciplines of critical importance to the NNSA Nuclear Security Enterprise, such as nuclear science, radiochemistry, materials at extreme conditions, high energy density science, advanced manufacturing, and high performance computing. In addition, building a diverse workforce will strengthen our stewardship of the future. The role of the Academic Programs is three-fold:

1. Develop the highly trained technical workforce needed to support core missions to replace the current generation of NNSA professionals,
2. Maintain technical peer expertise external to the nuclear security enterprise for providing valuable oversight, cross-check and review,
3. Enable scientific innovation to enhance the nuclear security enterprise missions to strengthen the basic fields of research relevant to the NNSA mission.

The Academic Programs enable robust and diverse research and foster STEM educational communities through a variety of methods to achieve the program goals.

Secure Transportation Asset

The Secure Transportation Asset (STA) provides safe, secure transport of the Nation's nuclear weapons, weapon components, and special nuclear material throughout the nuclear security enterprise to meet nuclear security requirements and support broader NNSA operations. Nuclear weapon life-extension programs, limited-life component exchanges, surveillance, dismantlement, nonproliferation activities, and experimental programs rely on transport of weapons, weapon components, and special nuclear material on schedule and in a safe and secure manner.

The FY 2021 budget request of $390 million supports modernizing STA transportation assets, replacement of STA's now-obsolete DC-9 aircraft, vehicle sustainment, replacement of armored tractors, escort and support vehicles; and upgrade of the Tractor Control Unit to accommodate for communications and security. Funding also supports a commitment to a stable human resources strategy that recruits and retains Federal Agents and staff with the requisite skills to meet priorities and mission requirements.

The FY 2021 request includes $102 million for development and testing of the Mobile Guardian Transporter, which will provide a replacement trailer system that will meet nuclear safety requirements, address evolving potential security threats, and replace the current Safeguards Transporter, which first entered service in 1997.

Improving Safety, Infrastructure, and Operations

An effective, responsive, and resilient nuclear weapons infrastructure is essential to the U.S. capacity to adapt flexibly to shifting requirements. Such an infrastructure offers tangible evidence to both allies and potential adversaries of U.S. nuclear weapons capabilities and can help to deter, assure, and hedge against adverse developments, and discourage adversary interest in arms competition.

The FY 2021 budget request for Infrastructure and Operations is $4.4 billion, an increase of $1.2 billion, or 37 percent above the FY 2020 enacted level. More than a third of NNSA's facilities are over 60-years-old. It will take sustained, significant resources and sound management practices to modernize NNSA's nuclear weapons infrastructure.

The FY 2021 budget request includes significant increases in the *Operations of Facilities*, *Maintenance and Repair of Facilities*, *Infrastructure and Safety Recapitalization*, and *Construction* accounts. These increases support major efforts like the pit production mission at LANL and LEP missions at Kansas City; and begin to address space issues across the nuclear security enterprise as the sites are staffing up to tackle these challenging missions.

The *Programmatic Construction* activities provide continued support to major construction projects such as UPF, the Chemistry and Metallurgy Research Replacement project, the Lithium Production Capability, and U1a Complex Enhancements Project, among others. The request also supports the initiation of design efforts for the High Explosive Synthesis, Formulation, and Production project at the Pantex Plant.

The Mission Enabling Construction activities support the transition to construction for Nevada 138kV Power Transmission System Replacement and two Emergency Operations Centers at LLNL and Sandia National Laboratories.

Thanks to the support of Congress, NNSA is making progress in repairing, replacing, and modernizing NNSA's facilities and stabilizing deferred maintenance; yet much more remains to be done.

NNSA is deploying a new science-based infrastructure stewardship approach that is improving infrastructure data quality. Part of this approach includes the deployment of BUILDER, a system developed by the U.S. Army Corps of Engineers and recognized by the National Academy of Sciences as a best-in-class practice for infrastructure management.

Using BUILDER-based calculations has provided us with a more accurate and transparent understanding of NNSA's vast infrastructure. Historical approaches had greatly underestimated the replacement plant value of NNSA's facilities. For example, NNSA's replacement value was previously estimated to be $55.4 billion and is now estimated to be $124.3 billion. Deferred maintenance costs are tied to the replacement plant value as it costs more to repair a more expensive facility. Therefore, as expected, NNSA deferred maintenance increased with the deployment of our new, more accurate, data-driven approach, from $2.5 billion as of FY 2018 to $4.8 billion as of FY 2019.

However, this is not an indication that NNSA's infrastructure condition declined, merely that the values are more accurate. In fact, the ratio of deferred maintenance to replacement plant value decreased from 4.6 percent to 3.8 percent, an indication that NNSA's investments have been successful. NNSA is using BUILDER to pinpoint infrastructure investments that reduce the most risk to the mission. In addition, NNSA is undertaking new initiatives and pilots to identify opportunities for improved project execution and asset acquisition.

NNSA is making critical investments to stabilize and dispose of high-risk excess facilities. For example, in FY 2019, NNSA completed its first large-scale process-contaminated disposition at LANL Building 46-001. In FY 2021, NNSA is investing $30 million for the disposition of ten facilities, including three process-contaminated facilities.

Defense Nuclear Security Efforts

The Office of Defense Nuclear Security's (DNS) primary mission is protecting the facilities, people, and assets that are critical to achieving NNSA's important national security missions. Defense Nuclear Security's FY 2021 budget request is $826.9 million, an increase of $51.9 million, or 6.7 percent, over the FY 2020 enacted amount. This growth in funding supports increased security personnel at LANL PF-4 as it transitions to 24/7 operations and initial increased support at SRS in support of SRPPF. While NNSA faces challenges replacing and refreshing aging physical security infrastructure, it is making key investments to recapitalize this infrastructure through the Security Infrastructure Revitalization Program. Increased security requirements are associated with growth across the nuclear security enterprise, including plutonium pit production efforts. DNS is focused on countering the threat posed by unmanned

aircraft systems and aims to complete the installation of counter unmanned aircraft systems at Y-12, the Pantex Plant, and the Nevada National Security Site in FY 2021.

Enhancing Cybersecurity

Information Technology and Cybersecurity enable every element of NNSA's missions. The FY 2021 budget request is $375.5 million, an increase of $75.5 million, or 25.2 percent, over the FY 2020 enacted level. 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 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, 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 on which NNSA depends to execute its mission.

Defense Nuclear Nonproliferation Appropriation

The FY 2021 budget request for the Defense Nuclear Nonproliferation account is $2 billion, an increase of $86.6 million, or 4.5 percent, over the FY 2020 enacted level, after adjusting for the $220 million FY 2020 appropriation for the termination of the Mixed Oxide Fuel Fabrication Facility (MOX) project. 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.

This appropriation funds five existing programs and expands NNSA's nuclear forensics mission. These six programs, as part of a whole-of-government approach, provide policy and technical leadership to prevent or limit the spread of weapons of mass destruction (WMD)-related materials, technology, and expertise; develop technologies to detect nuclear proliferation; secure or eliminate inventories of nuclear weapons-related materials and infrastructure; and ensure that technically trained emergency management personnel are available to respond to nuclear and radiological incidents and accidents.

Nuclear 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 for U.S. enforcement agencies and international partners; strengthen the International Atomic Energy Agency'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 FY 2021 budget request is $400 million, an increase of $37.2 million, or 10.2 percent above the FY 2020 enacted level. The request provides additional cooperative agreement funding for establishing non-HEU-based molybdenum-99 production technologies in the United States. Additionally, the request for M3 supports the conversion of research reactors to low enriched uranium and the removal and disposal of weapons-usable nuclear material, with priority on removing surplus plutonium from the state of South Carolina.

The *Global Material Security* program works with partner nations to increase the security of vulnerable nuclear and radioactive materials and improve their ability to detect, disrupt, and investigate illicit trafficking of these materials. The FY 2021 budget request of $400 million is a decrease of $42 million, or 9.6 percent, below the FY 2020 enacted level. This reduction is a result of a funding increase received in FY 2020 for Cesium Irradiator Replacement Program activities, to include addressing the container breach in Seattle, and for efforts to partner with state and local governments to train first responders. The requested funding includes efforts to secure and protect at risk nuclear and radioactive materials both domestically and internationally, remove and reduce radioactive materials, prevent and investigate the illicit trafficking of materials, and promote international and national best practices in nuclear security and long-term sustainment of national programs. NNSA is on track to replace all cesium-137 based blood irradiators in the U.S. by the end of 2027.

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 agreements and arrangements; and address enduring and emerging proliferation challenges requiring the development of innovative policies and approaches. The FY 2021 budget request is $138.7 million. This request fully funds implementation of our obligations, commitments, and authorities pursuant to statutes and international agreements. It includes efforts to strengthen the U.S. safeguards technology and human capital base to meet projected U.S. and International Atomic Energy Agency resource requirements, facilitate the expansion of civil nuclear power while minimizing proliferation risks through the conclusion of Civil Nuclear Cooperation ("123") Agreements and implementation of Administrative Arrangements, maintain technical monitoring, verification, and analysis capabilities to support implementation of strategic arms and nuclear testing limitations initiatives, and strengthen domestic and international implementation of export controls.
The *Defense Nuclear Nonproliferation Research and Development* (DNN R&D) 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 FY 2021 budget request for this program is $531.7 million. The funding requested strengthens U.S. technical capabilities to detect, locate, and characterize foreign nuclear programs and expands Nonproliferation Stewardship Program efforts.

Nonproliferation Construction consolidates construction costs for DNN projects. The FY 2021 budget request is $148.6 million, a decrease of $150.4 million, or 50.3 percent, below the FY 2020 enacted level. The decrease reflects the completion of the MOX contractual termination settlement. The $148.6 million will be used for the Surplus Plutonium Disposition (SPD) project,

which supports the dilute and dispose approach. This supports the execution of early site preparation and long lead procurements activities, as well as continuing the maturation of the design for all major systems supporting the plutonium processing gloveboxes. NNSA will continue looking at opportunities for improving the SPD project schedule.

The *NNSA Nuclear Forensics Research and Development* effort will expand our capabilities and reflects NNSA taking a more active leadership role in this area. The FY 2021 budget request for this program is $40 million, which includes consolidating $12 million from DNN R&D. NNSA will focus on expanding nuclear forensics capabilities in both research and development and operations. NNSA will leverage its existing capabilities to develop advanced technical nuclear forensics analysis capabilities within the Office of Counterterrorism and Counterproliferation to support interagency response to a nuclear event.

Nuclear Counterterrorism and Incident Response

The FY 2021 request for the Nuclear Counterterrorism and Incident Response (NCTIR) Program is $377.5 million, an increase of $5.4 million over the FY 2020 enacted level. NCTIR includes two subprograms: the *Emergency Operations* (EO) subprogram and the *Counterterrorism and Counterproliferation* (CTCP) subprogram. EO provides both the structure and processes the Department uses to prevent, prepare for, respond to, recover from, and mitigate all-hazards emergencies that threaten life and property. In addition EO provides the framework for building, assessing, and improving organizational resilience to ensure uninterrupted performance and delivery of the Department's Essential Functions under any circumstance. The Department's Emergency Operations program aligns and complies with Presidential Policy Directive 8 (PPD-8), "National Preparedness," and PPD-40, "National Continuity Policy".

CTCP provides effective capabilities to respond to any nuclear or radiological incident or accident in the United States or abroad by applying the unique technical expertise found across NNSA's nuclear security enterprise. Highly trained NEST personnel with specialized technical equipment maintain readiness to support lead Federal agencies to locate and defeat potential nuclear and radiological threat devices, to effectively manage the consequences of nuclear or radiological emergencies, and to support enhanced security operations for National Special Security 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 United States, as well as in support of regularly scheduled NSSEs. With the support of Congress, NNSA completed procurement of three fixed-wing AMS aircraft in FY 2020 and is in the process of procuring two rotary-wing AMS aircraft. The new airframes will minimize the risk of mission failure due to unscheduled maintenance and reduce future maintenance costs.

NNSA provides specialized technology, equipment, and training to regional Federal Bureau of Investigation (FBI) teams at FBI field offices in 12 major American cities, enabling these teams to identify and mitigate the function of a nuclear or radiological device. As part of the Capability Forward initiative, the FY 2021 requested budget will enable CTCP to enhance WMD device defeat capabilities in the current 12 cities; increase the number of regional counter-WMD FBI

teams in major metropolitan areas from 12 to 14 by FY 2022; and enhance NNSA facilities to accommodate increased training requirements.

Complementing these efforts, the FY 2021 budget sustains and improves the nation's capability to understand and counter nuclear threats, informing a range of policy and technical efforts to detect and defeat adversary efforts to illicitly acquire nuclear capabilities. This work informs the capabilities of the military, intelligence, and national security communities by leveraging the technical innovation of the nuclear security enterprise to achieve increased confidence and accuracy in predictive modeling and new tools in support of the nuclear incident response mission.

CTCP provides technical and operational capabilities in support of the interagency National Technical Nuclear Forensic mission. The FY 2021 budget reflects an increased NNSA role in the nuclear forensics mission. NNSA and the Department of Homeland Security (DHS) will continue to engage with the committee and the relevant homeland security committees to secure agreement on transitioning leadership of this mission from DHS to NNSA. When nuclear materials or devices are interdicted or, in the event of a nuclear detonation, NNSA responds with national laboratory expertise and deployable field teams to provide technical analysis in support of the attribution process.

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.

As referenced above, in FY 2021, NNSA's request expands our national technical nuclear forensics work. CTCP is requesting $40 million to support this effort. This scope of work includes assisting in the coordination of interagency nuclear forensics activities through the National Nuclear Forensics Center. Without the requested funding, many technical experts will continue to leave this NPR priority mission to pursue other areas of work, posing a threat to U.S. national security.

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 U.S. 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 FY 2021 budget for *Naval Reactors* is $1.68 billion, an increase of $35.6 million, or 2.2 percent, over the FY 2020 enacted level. The budget request supports the requirements for Naval Reactors' three major projects – COLUMBIA-Class reactor 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 future generations of nuclear-powered warships, and make progress on both the recapitalization of laboratory facilities and the environmental remediation of legacy responsibilities.

The FY 2020 enacted level, $1.6 billion, does not reflect the mandated transfer of $88.5 million from Naval Reactors to Nuclear Energy for the operation of the Advanced Test Reactor. Naval Reactors has requested funding in FY 2021 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 Pennsylvania; Knolls Atomic Power Laboratory and Kesselring Site in New York; and the Naval Reactors Facility 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 ensure nuclear safety and maximize operational flexibility.

Federal Salaries and Expenses Appropriation

The FY 2021 budget request for *Federal Salaries and Expenses* (FSE) is $454 million, an increase of $19.3 million, or 4.3 percent, over the FY 2020 enacted level. This budget will support an additional 83 Full Time Equivalents (FTE), a one percent cost of living increase, five percent benefit escalation, and funding for training, travel, support services, and field and headquarters security investigations, among other workforce needs.

The 2018 NPR highlighted the need to properly support civilian personnel who protect the U.S. against nuclear threats. Effective deterrence would be impossible without the vital contributions our personnel make to the U.S.' nuclear capabilities and deterrence.

NNSA must have sufficient people, with the right capabilities and security clearances, to ensure we can modernize the nuclear deterrent, recapitalize an aging infrastructure, and continue to meet the requirements of our nonproliferation and counterterrorism programs. A skilled federal workforce is required to execute appropriate program and project oversight as the NSE is busier than it has been since the end of the Cold War. NNSA requires additional staff to support growing mission scope, including: (1) initiating new modernization programs, and (2) new unique high hazard, high scrutiny plutonium pit production, domestic uranium enrichment, tritium, lithium, and high explosives projects.

In 2018, before the updated requirements included in the NPR, two independent studies concluded that the NNSA had unmet critical staffing needs. The Office of Personnel Management (OPM) and NNSA's CEPE separately arrived at the conclusion that additional federal staff would be needed to meet the demands of the NNSA mission. Both studies recommended NNSA hire additional staff above its previous statutory cap of 1,690 FTE positions. In March 2019, the Government Accountability Office (GAO) endorsed OPM and CEPE's conclusions across multiple NNSA functions.

Congress, recognizing NNSA's need to properly support its growing workforce, appropriated $434.7 million for FSE (at NNSA's FY 2020 request level), authorized an additional 200 FTEs, and raised the Excepted Service cap by 200. With this strong support from Congress in FY 2020, NNSA has focused on external hiring to reach an end strength of 1,858 FTE positions.

During my tenure, NNSA implemented an aggressive hiring strategy to address staffing requirements across the NSE. When the COVID-19 pandemic made in-person recruiting events impossible, the NNSA team pivoted to virtual recruiting and held three virtual job fairs since June. The most recent virtual job fair in August included all of the national security laboratories, plants, and sites, providing us with the opportunity to interact with over 1,500 candidates who are interested in joining the nuclear security enterprise. All of the labs, plants, and sites are on pace to meet their FY 2020 hiring goals.

With a renewed focus on recruitment in multiple cities and college campuses to support all program areas, NNSA is recruiting the personnel needed to successfully meet its mission growth and commitments as directed in the 2018 NPR.

Conclusion

NNSA's diverse and enduring national security missions are crucial to the security of the U.S., the defense of its allies and partners, and global stability. The U.S. nuclear deterrent has been and will continue to remain the cornerstone of America's national security. NNSA has the unique responsibility to ensure its continued safety, security, reliability, and effectiveness.

Nuclear nonproliferation and nuclear counterterrorism activities are essential to promoting the peaceful use of nuclear energy and preventing malicious use of nuclear and radioactive materials and technology around the world. Nonproliferation and counterterrorism both rely on the technical expertise uniquely available from Defense Programs activities. Providing naval nuclear propulsion to the U.S. Navy is crucial to the U.S. to defend interests abroad and protect the world's commercial shipping lanes. The FY 2021 budget request, fully supported by the Senate and House versions of this year's NDAA, supports the Administration's recognition of the urgency to restore our Nation's nuclear security enterprise. NNSA is mindful of the resources entrusted to it and gratefully recognizes the ongoing support of the American people and Congress for these important missions.