

**Statement of The Honorable Dr. Charles P. Verdon
Acting Under Secretary for Nuclear Security
and Administrator of the National Nuclear Security Administration
U.S. Department of Energy
Before the
Subcommittee on Strategic Forces
Senate Committee on Armed Services**

May 19, 2021

Chairman King, Ranking Member Fischer, and members of the Subcommittee, it is an honor to appear before you, on behalf of Department of Energy's (DOE) National Nuclear Security Administration (NNSA), with my colleagues William "Ike" White and Admiral James "Frank" Caldwell. NNSA greatly appreciates the Subcommittee's bipartisan support for our nuclear security missions.

NNSA is committed to supporting the President's national security strategy. The President's Fiscal Year (FY) 2022 Discretionary Funding Request reflects the U.S. commitment to maintain a safe, secure, and effective nuclear weapons stockpile, reduce global nuclear threats, and provide the U.S. Navy's submarines and aircraft carriers with militarily effective nuclear propulsion. NNSA is on track to modernize the nuclear stockpile with our life extension and alteration programs; make substantial progress on maintaining, repairing, and recapitalizing NNSA's deteriorating infrastructure; provide policy and technical leadership to address all aspects of the nuclear threat reduction mission; and deliver nuclear propulsion that meets the U.S. Navy's operational requirements.

The U.S. nuclear deterrent is the foundation of our national defense, and its credibility serves as the ultimate insurance policy against a nuclear or large-scale conventional attack. We must contend with the reality of renewed peer competition, which is creating new threats. The world is in a moment of many global challenges. China and Russia are modernizing their nuclear arsenals, and the risk of proliferation of nuclear weapons and other weapons of mass destruction pose profound and existential dangers. In the face of these challenges, it is our most solemn obligation to protect the security of the American people. The United States must be responsive to the increasing desire for state and non-state actors to reshape the world in their favor at the expense of our Nation, allies, and partners, and at times in contravention of international norms.

A Changing Threat Environment

The FY 2022 Discretionary Funding Request enables NNSA to execute its long-standing nuclear modernization efforts begun under the Obama-Biden Administration while this Administration undertakes its formal review of efforts to modernize our nuclear deterrent, to include Department of Defense delivery platforms, the nuclear weapons required for those platforms, and the NNSA infrastructure needed to produce and maintain those weapons. This will preserve space for future policy decisions related to nuclear modernization, nuclear nonproliferation and counterterrorism, and naval reactors as the Administration adjusts to the changing international threats facing America. Russia, China, and our adversaries should make no mistake – America

will do whatever is necessary to deter our enemies and provide stability in our strategic relationships with allies and partners.

The U.S. nuclear weapons stockpile is currently safe, secure, and militarily effective. However, the legacy stockpile systems are aging, and NNSA's production infrastructure has atrophied considerably. America must invest in the weapons and infrastructure modernization programs to provide the capabilities needed to ensure the deterrent's viability into the future. Future American political leaders will not have the weapons and infrastructure in place to support the nuclear arsenal unless we reestablish that capability now.

The need to modernize the nuclear weapons stockpile and recapitalize the supporting infrastructure needed to produce and maintain that stockpile has reached a tipping point. Approximately 60 percent of NNSA's facilities are more than 40 years old and more than 50 percent are in poor condition. Assessments of facilities throughout the enterprise have identified numerous single-point failures. Production capabilities allowed to lapse are needed once again and reestablishing these capabilities is both a priority and a challenge. If not appropriately addressed, the age and condition of NNSA's infrastructure will put at risk NNSA's missions, and the safety of its workforce, the public, and the environment.

With support from the Administration and Congress, NNSA is undertaking a risk-informed, complex, and time-constrained modernization and recapitalization effort. To do so, NNSA must rely on its own industrial base within its nuclear security enterprise for some critical processes and parts, in addition to using commercial industry. NNSA manages eight government-owned, contractor-operated organizations throughout the country focused on the nuclear security enterprise. 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 unique and specialized capabilities also extend to global nonproliferation efforts. NNSA's Office of Defense Nuclear Nonproliferation (DNN) supports future arms control negotiations with well researched, tested, and evaluated technologies that strengthen confidence in verification of treaty obligations. DNN's unique capabilities are critical to America's national security and welfare, working worldwide to prevent state and non-state actors from developing nuclear weapons or acquiring weapons-usable nuclear or radiological materials, equipment, technology, and expertise.

In addition, the U.S. Nuclear Navy remains second to none, largely because Congress and the American people have strongly supported and invested in the Office of Naval Reactors, which is responsible for the U.S. Navy's nuclear propulsion work. 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.

COVID-19

I am pleased to report NNSA did not miss a single major milestone or Department of Defense (DoD) requirement because of the COVID-19 pandemic. We completed our mission while ensuring the health and safety of the workforce during the global pandemic. It is a testament to

the dedication of the men and women of the nuclear security enterprise that NNSA met its major deliverables and reflects our deep commitment to protecting America's national security.

NNSA accomplished this by adopting a policy of maximum telework and social distancing to safeguard the health and welfare of the workforce, while also identifying mission-critical activities that could not be performed remotely. NNSA worked with its M&O contractors to set priorities and relied on them to make decisions based on the local situation, input from health officials, and regulations to protect their workforce.

Weapons Activities

Stockpile Management

NNSA's Office of Defense Programs, in coordination with the DoD, has supported the nuclear deterrent for almost 30 years without the need for additional nuclear explosive testing. In FY 2021, the science-based Stockpile Stewardship Program allowed the Secretaries of Energy and Defense to certify to the President for the 25th consecutive year the nuclear weapons stockpile remains safe, secure, and militarily effective. This remarkable scientific achievement is made possible through the expertise of NNSA's world-class scientists, engineers, and technicians, and prior investments made in the necessary infrastructure and tools.

The B61-12 Life Extension Program (LEP) consolidates four variants of the B61 gravity bomb and improves the safety and security of a weapon that first entered service in 1966. Currently in Phase 6.5, First Production Unit, the B61-12 LEP has achieved first production on most of its components and will achieve the system's first production unit (FPU) in the first quarter of FY 2022.

The W88 Alteration (Alt) 370 supports the sea-based leg of the nuclear triad and is currently in Phase 6.5 with a system FPU date on track for the fourth quarter of FY 2021. Nearly all major components have completed their respective FPUs.

The W80-4 LEP is currently in Phase 6.3, Development Engineering, in support of the U.S. Air Force Long Range Standoff (LRSO) program. FY 2022 will see a planned ramp-up of production development and design activities as the program transitions to Phase 6.4, Production Engineering.

The W87-1 Modification Program will replace the aging W78-0 warhead. NNSA has planned first production in FY 2030 to support fielding on the Ground-Based Strategic Deterrent ballistic missile system in the Mk21A reentry vehicle. The program will deploy new technologies that improve safety and security and improve manufacturability. Efforts in the next fiscal year will focus on completion of the Weapon Design and Cost Report, conducting an independent cost estimate, and entry into Phase 6.3.

The W93/Mk7 is a new program of record authorized by Congress in FY 2021 and was established to meet DoD requirements. Starting the W93 program in FY 2021 ensured coordinated development of the warhead along with the Navy's Mk7 aeroshell program. 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 the key nuclear components will be based on previously tested nuclear designs and will not require underground nuclear explosive testing to certify. FY 2022 will focus on completion of Phase 1 activities and entry into Phase 2, Feasibility Study and Design Options.

Production Modernization

The Production Modernization program focuses on the production capabilities of nuclear weapons components critical to weapon performance, including primaries, secondaries, radiation cases, and non-nuclear components. Activities within this program support the Primary Capability Modernization, Secondary Capability Modernization, and Non-Nuclear Component Modernization programs.

Primary Capability Modernization includes the plutonium program and the high explosives and energetics programs. NNSA urgently needs to recapitalize our plutonium pit production fabrication capabilities to support our weapons modernization programs, as high explosive and energetic materials are required for every weapon system in the stockpile and are also under increasing demand.

NNSA's priority infrastructure need is reestablishing a modestly sized production capacity for plutonium pits. This summer, efforts will focus on advancing the Savannah River Plutonium Processing Facility through the Critical Decision (CD) process from CD-0 (Mission Need) to CD-1 (Alternative Selection and Cost Range) and beginning the process toward CD-2 (Performance Baseline) 90% design complete. At Los Alamos National Laboratory (LANL), the Los Alamos Plutonium Pit Production Project achieved CD-1 in April 2021 and work has begun on developing the 90% design package needed for CD-2. This two-site approach is necessary to re-establish the nation's ability to produce plutonium pits in support of defense requirements, and to provide needed resiliency against unplanned outages.

Secondary Capability Modernization includes our Uranium, Depleted Uranium, Lithium, Tritium, and Domestic Uranium Enrichment programs. All these programs support the nuclear stockpile and face infrastructure and lapsed capability concerns. NNSA is continuing its progress on the Uranium Processing Facility (UPF), which remains on budget. UPF construction will support 2,500 good-paying jobs in 2022 and 1,100 jobs in 2023. NNSA is also working with its partners to increase production of tritium and is in the early phases of designing the Tritium Finishing Facility (TFF), to replace a 1950s-era facility. The United States no longer maintains a lithium purification capability and relies on material recycling as its main source, which will be exhausted soon. These operations currently take place in a World War II-era building well beyond its design life, putting both operators and processing at risk. NNSA plans to modernize lithium purification and processing operations in a new Lithium Processing Facility (LPF) built to modern standards.

Non-Nuclear Capability Modernization includes programs to modernize production of non-nuclear components for multiple weapon systems. Non-nuclear components are a significant portion of the costs for the warhead modernization programs due to the number of parts,

complexity, and testing required to establish confidence the components will continue to function over the required 20-to-30-year lifetime.

This ongoing successful capital project implementation is advancing at a critical time. As Commander Admiral Charles Richard from U.S. Strategic Command recently testified, ***“We simply cannot continue to indefinitely life extend Cold War leftover systems...and successfully carryout our national strategy. A particular concern is the aging nuclear weapons stockpile and supporting infrastructure and we can reach a point where no amount of money will adequately mitigate the operational risks the Nation will face due to infrastructure and human talent capability losses.”*** Put another way: time is money. Continued recapitalization is imperative, otherwise there will be a point at which no amount of money will be able to mitigate the operational risks and losses to infrastructure capabilities that accrued over time.

Stockpile Research, Technology, and Engineering (SRT&E)

SRT&E provides the data and tools that underpin science-based stockpile decisions, including the knowledge and expertise needed to maintain confidence in the nuclear stockpile without the need for additional underground nuclear explosive testing.

SRT&E covers many critical programs for the nuclear security enterprise.

The Enhanced Capabilities for Subcritical Experiments (ECSE) will produce experimental data enabling assessment of the current stockpile and certification of the future stockpile, minimizing the future need to return to nuclear testing. This capability is needed to help underpin confidence in the certification of the W80-4 LEP, W87-1 Modification, and future warhead acquisition programs.

The Exascale Computing Initiative (ECI) will provide NNSA with next-generation simulation capabilities to support weapons design, warhead assessment and certification, and continued development of the underpinning science needed to support the nuclear stockpile long-term. NNSA remains on track to accept and operate NNSA’s first Exascale high performance computing system for program use in 2023.

The Inertial Confinement Fusion (ICF) program provides high energy density (HED) science capabilities and expertise to provide the data needed to advance warhead performance and production science, and to inform design choices for warhead acquisition programs. In addition, activities like the pursuit of ignition provide not only important scientific understanding, but a unique training environment for the workforce.

These programs, along with our advanced computing and simulation, technology maturation, academic programs, and other SRT&E missions are essential to maintaining our confidence in the stockpile.

NNSA provides significant investment in grants and cooperative agreements with top universities across the country every year, through programs such as the Stewardship Science

Academic Alliances Program and the Minority Serving Institution Partnership Program (MSIPP) to recruit the next generation of scientists and engineers for our nuclear security enterprise, and to conduct cutting-edge science in national security and nonproliferation. In support of the President's effort to eliminate inequities in Science, Technology, Engineering, and Math (STEM), MSIPP's mission is to create and foster a sustainable STEM-pipeline that prepares a diverse workforce of world class talent through strategic partnerships between Minority serving Institutions and the nuclear security enterprise.

Infrastructure and Operations

NNSA's infrastructure needs are greater than the production complex. NNSA's infrastructure includes office buildings, light laboratories, emergency operations centers, fire houses, roads, utilities, and the specialized equipment used to support our missions. Infrastructure is the foundation that supports all NNSA missions. Modern, efficient, sustainable, and resilient infrastructure is needed for the nuclear deterrent, nonproliferation, counterterrorism, emergency response, leading-edge research, and solving the climate crisis. NNSA's mission execution is threatened by deteriorating facilities built during the Manhattan Project and Cold War eras. Today, nearly 60 percent of NNSA's \$116 billion worth of real property infrastructure is beyond its design life, half of all facilities are in poor condition, and the average age of NNSA's facilities is 47 years old.

NNSA infrastructure must be resilient and provide the capabilities and capacities for executing its vital national security missions into the future. This requires an array of complementary strategies, including minor and major construction projects, short-term leasing, purchases, and timely disposition of excess facilities. We must modernize and upgrade antiquated infrastructure and address safety and programmatic risks through strategic, risk-informed investments that directly support our nuclear weapons and nonproliferation programs.

Also, key are the personnel needed to safely and securely operate and maintain all NNSA facilities. As NNSA mission scope increases, so does the demand for increased personnel to support new facilities and capabilities being brought on-line, and to support moving to 24/7 operations at many sites across the complex. These individuals are essential to minimizing unplanned outages and to supporting safe and secure operations, particularly in high hazard operations.

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. 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.

Enhancing Cybersecurity

Information Technology and Cybersecurity enable every element of NNSA's missions. To meet future requirements, NNSA must modernize its outdated and legacy technology. NNSA must undertake activities and projects that will improve the security of NNSA networks and data, including recapitalizing and modernizing aging infrastructure, executing the IT modernization strategy, and stabilizing inherited legacy networks, systems, and applications and finally, the Emergency Communications Network (ECN). In addition to modernizing legacy networks, NNSA is looking ahead at emerging technologies, which has propelled the convergence of IT and Operational Technology. 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

NNSA's Office of Defense Nuclear Nonproliferation (DNN) is critical to implementing the President's call to "lock down fissile and radiological materials around the world." DNN works worldwide with our partners to prevent state and non-state actors from developing nuclear weapons or acquiring weapons-usable nuclear or radiological materials, equipment, technology, and expertise. Around the globe, DNN has eliminated the need for weapons-usable material at over 100 civilian sites and removed over 7,200 kilograms of highly enriched uranium (HEU) and plutonium from almost 50 countries, achieving permanent threat reduction. DNN's unique capabilities are critical to America's national security and welfare: from promoting and supporting International Atomic Energy Agency (IAEA) safeguards agreements internationally; to supporting diplomatic arms control efforts such as the successfully extended New START treaty with Russia; to partnering with U.S. industry to support non-HEU based production of the vital medical isotope molybdenum-99, which is used in 40,000 procedures every day in the United States.

Nuclear Terrorism and Incident Response

NNSA's Nuclear Counterterrorism and Incident Response (NCTIR) includes two subprograms: *Emergency Operations* (EO) and *Counterterrorism and Counterproliferation* (CTCP).

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.

CTCP provides capabilities to counter and respond to nuclear incidents and accidents worldwide. The foundation of NNSA's diverse missions is an unparalleled command of nuclear science, which is harnessed to understand and contend with global nuclear threats. CTCP's expertise

influences a wide range of policies to keep nuclear material beyond the reach of terrorists, including security standards for the storage and transport of such material. The office shares knowledge of nuclear and radiological threats with federal, state, local, and international partners by conducting training, exercises, and information exchanges to strengthen emergency preparedness and response. CTCP also develops tools to impede the efforts of proliferant states to obtain nuclear capabilities.

CTCP manages the Nuclear Emergency Support Team (NEST), a cadre of on-call technical specialists who are trained and equipped to respond to all manner of nuclear events. Notable NEST capabilities include mobile teams that can search for nuclear devices and technical personnel whose knowledge of nuclear weapons is used to characterize and defeat such threats. NEST features nuclear forensics capabilities to identify the origin of nuclear material outside of regulatory control or used in a threat device, allowing the United States to credibly threaten retaliation against any state that facilitates an act of nuclear terrorism, constituting an important element of the U.S. deterrence strategy.

Naval Reactors

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. Naval Reactors has given the United States unmatched reach with an unparalleled record of over 169 million miles safely steamed on nuclear power and over 7,300 reactor-years of operation.

Naval Reactors' has 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. Naval Reactors is committed to supporting 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.

NNSA Workforce

NNSA cannot accomplish its mission without recruiting, training, and retaining a highly technical Federal and M&O workforce. In addition to the Federal and M&O workforce, NNSA's success depends on leveraging all parts of American society to bring the best quality ideas, products, and solutions to our shared challenges. NNSA relies on American businesses and labor to execute our national security programs. NNSA provided over \$3.5 billion in funding for contracting opportunities with small businesses and over \$789 million to socially and economically disadvantaged businesses in 2020. This created many high-paying, quality jobs for areas of the country where increased employment opportunities for disadvantaged communities are greatly needed. These investments demonstrate that NNSA's national security missions provide opportunities for all Americans – in fact, our mission success depends on them.

Conclusion

NNSA's diverse and enduring national security missions are crucial to the security of the United States, the defense of its allies and partners, and global stability. NNSA appreciates the many years of bipartisan support from this Committee to our mission and looks forward to continuing to earn that support into the future.