

Testimony of Secretary Rick Perry
U.S. Department of Energy
Before the
U.S. Senate Committee on Appropriations Energy and Water Development
Subcommittee
March 27, 2019

Chairman Alexander, Ranking Member Feinstein, and Members of the Subcommittee, it is an honor to appear before you today to discuss the President's FY 2020 Budget Request ("Budget Request" or "Budget") for the Department of Energy ("the Department" or "DOE").

It continues to be a great privilege and an honor to serve as the 14th Secretary of Energy.

This Budget is a request to the American people through their representatives in Congress to secure America's future through energy independence, scientific innovation, and national security.

As such, it represents a commitment from all of us at DOE that we will honor the trust of our citizens with increased stewardship, accountability, and commitment to excellence. For too long, government success has been measured by how much we spend on it. This Budget Request makes clear that success will be measured by how effectively and efficiently government is able to manage the precious resources entrusted to them by the American taxpayer to achieve its mission.

When I appeared before this Committee last year, I committed to protect our critical electric grid and energy infrastructure from cyber threats; improve resilience and reliability of the Nation's electricity system; make progress on the Federal Government's responsibility to dispose of the Nation's nuclear waste; focus resources on early-stage, cutting edge Research and Development (R&D); advance exascale and quantum computing; address responsibilities for the cleanup and disposition of facilities; and, rebuild and restore our Nation's security.

This FY 2020 \$31.7 billion Budget Request for the Department of Energy ("Budget") focuses on advancing these commitments – from opening a New American Energy Era to sustaining our recent historic economic growth by investing in reliable, affordable energy, transformative scientific innovation, and national security.

The Department's world-leading science and technology enterprise generates the innovations needed to fulfill our missions. Through support of cutting-edge research at our 17 National Laboratories and at over 300 universities across the Nation, we are expanding the frontiers of scientific knowledge and laying the groundwork for new technologies to address our greatest challenges.

When I became Secretary of Energy, I made a promise to visit all 17 of the Department's National Laboratories. I am pleased to report that I have fulfilled that promise and have witnessed first-hand the innovative and brilliant work performed by the dedicated individuals at each of these sites across the Nation. The National Laboratories are doing outstanding work in many areas. Each has a unique, rich history of innovation across a broad scope of scientific expertise, and the record of collaboration across the National Laboratory system – which makes its impact greater than the sum of its parts – has bettered the lives of millions across the globe.

For example, in 2018, the National Laboratories won 32 of the prestigious R&D 100 Awards, including technologies regarding new materials, protecting the environment, incorporating renewable energy reliably to the electric grid, and sophisticated cybersecurity tools. These are just a few examples of the work the National Laboratories have done just last year to push the boundaries of research, development, commercialization, and national security.

I am especially proud of the work the National Laboratories are doing in collaboration with other federal agencies, universities, doctors, and researchers to harness the power of our world-class supercomputers to maintain America's leadership in High Performance Computing (HPC), advance Exascale computing, and push for breakthroughs in Artificial Intelligence (AI).

To do so, this Budget proposes nearly \$11 billion in early-stage R&D that will focus the intellectual prowess of scientists and engineers on the development of technologies that the ingenuity and capital of America's entrepreneurs and businesses can convert into commercial applications and products to improve the lives and security of all Americans. The Budget also invests in laboratory infrastructure and test beds for future breakthroughs in energy. It prioritizes funding to maintain the world-class nature of national laboratory facilities and better facilitate private sector demonstration and deployment of energy technologies.

Securing Against Cyber Threats

In addition to nuclear security, our national security also depends on a resilient electric grid and successfully countering the ever-evolving, increasing threat of

cyber and other attacks on networks, data, facilities, and infrastructure. Among the most critical missions at the Department is to develop science and technology that advances these aims.

At stake is continued U.S. economic competitiveness and leadership, as well as the overall safety and security of the nation. We need to understand the increasing and evolving natural and man-made threats and develop the tools to respond to those threats across our energy infrastructure.

To that end, the Budget provides \$157 million for the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) to develop tools needed to protect the U.S. energy sector against threats and hazards, mitigate the risks and the extent of damage from cyberattacks and other disruptive events, and improve resilience through the development of techniques for more rapid restoration of capabilities.

Securing against cyber threats means we must also protect against threats to the Department's own infrastructure in science, technology, and nuclear security. This Budget takes major steps to safeguard DOE's enterprise-wide assets against cyber threats. It provides \$71 million for the Chief Information Officer directed funding to secure our own networks, modernize infrastructure, and improve cybersecurity across the DOE IT enterprise. Funding for cybersecurity in the National Nuclear Security Administration (NNSA) is increased to \$208 million to enhance security for our nuclear security enterprise. In the Environmental Management program, we provide \$37 million for cybersecurity at seven cleanup sites.

This Budget provides the resources we require to secure DOE systems and energy infrastructure.

Improving Grid Resilience

As we protect our energy infrastructure from cyber threats, we also must improve the resilience and reliability of the nation's electricity system. The Budget provides \$183 million for the Office of Electricity to support transmission system resource adequacy and generation diversity. The Budget will explore new architecture approaches for electric transmission and distribution systems, including the development of the North American Energy Resilience Model that will provide unique and ground-breaking national-scale energy planning and real-time situational awareness capabilities to enhance security and resilience. The Budget continues to advance energy storage through the Advanced Energy Storage Initiative (AESI), including

development of a new Grid Storage Launchpad aimed at accelerating materials development, testing, and independent evaluation of battery materials and systems for grid applications. In addition, the Budget supports R&D at DOE's National Laboratories to develop technologies that strengthen, transform, and improve energy infrastructure so that consumers have access to reliable and secure sources of energy.

Addressing the Imperative of Nuclear Waste Management

The Budget includes \$116 million, of which \$26 million is in defense funds, to move ahead in fulfilling the Federal Government's responsibility to dispose of the Nation's nuclear waste. This request is dedicated to resuming regulatory activities concerning Yucca Mountain and initiating a robust interim storage program.

The Budget Request supports functions necessary to support regulatory activities, including legal support to represent the Department as well as responding to litigation and other legal matters. The Budget also provides for technical and scientific work necessary to support and respond to any challenges in the regulatory process. Resuming regulatory activities at Yucca Mountain and committing to a robust interim storage capability for near-term acceptance of spent nuclear fuel, our Budget demonstrates the Administration's commitment to nuclear waste management and will help accelerate fulfillment of the Federal Government's obligations to address nuclear waste, enhance national security, and reduce future burdens on taxpayers. This also will increase public confidence in the safety and security of nuclear energy, thus helping nuclear energy remain a significant contributor to the country's energy needs for generations to come.

Energy Independence and Innovation

The Budget requests \$2.3 billion in funding for energy independence and innovation. Within the applied energy program offices, the FY 2020 Budget focuses resources on early-stage, cutting-edge R&D conducted by the scientists and engineers at our 17 National Laboratories who are striving to develop the next great innovations that will strengthen American competitiveness and transform society as these breakthroughs reach the private marketplace.

The Harsh Environment Materials Initiative (HEMI) is a new coordinated effort within the Offices of Fossil Energy R&D (FE), Nuclear Energy (NE), and Energy Efficiency and Renewable Energy (EERE) to use common investments. This effort will coordinate interrelated R&D in materials, sensors, and component manufacturing R&D for advanced thermoelectric power plants between FE and NE.

For example, NE's budget includes \$23 million for the Nuclear Energy Enabling Technologies (NEET) Transformational Challenge Reactor program, which enhances the development of breakthrough technologies that provide the ability to manufacture small/micro advanced reactor components using additive manufacturing techniques. Investments will also be aligned with EERE's Advanced Manufacturing Office R&D in materials and manufacturing process research, as well as flexible combined heat and power systems.

The AESI is a coordinated effort across DOE that will accelerate the development of energy storage R&D as key to increasing energy security, reliability, resilience, and system flexibility technologies. The ASEI will focus DOE's efforts to take a broad, more holistic view of energy storage as a set of capabilities with temporal flexibility in the conversion of energy resources to useful energy services. The initiative will develop a coordinated strategy for aligning DOE R&D for cost competitive energy storage services.

The Budget supports, and makes for more efficient, programs focused on bringing technologies to the market in the Office of Technology Transitions, requesting a 7% increase from the FY 2019 enacted level. Through coordination with our Labs, these efforts will reduce costs to the taxpayer while at the same time providing an enhanced technology transfer program to transfer breakthroughs from the National Laboratories to the private sector.

Nuclear Energy

The Budget for Nuclear Energy focuses funding on early-stage R&D, such as the Nuclear Energy Enabling Technologies program, which includes \$23 million for the Transformational Challenge Reactor, at Oak Ridge National Laboratory, to continue to develop an advanced manufacturing technique to demonstrate a new approach to nuclear design, qualification, and manufacturing of advanced reactor technologies.

The FY 2020 Budget includes \$215 million for the Reactor Concepts Research, Development and Demonstration program. Within this total, the Budget provides \$100 million to put DOE on a path to construct the Versatile Advanced Test Reactor, a facility that would enable development and testing of advanced fuels and materials for the next generation of commercial nuclear reactors. This is one of the highest priorities for the Department. The Budget also provides

\$85 million for early-stage R&D on advanced reactor technologies, including \$10 million for the Advanced Small Modular Reactor R&D subprogram.

Within the Fuel Cycle R&D program, the Budget requests \$40 million for the high-assay low-enriched uranium (HALEU) Civil Nuclear Enrichment subprogram. This three-year cost-shared subprogram is designed to demonstrate a specific U.S. enrichment technology that could produce HALEU. We understand that multiple reactor designs under development by U.S. advanced reactor developers will require fuel containing HALEU. In addition, the Budget requests \$36 million for the Fuel Cycle R&D program's early-stage R&D work in support of industry's development of light water reactor accident tolerant fuels.

Finally, the Budget for Nuclear Energy also supports a safeguards and security program with funding at \$138 million for protection of our nuclear energy infrastructure and investments at Idaho National Laboratory facilities.

Fossil Energy Research and Development

The Fossil Energy Research and Development (FER&D) program advances transformative science and innovative technologies needed for the reliable, efficient, affordable, and environmentally sound use of fossil fuels. Fossil energy sources currently constitute over 81 percent of the country's total energy use and are critical for the nation's security, economic prosperity, and growth. The FY 2020 Budget focuses 89 percent, or \$501 million, on cutting-edge fossil energy R&D to secure energy dominance, further energy security, advance strong domestic energy production, and support America's coal industry through innovative clean coal technologies.

FER&D will support early-stage research in advanced technologies, such as materials, sensors, and processes, to expand the knowledge base upon which industry can improve the efficiency, flexibility, and resilience of the existing fleet of coal fired power plants. The request also focuses funding on early-stage component research that will enable the next generation of high efficiency and low emission coal fired power plants that can increase the resiliency and reliability of the electric grid by providing low-cost reliable power 24/7.

Funding is also provided to support competitive awards with industry, National Laboratories and academia geared toward innovative early-stage R&D to improve the reliability, availability, efficiency, and environmental performance of advanced fossil-based power systems. For example, the Advanced Energy Systems subprogram will focus on the following six activities: 1) Advanced

Combustion/Gasification Systems, 2) Advanced Turbines, 3) Solid Oxide Fuel Cells, 4) Advanced Sensors and Controls, 5) Power Generation Efficiency, and 6) Advanced Energy Materials. While the primary focus is on coal-based power systems, improvements to these technologies will result in spillover benefits that can reduce the cost of converting other carbon-based fuels, such as natural gas, biomass, or petroleum coke into power and other useful products in an environmentally-sound manner.

Energy Efficiency and Renewable Energy

The Energy Efficiency and Renewable Energy budget requests \$696 million, including the use of \$353 million in prior year balances, towards maintaining America's leadership in transformative science and emerging energy technologies in sustainable transportation, renewable power, and energy efficiency.

The Budget emphasizes early stage R&D and other activities, which private industry does not have the technical capability to undertake. Knowledge generated by early-stage R&D to facilitate U.S. industries, businesses, and entrepreneurs to develop and deploy innovative energy technologies, and to gain the competitive edge needed to excel in the rapidly changing global energy economy.

The request funds \$105 million for the AESI, which takes a holistic approach to energy storage and develops electric grid technologies to create flexible generation and load, thereby increasing the reliability and resilience of the U.S. electric grid.

The request supports DOE's Grid Modernization Initiative, which includes reliably integrating an increasing amount of variable generation into the electric grid through R&D infrastructure investments at the National Renewable Energy Laboratory (NREL) to accelerate the conversion of the National Wind Technology Center (NWTC) campus into an experimental microgrid capable of testing grid integration at the megawatt scale.

Strategic Petroleum Reserve

The Department of Energy is responsible for the Nation's energy security, and the Strategic Petroleum Reserve (SPR), one component of that effort, protects the U.S. economy from disruptions in critical petroleum supplies and meets the U.S. obligations under the International Energy Program. The Budget includes \$174

million to support the Reserve's operational readiness and drawdown capabilities. The Department is requesting authorization to deposit into the SPR Petroleum Account up to \$27 million in proceeds from the sale of one-million barrels of refined petroleum product (gasoline blendstock) from the Strategic Petroleum Reserve to fund the cost of drawdowns.

The Budget also proposes to disestablish the Northeast Home Heating Oil Reserve (NEHHOR). In its two decades of existence, the NEHHOR has not been used for its intended purpose, and the Administration believes the continued taxpayer-funded expense of maintaining the reserve is unwarranted, particularly as the existing commercial storage contracts are up for renewal in March 2020. The Budget also proposes to disestablish the Northeast Gasoline Supply Reserve (NGSR). The NGSR has not been used since its establishment, and is not considered to be cost efficient or operationally effective. Proceeds of the combined sales of the NEHHOR and NGSR (estimated at \$130 million in receipts, net of the \$27 million retained for mandatory sale drawdown costs) will be contributed to deficit reduction.

Power Marketing Administrations

The Budget includes \$78 million for the Power Marketing Administrations (PMAs). The Budget proposes the sale of the transmission assets of the Western Area Power Administration (WAPA), the Bonneville Power Administration (BPA), and the Southwestern Power Administration (SWPA) and to reform the laws governing how the PMAs establish power rates to require the consideration of market based incentives, including whether rates are just and reasonable. The Budget also proposes to repeal the \$3.25 billion borrowing authority for WAPA authorized by the American Recovery and Reinvestment Act of 2009.

Leading World-Class Scientific Research

The Department of Energy is the Nation's largest Federal supporter of basic research in the physical sciences, and the President's FY 2020 Budget provides \$5.5 billion for the Office of Science to continue and strengthen American leadership in scientific inquiry. By focusing funding on early-stage research, this Budget will ensure that the Department's National Laboratories continue to be the backbone of American science leadership by supporting cutting-edge basic research, and by building and operating the world's most advanced scientific user facilities, which will be used by over 22,000 researchers in FY 2020.

Support for Core Research and Facilities

We provide \$921 million for Advanced Scientific Computing Research, a decrease of \$15 million below the FY 2019 enacted level. This funding will continue supporting the Nation's world-class high-performance computers that make possible cutting-edge basic research, while devoting \$500 million in the Office of Science to reflect the Department's plan to deploy an exascale computing system in calendar year 2021. The FY 2020 Request also supports quantum computing R&D and core research in applied mathematics and computer science, and high-performance computer simulation and modeling.

The Budget also provides \$1.9 billion for Basic Energy Sciences, supporting core research activities in ultrafast chemistry and materials science and the Energy Frontier Research Centers. We will continue construction of the Advanced Photon Source Upgrade at the Argonne National Laboratory, and initiate the Advanced Light Source Upgrade project at the Lawrence Berkeley National Laboratory, and the Linac Coherence Light Source-II High Energy project at SLAC National Accelerator Laboratory. The operations of the light sources across the DOE science complex and supporting research across the Nation maintain U.S. world leadership in light sources and the science they make possible. The Budget also supports continued construction for Spallation Neutron Source Proton Power Upgrade and Second Target Station at Oak Ridge National Laboratory.

The Budget requests \$768 million for High Energy Physics, including \$100 million for construction of the Long Baseline Neutrino Facility and Deep Underground Neutrino Experiment at Fermilab, \$30 million below the enacted FY 2019 level. We will continue to fund ongoing major items of equipment projects, including three new projects at the Large Hadron Collider: the High Luminosity Large Hadron Collider Accelerator Project; the High Luminosity ATLAS; and the High Luminosity CMS detector upgrade projects. By supporting the highest priority activities and projects identified by the U.S. high energy physics community, this program will pursue cutting-edge research to understand how the universe works at its most fundamental level.

The Budget for the Office of Science provides \$403 million for Fusion Energy Sciences, including \$296 million for domestic research and fusion facilities and \$107 million for the ITER project to continue to support delivery of the highest priority in-kind hardware systems contributions. For Nuclear Physics, the budget provides \$625 million to discover, explore, and understand nuclear matter, including \$40 million for continued construction of the Facility for Rare Isotope Beams and operations of facilities. For Biological and Environmental Research,

the Budget includes \$494 million to support foundational genomic sciences, including the Bioenergy Research Centers, and to focus on increasing the sensitivity and reducing the uncertainty of earth and environmental systems predictions.

Advancing Exascale Computing

As I discussed last year, the Department's leadership in developing and building the world's fastest computers faced increasingly fierce global competition over the last decade. Maintaining the Nation's international primacy in high-performance computing is more critical than ever for national security, economic prosperity, and a continued leadership role in science and innovation.

I am proud to say that, as of the present day, the Department is actively sustaining America's leadership in this vital area. As of November, the world's two fastest supercomputers were located at DOE National Laboratories – Summit at Oak Ridge and Sierra at Lawrence Livermore. In fact, the Summit system achieved the global number one ranking as the world's fastest system in June 2016, was delivered nine months ahead of schedule and \$13.5 million below budget, and is another example of the DOE lab continued project management excellence. In all, the Department currently owns five out of the world's top ten supercomputers. In addition, teams from DOE's Oak Ridge and Lawrence Livermore National Laboratories captured the 2018 Gordon Bell Prize, the most prestigious award for achievement in high performance computing software and applications. These coupled achievements in both hardware and software are significant, since it is by sustaining integrated capabilities in hardware, software, algorithms, and applications – along with basic research in applied mathematics – that America will maintain leadership in this critical field.

To cement America's leadership position, the Budget includes \$809 million to accelerate development of an exascale computing system, including \$500 million in the Office of Science (Science) and \$309 million in NNSA. This reflects the Department's plan to deploy an exascale machine for the Office of Science in calendar year 2021 at Argonne National Laboratory, a second machine with a different architecture in the 2021-2022 timeframe at Oak Ridge National Laboratory, and provides support for the procurement of and site preparation for a third exascale system, architecturally similar to the second machine at Oak Ridge, delivered to NNSA at Lawrence Livermore National Laboratory in FY 2023.

To achieve these goals, the Science/NNSA partnership will focus on hardware and software technologies needed to produce an exascale system, and the critical DOE

applications needed to use such a platform. This world-leading exascale program will bolster our national security by supporting the nuclear stockpile, while also supporting the next generation of scientific breakthroughs not possible with today's computing systems.

Quantum Information Science

Even as we prepare to deploy exascale systems, we are pursuing research in Quantum Information Science (QIS), an emerging multidisciplinary area that has the potential to define the next frontier in information processing and a range of other fields. Our QIS effort is genuinely interdisciplinary, a \$168 million investment involving all six major DOE Office of Science program offices: Advanced Scientific Computing Research (ASCR), Basic Energy Sciences (BES), Biological and Environmental Research (BER), Fusion Energy Sciences (FES), High Energy Physics (HEP), and Nuclear Physics (NP).

The potential of QIS to contribute to a wide range of disciplines is striking. Quantum computing promises the capability to attack large problems that elude classical computing and to provide new insights into materials and chemistry through accurate modeling and simulation of quantum systems. In addition, QIS holds the potential of developing exquisitely sensitive quantum sensors, for applications ranging from biology to the effort to detect Dark Matter. Finally, QIS may hold the key to ultra-secure networking, at a time when cybersecurity is a mounting concern.

The Budget provides \$40 million to ASCR, BES and HEP to establish a new QIS center, which would integrate universities with National Laboratories, through investments across all six Science program offices. We are seeking to sustain U.S. leadership in this important and highly competitive area.

Artificial Intelligence/Machine Learning

Artificial Intelligence (AI), including Machine Learning (ML) defines another critical cross-disciplinary activity, with the potential to contribute to advances across multiple fields. This is another rapidly developing area in which it is vital for America to maintain a leadership role.

In a world awash with data, AI holds the promise of harnessing and deriving new insights from massive data sets. The massive quantities of data generated by DOE Office of Science user facilities such as X-ray lights sources are believed to provide a major opportunity for the development of new AI applications for data analysis.

It is also believed that AI may provide a pathway to improving the performance of particle accelerators and other key facilities. The FY 2020 Budget provides \$71 million for AI/ML spread across all six Science program offices for both the application of AI/ML to research and the development of new AI/ML approaches and algorithms as well as \$48 million requested in the FY 2020 Budget for NNSA for AI.

Microelectronics

By virtue of its leadership in supporting high-performance computing, as well as its longstanding sponsorship of research in materials science, the DOE Office of Science has been a major contributor over the decades to the development of microelectronics. Science has helped lay the fundamental scientific foundation for advances in these technologies, while partnering with industry in the development of new systems requiring new chips. This role is becoming increasingly important as we approach the end of Moore's Law and stand at the threshold of what is likely to be a new era in microelectronics. In an important new initiative, the FY 2020 Budget provides \$25 million for redoubled research efforts on microelectronics. The research will benefit from groundwork laid at an October 2018 DOE workshop on "Basic Research Needs in Microelectronics," bringing together top experts and co-sponsored by ASCR, BES, and HEP.

Biosecurity

As mentioned, back in 1986, the Department provided the original impetus and idea for the Human Genome Project, and later partnered with the National Institutes of Health, to successfully complete the sequencing of a human genome in 2000. Since then the Department's Office of Science has remained on the cutting-edge of genomics-based system biology, making major contributions to the continued advancement of the relevant technologies. These dual use technologies have now advanced to a point where they pose new and unprecedented security challenges. To address this growing challenge, the FY 2020 Budget includes \$20 million for BER for research related to biosecurity.

Isotopes

One of the Department's important contributions to medicine and industry is the Isotope Development & Production for Research and Applications Program, known more simply as the DOE Isotope Program. The program, managed by Science's Office of Nuclear Physics, supports the production and development of production techniques, as well as radioactive and stable isotopes that are in short supply for

research and applications. In doing so, it provides a vital contribution to research, medicine, and industry. The Budget provides \$5 million to initiate a construction project for a U.S. Stable Isotope Production and Research Center at ORNL.

Fulfilling Legacy Cleanup Responsibilities

The mission of the Department's Environmental Management (EM) program is to complete cleanup of legacy nuclear weapons development and research sites. It is the largest program of its kind in the world and represents one of the top financial liabilities to the American taxpayer. EM is working collaboratively with regulators, federal, state, and local governments, and others toward a future that drives cleanup toward completion safer, sooner and at a responsible cost. As EM is put on a sustainable path forward, the FY 2020 Budget Request provides the resources necessary to build upon recent successes and bring a renewed sense of urgency to the program for meaningful and measurable progress at projects and sites throughout the cleanup complex.

The Budget Request includes \$6.5 billion for EM to address its responsibilities for the cleanup and disposition of excess facilities, radioactive waste, spent nuclear fuel, and other materials resulting from five decades of nuclear weapons development and production and Government-sponsored nuclear energy research. To-date, EM has completed cleanup activities at 91 sites in 30 states and Puerto Rico, and is responsible for cleaning up the remaining 16 sites in 11 states –some of the most challenging sites in the cleanup portfolio.

The Budget Request includes \$1.4 billion for the Office of River Protection at the Hanford Site for continued work at the Hanford Tank Farms and to make progress on the Waste Treatment and Immobilization Plant. This budget will continue progress toward important cleanup required by the Consent Decree and Tri-Party Agreement to include a milestone to complete hot commissioning of the Low Activity Waste Facility by December 31, 2023. The Budget also includes \$718 million to continue cleanup activities at Richland. The Budget continues River Corridor decontamination and decommissioning activities including remediation of the highly contaminated 300-296 waste site under the 324 Building. For Savannah River, the Budget provides \$1.6 billion, \$91 million above enacted FY 2019, to support activities at the site. This will include the Liquid Tank Waste Management Program, completing cold commissioning beginning operation of the Salt Waste Processing Facility, continued construction activities for Saltstone Disposal Unit #7 and #8/9 design and construction activities for Saltstone Disposal Unit #10-#12, and funding to support design and construction of the Advanced Manufacturing Collaborative facility.

The Waste Isolation Pilot Plant (WIPP) is essential for the disposition of transuranic defense-generated waste across the DOE complex, and the Budget provides \$398 million to safely continue waste emplacement at WIPP. The Budget Request will continue WIPP operations, including waste emplacements, shipments, and maintaining enhancements and improvements, and progress on critical infrastructure repair/replacement projects, including \$58 million for the Safety Significant Confinement Ventilation System and \$35 million for the Utility Shaft (formerly Exhaust Shaft). These steps will increase airflow in the WIPP underground for simultaneous mining and waste emplacement operations.

The Budget Request includes \$348 million to continue cleanup projects at the Idaho site, such as the Integrated Waste Treatment Unit, and to process, characterize, and package transuranic waste for disposal at offsite facilities. It provides \$429 million for Oak Ridge to continue deactivation and demolition of remaining facilities at the East Tennessee Technology Park, continue preparation of Building 2026 to support processing of the remaining U-233 material at the Oak Ridge National Laboratory, and support construction activities for the Outfall 200 Mercury Treatment Facility at the Y-12 National Security Complex and design for a new On-Site Waste Disposal Facility to support cleanup.

For Portsmouth, the Budget Request includes \$426 million to continue progress on the deactivation and decommissioning project at the Portsmouth Gaseous Diffusion Plant, safe operation of the Depleted Uranium Hexafluoride Conversion Facility, and construction activities at the On-Site Waste Disposal facility. At Paducah, the Budget Request includes \$277 million to continue ongoing environmental cleanup and depleted uranium hexafluoride (DUF6) conversion facility operations at the Paducah site. In addition, the FY 2020 Budget Request supports activities to continue the environmental remediation and further stabilize the gaseous diffusion plant.

The Budget continues funding of \$128 million to address specific high-risk contaminated excess facilities at Lawrence Livermore National Laboratory.

Together, these investments for EM will make significant progress in fulfilling our cleanup responsibilities while also beginning to address our high-risk excess facilities at NNSA sites.

National Security through Nuclear Security: Sustaining and Modernizing the Nuclear Stockpile and Infrastructure

Our national security rests upon the foundation of the Nation's nuclear security enterprise and the deterrent it provides. The Budget funds the overdue modernization of the nuclear stockpile and the aging infrastructure that supports it; strengthens key science, technology, and engineering capabilities that support stockpile modernization; reduces global nuclear threats through nonproliferation and counterterrorism initiatives; and designs and maintains safe and effective nuclear propulsion systems for the U.S. Navy for years to come.

The Budget fulfills the President's vision of rebuilding and restoring our Nation's security through investments in the Department's nuclear security mission. The Budget provides \$16.5 billion for the National Nuclear Security Administration (NNSA). Of this amount, the Budget Request includes \$12.4 billion for Weapons Activities. This \$1.3 billion increase supports maintaining the safety, security, and effectiveness of the nuclear stockpile; continuing the nuclear modernization program; and modernizing NNSA's nuclear security infrastructure portfolio in alignment with the Nuclear Posture Review.

The Budget includes \$2.1 billion for our ongoing Life Extension Programs (LEP), Major Alteration, and Modifications, a \$197 million increase. I am pleased to report that the W76-1 LEP completed its last production unit in December 2018. Final deliveries to the Navy will be completed by the end of this fiscal year. The W76-2 Modification, the low-yield variant of the W76, is on schedule, on budget, and will be completed consistent with Nuclear Weapons Council (NWC) direction. Funding for the B61-12 LEP and the W88 Alteration 370 will keep us on schedule to deliver the first production units in FY 2020. The Budget also supports the Air Force's Long-Range Stand-Off program through an increase of \$244 million from the FY 2019 enacted level for the W80-4 LEP to deliver the first production unit in FY 2025 of the cruise missile warhead. The request includes \$112 million for the W87-1 Modification Program, which will replace the W78, one of the oldest warheads in the stockpile, by 2030.

The Weapons Activities Budget request also includes \$309 million for NNSA collaboration with the Office of Science on the development of exascale computer systems; \$778 million for the protection of personnel, facilities, nuclear weapons, and materials across the Department's nuclear security enterprise; and \$232 million for information technology and cybersecurity protection.

The infrastructure portion in Weapons Activities increases investments to modernize our nuclear infrastructure, improve working conditions of NNSA's aging facilities and equipment, and address safety and programmatic risks through facility and equipment recapitalization and the stabilization of deferred maintenance. In this Budget is \$745 million for construction of the Uranium Processing Facility, which is needed to replace deteriorating facilities at the Y-12 National Security Complex, as well as \$123 million for the High Explosives Science and Engineering Facility at Pantex, \$27 million for a Tritium Finishing Facility at the Savannah River Site (SRS), and \$32 million for a Lithium Processing Facility at Y-12. The Budget also includes \$168 million to support the Department's commitment to finishing the Chemistry and Metallurgy Research Replacement Facility Project, which is necessary to support the pit production mission and other actinide activities at Los Alamos National Laboratory (LANL).

The highest NNSA infrastructure priority is re-establishing a plutonium pit production capability to meet military requirements, supported by numerous studies and analyses, of no fewer than 80 war reserve pits per year by 2030. Last May, the NWC endorsed NNSA's recommended alternative calling for plutonium pit production at LANL and SRS. This two-site approach bolsters the nuclear security enterprise's responsiveness and resiliency.

The Budget also includes \$2.0 billion for the Defense Nuclear Nonproliferation program to reduce global threats from nuclear weapons. This critical national security program prevents the spread of nuclear and radiological materials, and technologies, advances technologies that detect nuclear and radiological proliferation worldwide, and eliminates or secures inventories of surplus materials and infrastructure usable for nuclear weapons.

The Budget invests \$774 million at SRS in FY 2020, a 76 percent increase over FY 2019. NNSA will continue termination activities for the orderly and safe closure of the Mixed Oxide Fuel Fabrication Facility Project. The Budget will also continue to pursue a dilute and dispose strategy to fulfill the U.S. commitment to dispose of 34 metric tons (MT) of plutonium and modernize SRS infrastructure to support the tritium supply chain.

The Budget provides \$372 million for Nuclear Counterterrorism and Incident Response, \$53 million above the FY 2019 enacted level, to work domestically and around the world to improve our ability to respond to radiological or nuclear incidents, in conjunction with other agencies in a broader U.S. Government effort.

In the NNSA's Office of Naval Reactors, the Department has the ongoing

responsibility to provide militarily effective nuclear propulsion plants for the Navy and to ensure their safe, reliable and long-lived operation. The Budget provides \$1.6 billion to support the operation of the Navy's nuclear-powered fleet, the continuation of the *Columbia*-class reactor plant design, refueling of the land-based prototype reactor, and the construction of the Naval Spent Fuel Handling Facility.

Today, nearly 45% of the Navy's major combatants are nuclear powered. The Department's role in propulsion plant design, spent fuel handling, and recapitalization is critical to the Navy's ability to conduct its missions around the globe.

Finally, the Budget includes \$435 million for Federal Salaries and Expenses at the NNSA. This \$25 million increase is essential to ensuring our world-class workforce of dedicated men and women can effectively oversee NNSA's critical national security missions.

Focusing Priorities on Core Missions

The Budget continues to focus the Department's energy and science programs on early-stage research and development at our National Laboratories to advance American primacy in scientific and energy research in an efficient and cost-effective manner.

Also, in line with Administration priorities, the Budget terminates the Advanced Research Projects Agency-Energy, known as ARPA-E, and the Department's Loan Programs, while maintaining necessary federal staff to oversee existing awards and loans. Termination of these programs will save over \$850 million in FY 2020 alone while significantly reducing financial risk to the taxpayer moving forward.

Conclusion

In conclusion, I reaffirm my pledge that the Department of Energy, along with our National Laboratories, will continue to support the world's best enterprise of scientists and engineers who create innovations to drive American security, prosperity, and competitiveness. The President's FY 2020 Budget Request for the Department of Energy reflects the priorities to enhance our energy, economic, and national security today, while making strategic investments to accelerate the breakthroughs that will fuel America's tomorrow.

In the coming weeks and months, I look forward to working with you and your

colleagues in Congress on the specific programs mentioned in this testimony and throughout the Department. Congress has an important role in the path forward on spending decisions for the taxpayer, and I will, in turn, ensure DOE is run efficiently, effectively, and that we accomplish our mission-driven goals. Thank you, and I look forward to answering your questions.