Defense Nuclear Nonproliferation
Proposed Appropriation Language

For Department of Energy (DOE) expenses, including the purchase, construction, and acquisition of plant and capital equipment and other incidental expenses necessary for Defense Nuclear Nonproliferation activities, in carrying out the purposes of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion [$2,260,000,000]*$2,346,257,000*, to remain available until expended.

Explanation of Change

The FY 2023 Budget Request for the Defense Nuclear Nonproliferation appropriation reflects an overall 3.8% increase from the FY 2021 Enacted level. This change is comprised of increases for: a new high-assay low-enriched uranium (HALEU) recovery project; increased support for arms control monitoring and verification; and for Counterterrorism and Counterproliferation to address critical gaps in nuclear counterproliferation; and support for the Nuclear Emergency Support Team (NEST) to execute the DOE's Primary Mission Essential Function – 2, *Respond to Nuclear Incidents*.

Public Law Authorizations:

- P.L. 106-65, National Nuclear Security Administration Act, as amended
- P.L. 117-81, National Defense Authorization Act for Fiscal Year 2022
- P.L. 117-103, Consolidated Appropriations Act, 2022

Defense Nuclear Nonproliferation

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Defense Nuclear Nonproliferation Appropration	**2,260,000**	**2,260,000**	**2,346,257**	**+86,257**	**+3.8%**

Overview

The Department of Energy's National Nuclear Security Administration's (DOE/NNSA) nonproliferation, counterproliferation, and counterterrorism activities are critical to implementing the President's *Interim National Security Strategic Guidance* and the 2022 Nuclear Posture Review by demonstrating renewed American nonproliferation leadership. DOE/NNSA's programs help reduce the dangers posed by nuclear weapons by extending the United States' defenses against nuclear threats far beyond its borders. These programs help prevent adversaries from acquiring nuclear weapons or weapons-usable materials, technology, and expertise; counter adversary efforts to acquire such weapons or materials; and respond to nuclear or radiological incidents and accidents domestically and abroad. DOE/NNSA shares knowledge, accrued through its long experience in managing special nuclear materials, with partners around the world to achieve its international nonproliferation and nuclear security goals. DOE/NNSA leverages the unique technical and scientific expertise that underpins the Stockpile Stewardship Program for a range of nonproliferation and counterterrorism missions, from assessing foreign weapons programs and potential terrorist devices to managing the proliferation risks posed by civil nuclear applications.

The Defense Nuclear Nonproliferation appropriation funds six programs in the FY 2023 Budget Request. These programs, reduce the threats of weapons of mass destruction (WMD), provide policy and technical leadership to prevent or limit the spread of WMD-related materials, technology, and expertise; develop technologies to detect nuclear proliferation; verify international agreements and arrangements; secure or eliminate inventories of nuclear weapons-related materials and infrastructure; anticipate and detect threats and broaden DOE's role in national biodefense; ensure nuclear emergency support team (NEST) personnel are trained and equipped to respond to all manner of nuclear and radiological incidents worldwide; and apply a comprehensive and integrated approach to emergency management and continuity of operations to safeguard health and safety, protect the environment, and enhance the resilience of the Department and the Nation.

DOE/NNSA advances the security and safety of the United States through three enduring mission pillars: maintaining a safe, secure, and effective nuclear weapons stockpile; reducing the threat of nuclear proliferation and nuclear terrorism; and providing naval nuclear propulsion. As such, the Defense Nuclear Nonproliferation appropriation programs' mission is complementary to the missions of the Office of Defense Programs (DP) and the Office of Naval Reactors (NR). Together, they form the basis for providing a strong nuclear defense strategy. These activities are carried out within a dynamic global security environment, as described in DOE/NNSA's annual reports, the *Prevent, Counter, and Respond – A Strategic Plan to Reduce Global Nuclear Threats* and the *Stockpile Stewardship Management Plan.*

This global threat landscape is characterized by states with existing nuclear weapons capabilities, such as Russia and China, that continue to selectively expand and diversify their arsenals; destabilizing proliferation activities by states with emerging or latent capabilities, including Iran and North Korea; and the risk of hostile non-state actors gaining access to nuclear or radioactive material that can be used for malicious purposes. There is also an increased risk stemming from the availability of nuclear and radioactive materials as a result of the global expansion of commercial nuclear power and possible spread of fuel cycle technology, increased opportunities for illicit nuclear material trafficking and sophisticated procurement networks, and technology advances (including cyber-related tools) that may shorten nuclear weapon development timelines and complicate nuclear safeguards and security missions. Additionally, the rapid development and global dispersion of emerging technologies could improve U.S. capabilities to detect and respond to proliferation or, alternatively, could be used by adversaries to lower the barriers to proliferation or enable new proliferation pathways.

One of these emerging technologies is biotechnology. While biotechnology provides enormous potential for the U.S. economy, it also carries the potential for new risks to security. NNSA will leverage its experience with sensitive nuclear

programs, and capabilities and expertise developed at the National Laboratories in areas such as high-performance computing, modeling and simulation, laboratory analyses, and data analytics, to establish a national security bioassurance research and development program that focuses on anticipating and detection threats emerging from biotechnology work and steps to protect the future bioeconomy.

The Defense Nuclear Nonproliferation appropriation programs – comprised of the Office of Defense Nuclear Nonproliferation (DNN), the Office of Counterterrorism and Counter Proliferation (CTCP), and the Office of Emergency Operations (EO)– execute their missions in partnership with other U.S. Government agencies, most notably the Departments of State, Defense, Justice, and Homeland Security, the Intelligence Community, and the Nuclear Regulatory Commission (NRC). Internationally, the programs have a strong and long-established partnership with the International Atomic Energy Agency (IAEA). DOE/NNSA has active program coordination mechanisms through the Global Initiative to Combat Nuclear Terrorism (GICNT), the Global Partnership against the Spread of Weapons and Materials of Mass Destruction, the Nuclear Security Contact Group (NSGC), UNSCR 1540 Committee, International Criminal Police Organization (INTERPOL), and the reoccurring IAEA-hosted International Conference on Nuclear Security (ICONS).

In carrying out WMD threat reduction activities, the Defense Nuclear Nonproliferation programs depend on the scientific and technical expertise of the Department and the U.S. National Laboratories, as well as the capacity for international outreach, engagement, and project management, implementation, and policy expertise. DNN also relies on competencies of other elements of DOE/NNSA and DOE, particularly the Office of Nuclear Energy, the Office of Environmental Management (EM), and the Office of Science (SC).

The major elements of the Defense Nuclear Nonproliferation appropriation account include the following:

Material Management and Minimization (M3)
M3 programs reduce and, when possible, eliminate weapons-usable nuclear material around the world to achieve permanent threat reduction. The FY 2023 Budget Request supports the conversion or shutdown of research reactors and isotope production facilities that use highly enriched uranium (HEU), the qualification of new low-enriched uranium (LEU) fuels, the continued support of non-HEU-based molybdenum-99 (Mo-99) production facilities in the United States, the optimization of proliferation resistance in reactor designs, the HALEU recovery project, the removal and disposal of weapons-usable nuclear material, the continuation of activities to disposition plutonium from the state of South Carolina, implementation of the dilute and dispose strategy for plutonium disposition, and downblending HEU.

Global Material Security (GMS)
GMS directly contributes to national security efforts to reduce global nuclear and radiological security threats. The FY 2023 Budget Request supports programs to prevent terrorists and other actors from obtaining nuclear and radioactive material to use in an improvised nuclear device (IND) or a radiological dispersal device (RDD) by working domestically and with partner countries to improve the security of vulnerable materials and facilities and to build partners' capacity to detect, disrupt, and investigate illicit trafficking of these materials. GMS works with countries in bilateral partnerships, and with multilateral partners such as the IAEA, the GICNT, and INTERPOL. As part of an ongoing strategic analysis process, GMS is also exploring innovative approaches, technologies, and tools to adapt to emerging threats and the growing demand for nuclear energy and technology. GMS supports U.S. national security priorities to reduce global nuclear security threats and sustain access to needed peaceful applications of nuclear technology that support climate change, energy security, and global health priorities.

Nonproliferation and Arms Control (NPAC)
NPAC programs contribute to standing DOE/NNSA statutory and treaty/agreement obligations and authorities, prevent nuclear and dual-use technology from being exploited or diverted by adversaries, identify emerging technologies of potential proliferation concern, and consider ways to mitigate them. NPAC programs also strengthen the international nuclear safeguards regime and the IAEA's ability to verify peaceful uses of nuclear materials and facilities and detect non-compliance or illicit diversion of materials, reduce proliferation concerns by enabling verifiable arms reductions, and support negotiation and implementation of U.S. nonproliferation and arms control treaties and agreements, while ensuring U.S. requirements for maintaining a safe, secure, and reliable nuclear weapons stockpile are met. The FY 2023 Budget Request supports IAEA and partner countries' efforts to implement international safeguards obligations, builds domestic and international capacity to implement export control obligations, supports the negotiation of and implement agreements

and associated monitoring regimes to verifiably reduce nuclear weapons and nuclear programs, and develops approaches and strategies to address emerging nonproliferation and arms control challenges and opportunities.

Defense Nuclear Nonproliferation Research and Development (DNN R&D)
DNN R&D directly contributes to nuclear security by developing U.S. capabilities to detect and characterize global nuclear security threats in full coordination with the goals and priorities of U.S. Government mission stakeholders across nonproliferation, counterterrorism, and emergency response mission areas. In addition, DNN R&D sustains and develops foundational nonproliferation technical competencies that ensure the technical agility needed to support a broad spectrum of U.S. nonproliferation missions and anticipate threats. To do these activities, DNN R&D leverages the unique facilities and scientific skills of DOE, academia, and industry to perform research and demonstrate advances in capabilities, develop prototypes, and produce sensors for integration into operational systems. The FY 2023 Budget Request supports planned activities for the early detection of proliferation-related R&D and continued production of nuclear detonation detection satellite payloads. The request also supports continued efforts to sustain and develop foundational nonproliferation technical competencies by providing targeted, long-term support for enabling infrastructure, science and technology, and an expert workforce, and it continues to develop and maintain advanced technical nuclear forensics analysis capabilities at the U.S. National Laboratories that can support time-critical decisions in the event of a nuclear or radiological incident and assist in determining the origin of interdicted materials or nuclear devices.

DOE/NNSA Bioassurance Program
The DOE/NNSA Bioassurance Program establishes a national security R&D program to anticipate and detect threats and broaden DOE's role in national biodefense. The DOE/NNSA Bioassurance Program complements DOE's support of other departments and agencies in biodefense. The program addresses work in close coordination with DOE's Office of Science (SC). Integrating DOE/NNSA's high-security work with SC's supported "open" science provides the full spectrum of capabilities essential for a bioassurance program informed by national security expertise that is drawn from parallel and analogous work on nuclear threats, risks, export controls and licensing, nonproliferation, detection, and verification.

Nonproliferation Construction (supports Material Management and Minimization)
Nonproliferation Construction consolidates construction costs for DNN projects in support of the dilute and dispose strategy for surplus plutonium disposition. The Surplus Plutonium Disposition (SPD) project will add additional glovebox capacity at the Savannah River Site to accelerate plutonium dilution and aid in the removal of plutonium from the state of South Carolina. The FY 2023 Budget Request supports completing the final design review and continues activities to request CD-2/3, *Approval of Performance Baseline and Start of Construction*, to initiate full construction on the SPD project.

Nuclear Counterterrorism and Incident Response Program (NCTIR)
The NCTIR program sustains the United States' nuclear counterterrorism and counterproliferation activities as well as operational nuclear incident response capabilities while supporting DOE's all-hazards emergency management system. The CTCP subprogram provides the Nation's technical capability to understand and defeat nuclear devices, including INDs and lost or stolen foreign nuclear weapons. This knowledge in turn informs U.S. Government policies, regulations, and key Department of Defense (DoD) mission partners on terrorist and proliferant state nuclear threats and related contingency planning. In support of the nuclear counterterrorism mission, the FY 2023 Budget Request for NCTIR supports programs to manage and deploy the DOE/NNSA NEST, comprised of scientific and technical experts who are trained and equipped to respond rapidly to nuclear or radiological incidents and accidents worldwide. NEST includes scientific nuclear forensics capabilities to identify the origin of nuclear material interdicted outside of regulatory control or used in a nuclear attack. Additionally, CTCP educates international partners to respond effectively to nuclear or radiological incidents in their countries. Finally, CTCP integrates DOE/NNSA policy, planning, and operations on counterproliferation priorities, supporting urgent needs and proactively pursuing opportunities to prevent nuclear threats and develop technologies to apply to the counterproliferation mission.

Additionally, NCTIR executes the DOE/NNSA's Emergency Operations (EO) subprogram. EO provides both the structure and processes to ensure a comprehensive and integrated approach to emergency management, continuity of operations, and higher-level continuity programs, thereby safeguarding the health and safety of workers and the public, protecting the environment, and enhancing the resilience of the Department and the Nation. In addition, EO coordinates a whole-of-community approach to mitigating, preventing, preparing for, responding to, and recovering from all-hazards emergencies,

improving readiness and effectiveness of the DOE Emergency Management System on a programmatic and performance level, while promoting unity of effort and a culture of continuous improvement.

Highlights and Major Changes in the FY 2023 Budget

FY 2023 request includes:

- DNN programs: $1.974.6 billion, an increase of $106.5 million, or 5.7%, from the FY 2021 Enacted level. The increase will fund the initiation in FY 2023 of a three-year project to recover 2.2 metric tons of HALEU scrap at Y-12 to support advanced reactor demonstration projects and a monitoring and verification initiative to bolster the expertise and technology critical to sustaining DOE/NNSA's arms control mission and accelerate the development of new technologies and approaches. The increase also supports the establishment of a Bioassurance Program to anticipate and detect threats and broaden DOE's role in national biodefense.
- NCTIR: $439.0 million, an increase of $61.5 million, or 16.3%, from the FY 2021 Enacted level. This increase is due to the need to address a critical gap in nuclear counterproliferation with new and innovative technology developments and addresses gaps identified in the NEST workforce study in FY 2019. There is also a decrease in EO associated with the realignment of management responsibility and authority for IT and Cyber services, offset by an increase, also in EO, for investment in consolidated emergency operations center and alternate operations centers' infrastructure and supporting communications equipment, as well as classified communications system improvements to support continuity operations and infrastructure improvements required by OMB/OSTP Directive 16-1 and EO 13961.
- Legacy Contractor Pensions and Settlement Payments $55.7 million, an increase of $41.4 million, or 288.3%, from the FY 2021 Enacted level reflects expansion of this budget line to include funding for the Requa settlement reached in 2019 as well as a portion of an unfunded pension liability at the Savannah River Site in addition to DOE's annual reimbursement made to the University of California (UC) Retirement Plan (UCRP) for former UC employees and annuitants who worked at the Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL).

Note:
Funding amounts referenced in the above bullets include the use of $123.0 million of prior year balances to fund program activities in FY 2023 (including $79.9 million remaining from the Mixed Oxide Fuel Fabrication Facility project), and allows DNN to reduce the request for new FY 2023 funding by this amount.

FY 2024 – FY 2027 Key Milestones

Material Management and Minimization

- FY 2024 - Establish reliable domestic Mo-99 production without use of HEU.
- FY 2024 – Pack and deliver scrap material from Y-12 to a domestic commercial processor and initiate commercial material recovery process as part of the = HALEU recovery project.
- FY 2024 – Conduct a training exercise of the Mobile Packaging capabilities.
- FY 2024 – Initiate hiring, training, and qualification for operators for the SPD Project gloveboxes.
- FY 2024 – Achieve Approval of Alternative Selection and Cost Range Critical Decision, CD-1 for the Pit Disassembly and Processing (PDP) project.
- FY 2024 - Complete DNN's portion of Area 5 De-inventory (A5D) and Building 9212 low equity discards at Y-12.
- FY 2024 – FY 2027 – Continue to eliminate excess HEU and plutonium globally.
- FY 2024 – FY 2027 - Continue to convert research reactors from the use of HEU fuel to LEU fuel or verify the shutdown of HEU fueled research reactors.
- FY 2025 - Complete final excess HEU shipment from Y-12 included in the Down-blending Offering for Tritium (DBOT) contract.
- FY 2025 – FY 2027 – Execute commercial process to recover material and convert to oxide as part of the HALEU recovery project.
- FY 2026 – Conduct a training exercise of the Mobile Packaging capabilities.
- FY 2027 – Submit application to the NRC for the qualification of high-density LEU fuel for the U.S. High Performance Research Reactors.

Office of Global Material Security

- FY 2024 – Commence at least one partnership with a U.S. company on Security by Design for advanced reactors/small modular reactors.
- FY 2024 – Complete upgrades at the Regional Center for Nuclear Studies in Kinshasa (CREN-K) research reactor in the Democratic Republic of Congo.
- FY 2024 – Maintain long-term nuclear security engagements and partnerships with more than 60 countries.
- Complete the 2019 NDAA target of replacing nearly all cesium-137 blood irradiators in the United States by the end of FY 2027.
- Work domestically and internationally to replace 350 devices that use radioactive material with safer alternatives that pose no RDD risk.
- Protect an additional 200 additional buildings that contain radioactive material.
- FY 2025 – Expand counter nuclear smuggling partnerships to at least five countries Africa, with a focus on the Sahel, and to three countries in Southeast Asia to create layered defenses to disrupt smuggling activity.
- FY 2026 – Deploy counter nuclear smuggling systems to frontier area and law enforcement partners in at least 15 partner countries to complement point of entry deployment deployments and create layered defenses against smuggling activity.
- FY 2026 – Establish counter nuclear smuggling capability and technical cooperation with 95 countries.
- FY 2027 – Support over 80% of partner agencies to demonstrate operational capability of systems to counter nuclear smuggling.

Nonproliferation and Arms Control

- FY 2024 – Commission and begin operation of a nonproliferation testing and training platform for use in testing and validation of IAEA safeguards technologies and training of IAEA inspectors and analysts.
- FY 2024 – Complete the dedicated Test and Demonstration Bay at Pantex for the development of stretch verification approaches and tools.
- FY 2024 – FY 2027 - Maintain technical and manpower readiness for future U.S.-led monitoring and verification of denuclearization activities through regular verification team exercise and training events, approximately four per year.
- FY 2024 – Complete upgrades to e810 in response to industry and internal feedback.
- FY 2024 – FY 2027 – Conduct approximately 80 training and outreach events, annually, for U.S. enforcement agencies and foreign partners to strengthen global export control implementation.
- FY 2024 – FY 2027 – Support U.S. Government nonproliferation objectives in the multilateral regimes through review of technical proposals strengthening the guidelines and control lists, and review IAEA Technical Cooperation projects for proliferation and export control issues.
- FY 2027 – Complete the negotiations of eight 123 Agreements and their associated Administrative Arrangements.

Defense Nuclear Nonproliferation Research and Development

- FY 2024, FY 2026 – Award new university consortia focused on nuclear nonproliferation, and nuclear engineering.
- FY 2024 – FY 2027 – Conduct multiple experimental field campaigns for nuclear material production detection.
- FY 2024 – Deliver first Global Burst Detector IIIF payload to the U.S. Air Force in accordance with negotiated schedule.
- FY 2024 – Validate a 3D Computational Fluid Dynamics advanced material production modeling and simulation capability against real-world nonproliferation benchmarks and challenges.
- FY 2024 – Complete development of a new testbed focused on understanding signatures of the use of advanced manufacturing for nuclear weapons development and conduct inaugural experimental field campaign.
- FY 2025 – Achieve fully operational uranium sciences capability with optimized material science, computational science, and advanced enrichment methods capabilities that address evolving nuclear threats.
- FY 2025 – Conduct uranium and plutonium processing experiments to study material provenance signatures.
- FY 2026 – Conclude first phase of integrated field experiments at the Low-Yield Nuclear Monitoring testbed, designed to improve U.S. capabilities to detect and characterize low-yield and evasively conducted underground nuclear explosions.
- FY 2027 – Develop the Source Physics Experiment Phase III testbed and conduct a high-explosive experiment to collect data aimed at improving yield estimation and discrimination between nuclear detonations and seismic events.

NNSA Bioassurance Program

- FY 2024 – Complete requirements framework for prioritizing research and procurements, including risk assessment and plan for pilot technology demonstrations that identify and leverage state-of-the-art test beds and other research facilities and platforms across DOE, NNSA, and the interagency.
- FY 2024 – Complete S&T plan, including objectives and requirements for predictive modeling capability.
- FY 2024 – Complete framework for partnerships that leverages private industry advances and provides pathways for technology transition.
- FY 2025 – Award lab-university consortium focused on emerging and converging biotechnologies, biosecurity, and biodefense research and development needs.
- FY 2026 – Demonstrate capabilities to evaluate and anticipate threats from emerging and converging technologies.
- FY 2026 – First demonstration of a bioassurance test bed.

Nuclear Counterterrorism and Incident Response Program (NCTIR)

- FY 2024 – FY 2027 – Ensure NEST equipment modernization is on pace to enable successful responses to radiological/nuclear incidents.
- FY 2024 – FY 2027 – Enhance interagency coordination of training events, exercises, and response operations to improve NEST capabilities.
- FY 2024 – FY 2027 – Validate the increase in the Federal Radiological Modeling and Assessment Center response capacity to better support large or complex events (i.e., Type 1 responses, such as continuous radiation release from a nuclear power plant).
- FY 2024 – FY 2027 – Certify improvements to the National Atmospheric Release Advisory Center's modeling capabilities to meet maximum demands for real-world responses.
- FY 2024 – FY 2027 – Deliver enhanced Accident Response Group support to MOD changeouts, including builds of high-fidelity training devices.
- FY 2024 – FY 2027 – Provide expanded technical and policy solutions to the U.S. Government's counterproliferation toolkit to disrupt global nuclear proliferation.
- FY 2024 – FY 2027 – Execute a series of integrated experiments to validate risk assessments of nuclear materials and threat devices.
- FY 2024 – Complete the transition of the U.S. Government interagency nuclear forensics capability to NNSA to support the characterization and attribution of nuclear material, device, accident, or attack.
- FY 2024 – FY 2025 – Complete examination of the technical and operational capability to conduct Design Heritage assessments for attributing origin of a device and material used in an attack.
- FY 2024 – FY 2027 – Complete development and field new nuclear forensics capabilities to accelerate attribution timeliness: perform high confidence in-field measurements of short-lived isotopes; increase prompt collection capabilities to better characterize an initial blast in minutes rather than days; improve air and ground debris collection to increase coverage, collect more robust samples, and shorten attribution timelines; and improve laboratory capability to perform more discriminating measurements in shorter timelines.
- FY 2024 – FY 2027 – Complete analysis of RDD experiment results to improve response to such terror threats.
- FY 2024 – FY 2027 – Develop, implement, and track progress against an NA-40 Strategic Plan, aligning all NA-40 activities with overarching DOE/NNSA mission priorities.
- FY 2024 – FY 2027 – Integrate the Federal Mission Resilience Strategy (FMRS), to include a viable Devolution capability, into Departmental day-to-day operations and maintaining continued interoperability of required continuity communications systems across DOE/NNSA and with interagency partners
- FY 2024 – FY 2027 – Leading, managing, and operating the DOE/NNSA Consolidated Emergency Operations Center (CEOC), improving integration of, and coordination with, the various DOE and DOE/NNSA operations centers and the interagency, to include growing our internal capacity to provide operative emergency management support, to include staffing no less than 10 teams of qualified Emergency Management Specialists capable of providing extended operational support by FY 2025, and updating and validating emergency management and continuity directives, guides, and technical planning basis standards, including DOE Orders 150.1 and 151.1 by FY 2026
- FY 2024 – FY 2027 – Compile and promulgate the annual readiness assurance report regarding the Department's Emergency Management System, to include achieving Full Operational Capability of the Emergency Management Readiness Assurance Reporting Dashboard and conduct of biennial site visits at all participating DOE/NNSA National Laboratories, Plants, Sites, and Offices by FY 2027.

- FY 2024, FY 2026 – Design, develop, and execute DOE's participation within the National Level Exercise (NLE) on a biennial basis, to include NLE 2024 and NLE 2026, and the annual Eagle Horizon exercise.
- FY 2024- FY-2027 – Support DOE and NNSA risk management and worker safety policy efforts, to include development, updating, and distribution annually of an Enterprise Threat and Hazard Risk Profile, and through the hosting of the 38th-41st annual emergency management-based forums to enhance collaboration, issue resolution, and enhancement of all-hazards preparedness, prevention, mitigation, response, and recovery across the Department.

The Defense Nuclear Nonproliferation appropriation FY 2023 Budget Request supports the following key priorities:

DNN Programs

- Convert and/or verify the shutdown of one research reactor and isotope production facility.
- Eliminate excess HEU and plutonium, including removing and/or confirming the disposition of 10 kilograms of material.
- Continue efforts to disposition plutonium from the state of South Carolina and pursue the dilute and dispose strategy to dispose of 34 metric tons of plutonium.
- Continue conceptual design activities for pit disassembly and processing expansion.
- Continue to eliminate surplus HEU by downblending it to LEU, or through direct disposal with a priority on legacy material to reduce operating risk in deteriorating infrastructure.
- Complete final design to support Critical Decision (CD) – 2/3, Approve Performance Baseline/Approve Start of Construction, for the SPD Project.
- Lead high-priority nuclear security engagements bilaterally and regionally to mitigate risks to nuclear and radiological security, including mitigating insider threats and improving cyber security, transportation security practices, nuclear material control and accounting, physical security, etc.
- Develop strategies for new areas of engagement including engaging with nuclear newcomers; a formal countering unmanned aerial systems strategy; and advanced reactors.
- Provide critical mission support to the IAEA, including strengthening the international nuclear safeguards system and supporting their expanding nuclear security activities, regional and international training courses on topics such as advanced insider and computer security; strengthening training capabilities and helping develop guidance documents; and promoting security best practices to nuclear newcomers.
- Continue implementation of Advanced Reactor International Safeguards Engagement (ARISE) program, including working with key stakeholders (i.e., NRC, DOE-NE, industry, national labs) to incorporate Safeguards by Design elements into advanced reactor designs.
- Support development of DOE/NNSA's Arms Control Advancement Initiative to bolster the expertise and technology critical to sustaining DOE/NNSA's arms control mission and accelerate the development of new technologies and approaches.
- Initiate the development of an arms control user facility to support DOE/NNSA's arms control monitoring and verification additional and stretch approaches.
- Secure buildings with high-priority radioactive sources.
- Promote and facilitate the adoption of viable alternative technologies that do not use high-activity radioactive sources to achieve permanent risk reduction.
- Deploy and support sustainable counter nuclear smuggling solutions to detect, disrupt, and investigate the illicit trafficking of nuclear and radioactive material through critical pathways.
- Facilitate U.S. trade by providing roughly 6,000 technical reviews of U.S. export license applications, and technical support and training to U.S. law enforcement to help prevent the exploitation of the U.S. industrial base.
- Work with over 30 international partners to build global export control capacity through training, technical exchanges, and train-the-trainer approaches.
- Provide nonproliferation assessments of emerging nuclear technologies and other emerging strategic risks and challenges.
- Develop policy and technical solutions for, and support the implementation of, arms control and nonproliferation treaties, agreements, and on-site denuclearization monitoring and verification activities.
- Demonstrate new U.S. capabilities for detecting foreign material and weapons production processes.
- Demonstrate new capabilities for weapons and material security applications, including detecting special nuclear material movement and diversion and nuclear safeguards.

- Sustain and improve U.S. nuclear explosion monitoring capabilities, including delivering the Nation's space-based nuclear detonation detection payloads and related activities that support treaty monitoring and military missions.
- Sustain and develop foundational nonproliferation technical competencies that ensure the technical agility needed to support a broad spectrum of U.S. nonproliferation missions and anticipate threats.
- Advance technical nuclear forensics analysis capabilities that support the U.S. Government response to a nuclear event, with an emphasis on advancing timelines to support attribution and novel approaches to material provenance.
- Establish a bioassurance capability for anticipating destabilizing bio threats and avoiding technical surprise through predictive modeling and data science, identifying threat signatures, and developing detection technologies, and developing and validating safeguards and threat mitigation approaches.

NCTIR Program

- Enhance capabilities to counter nuclear and radiological threats—including improved tools to locate, characterize, defeat, and conduct forensics on these threats.
- Provide training and maintain equipment to enhance specialized regional and national response capabilities to respond to nuclear terrorism threats, including the sustainment of enhanced counter weapons of mass destruction capability in 14 major U.S. cities.
- Detect, measure, and track radioactive material in an emergency to determine contamination levels through the Aerial Measuring System.
- Provide security and assessment capabilities for non-stockpile nuclear threat device designs, including INDs.
- Implement training, develop, and validate tools, and maintain expertise for DOE/NNSA, DoD, and FBI counterterrorism, counterproliferation, and contingency planning efforts.
- Continue to evaluate technologies for counterterrorism and counterproliferation applications.
- Lead coordination of the government agencies supporting response and assessment for technical nuclear forensics.
- Advance capabilities that can significantly improve time-critical decision support, improving attribution timeliness.
- Enhance technical nuclear forensics capabilities by leveraging expertise from the national laboratories to analyze and determine the origin of interdicted nuclear materials and nuclear devices, and in the case of a nuclear attack, the device design and origin of the nuclear materials used.
- Identify, consolidate, and analyze historical nuclear material samples of value to the technical nuclear forensics program and consolidate the National Nuclear Material Archive within DOE/NNSA.
- Enhance domestic and international engagements on nuclear counterterrorism and emergency preparedness and response, improving strategic communications, medical response competencies, and technical capabilities of public health, law enforcement, and emergency management authorities before, during and after a nuclear or radiological incident or accident.
- Develop and deliver training events focusing on nuclear counterterrorism and emergency preparedness and response combining virtual and in-person instruction methods to maximize the benefits of each method and increase the reach and impact of the program.
- Advance Emergency Management training, exercise, and certification programs.
- Serve as the focal point of the DOE and DOE/NNSA Continuity Programs and higher-level continuity programs, assisting the Secretary of Energy, DOE/NNSA Administrator, and their staffs or higher designated officials, in executing the National Continuity Policy.
- Lead, manage, and operate the DOE/NNSA Consolidated Emergency Operations Center 24/7/365.
- Mature the Emergency Management Readiness Assurance Reporting Program.
- Lead the design and development of the DOE National Level Exercise, to include Eagle Horizon 2023.
- Institutionalize the FMRS, to include a viable Devolution capability.
- Ensure and improve interoperability of continuity communications systems across DOE/NNSA and with interagency partners.
- Update and validate emergency management and continuity directives, guides, and technical planning basis standards.
- Enhance the security and resilience of the Department and Nation.

DOE Working Capital Fund (WCF) Support
The DOE/NNSA DNN appropriation projected contribution to the DOE WCF for FY 2023 is $4,487,000. This funding covers shared enterprise activities including managing enterprise-wide systems and data, telecommunications, and supporting the integrated acquisition environment.

Legacy Contractor Pensions and Settlement Payments
This budget line includes funding for the Requa settlement reached in 2019 as well as a portion of an unfunded pension liability at the Savannah River Site in addition to DOE's annual reimbursement made to the University of California (UC) Retirement Plan (UCRP) for former UC employees and annuitants who worked at the Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL).

The *Requa* lawsuit involved UC employees of LLNL who retired prior to the Laboratory's transition to a new contractor on October 1, 2007. The retirees had been receiving health insurance through a UC health plan but when the LLNL contract transitioned to LLNS, the employees were offered health insurance through the new LLNL contractor, leading the retirees to file a lawsuit seeking reinstatement into the UC health plan. The parties settled the lawsuit in 2019, and a final judgment was issued in April 2020. DOE/NNSA agreed, pursuant to the legacy UC-LLNL Contract, to provide UC a portion of the total costs to settle the lawsuit, over a period of seven years through FY 2026. DOE/NNSA's responsibility for FY 2023 is $9 million.

Funding is also requested for reimbursement of DNN programs' share of the unfunded liability of the Savannah River Nuclear Solutions pension plan. The FY 2023 Request includes a total of $218 million for this liability with 60 percent allocated to the Office of Environmental Management (EM) and 40 percent allocated to DOE/NNSA. DOE/NNSA's portion is allocated between the DNN and Weapons Activities (WA) appropriation accounts.

This budget line also continues to include the DNN share of the DOE's annual reimbursement made to the UC Retirement Plan (UCRP) for former UC employees and annuitants who worked at the LLNL and LANL. The annual reimbursement is based on the actuarial valuation report and an annual assessment provided by UC and is covered by the terms described in the contracts. These contracts are paid through the Legacy Contractor Pensions and Settlement Payments line item.

The DNN share of these costs in the FY 2023 Budget is $55,708,000.

Entry Level Hires
DOE/NNSA supports a variety of programs to help train and recruit the next generation of leaders in managing the nuclear stockpile, nonproliferation, nuclear security, and international security, such as the NNSA Graduate Fellowship Program (NGFP), and, where appropriate, the Presidential Management Fellows (PMF) program. These programs foster the pipeline of qualified professionals who will sustain expertise in these areas through future employment within the nuclear security enterprise. In FY 2023, the DNN appropriation projects providing $3.3 million for NGFP support and development activities.

Defense Nuclear Nonproliferation
Funding by Congressional Control

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Defense Nuclear Nonproliferation Appropriation [a]					
Defense Nuclear Nonproliferation					
Material Management and Minimization					
Conversion	110,000	110,000	153,260	+43,260	+39.3%
Nuclear Material Removal	40,000	40,000	41,600	+1,600	+4.0%
Material Disposition	190,711	190,711	256,025	+65,314	+34.2%
Laboratory and Partnership Support	60,000	60,000	0	-60,000	-100.0%
Total, Material Management and Minimization	**400,711**	**400,711**	**450,885**	**+50,174**	**+12.5%**
Global Material Security					
International Nuclear Security	78,939	78,939	81,155	+2,216	+2.8%
Radiological Security	275,000	275,000	244,827	-30,173	-11.0%
Nuclear Smuggling Detection	175,000	175,000	178,095	+3,095	+1.8%
Total, Global Material Security	**528,939**	**528,939**	**504,077**	**-24,862**	**-4.7%**
Nonproliferation and Arms Control	**148,000**	**148,000**	**207,656**	**+59,656**	**+40.3%**
Defense Nuclear Nonproliferation R&D					
Proliferation Detection	255,000	255,000	287,283	+32,283	+12.7%
Nuclear Detonation Detection	267,000	267,000	279,205	+12,205	+4.6%
Nonproliferation Fuels Development	20,000	20,000	0	-20,000	-100.0%
Nuclear Forensics R&D	40,000	40,000	44,414	+4,414	+11.0%
Nonproliferation Stewardship Program	59,900	59,900	109,343	+49,443	+82.5%
Total, Defense Nuclear Nonproliferation R&D	**641,900**	**641,900**	**720,245**	**+78,345**	**+12.2%**
NNSA Bioassurance Program	**0**	**0**	**20,000**	**+20,000**	**+0.0%**
Nonproliferation Construction					
18-D-150, Surplus Plutonium Disposition Project	148,589	148,589	71,764	-76,825	-51.7%
Total, Nonproliferation Construction	**148,589**	**148,589**	**71,764**	**-76,825**	**-51.7%**
Total, Defense Nuclear Nonproliferation Programs	**1,868,139**	**1,868,139**	**1,974,627**	**+106,488**	**+5.7%**

[a] The FY 2021 and FY 2022 amounts are presented comparable to the structure proposed for FY 2023 with Forensics R&D (formerly NTNF R&D) under DNN R&D and not as a separate line.

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Nuclear Counterterrorism Incident Response Program					
Emergency Operations	36,000	36,000	29,896	-6,104	-17.0%
Counterterrorism and Counterproliferation	341,513	341,513	409,074	+67,561	+19.8%
Total, Nuclear Counterterrorism Incident Response Program	**377,513**	**377,513**	**438,970**	**+61,457**	**+16.3%**
Legacy Contractor Pensions and Settlement Payments	**14,348**	**14,348**	**55,708**	**+41,360**	**+288.3%**
Subtotal, Defense Nuclear Nonproliferation Appropriation	**2,260,000**	**2,260,000**	**2,469,305**	**+209,305**	**+9.3%**
Use of Prior Year Balances	**0**	**0**	**-123,048.00**	**-123,048.00**	**0%**
Rescission of Prior Year Balances	**0**	**0**	**0**	**0**	**0%**
Total, Defense Nuclear Nonproliferation Appropriation	**2,260,000**	**2,260,000**	**2,346,257**	**+86,257**	**+3.8%**

SBIR/STTR:

- FY 2021 Transferred: SBIR: $13,202; STTR: $0
- FY 2022 Annualized CR: SBIR: $13,975; STTR: $0
- FY 2023 Request: SBIR: $14,705; STTR: $0

Funding by Congressional Control
Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Defense Nuclear Nonproliferation				
Material Management and Minimization	**425,644**	**453,045**	**427,755**	**422,967**
Global Material Security	**515,897**	**534,986**	**539,159**	**538,936**
Nonproliferation and Arms Control	**207,188**	**214,854**	**216,529**	**216,439**
Defense Nuclear Nonproliferation R&D	**712,724**	**739,095**	**744,859**	**744,551**
NNSA Bioassurance Program	**20,000**	**20,000**	**20,000**	**20,000**
Nonproliferation Construction				
24-D-XXX, Pit Disassembly and Processing (PDP) Project	45,000	67,244	120,000	120,000
18-D-150, Surplus Plutonium Disposition (SPD) Project	92,257	35,000	0	0
Total, Nonproliferation Construction	**137,257**	**102,244**	**120,000**	**120,000**
Total, Defense Nuclear Nonproliferation Programs	**2,018,710**	**2,064,224**	**2,068,302**	**2,062,893**
Nuclear Counterterrorism Incident Response Program				
Emergency Operations	15,123	15,683	15,805	15,798
Counterterrorism and Counterproliferation	421,209	438,204	441,308	440,818
Total, Nuclear Counterterrorism Incident Response Program	**436,332**	**453,887**	**457,113**	**456,616**
Legacy Contractor Pensions and Settlement Payments	**40,447**	**41,296**	**42,163**	**43,048**
Subtotal, Defense Nuclear Nonproliferation Appropriation	**2,495,489**	**2,559,407**	**2,567,578**	**2,562,557**
Use of Prior Year Balances	**0**	**0**	**0**	**0**
Total, Defense Nuclear Nonproliferation Appropriation	**2,495,489**	**2,559,407**	**2,567,578**	**2,562,557**

Research and Development

The Office of Management and Budget (OMB) Circular No. A-11, "Preparation, Submission, and Execution of the Budget," requires the reporting of research and development (R&D) data. Consistent with this requirement, R&D activities funded by DOE/NNSA Defense Nuclear Nonproliferation programs are displayed below.

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Research and Development (R&D)					
Basic	158,215	157,596	179,084	+20,869	+13.2%
Applied	195,197	164,212	203,806	+8,609	+4.4%
Development	114,819	105,325	124,835	+10,016	+8.7%
Subtotal, R&D	**468,231**	**427,133**	**507,725**	**+39,494**	**+8.4%**
Equipment	24,500	24,500	26,164	+1,664	+6.8%
Construction	0	0	0	0	0%
Total, R&D	**492,731**	**451,633**	**533,889**	**+41,158**	**+8.4%**

Material Management and Minimization

Overview

The Material Management and Minimization (M3) program aims to reduce and, when possible, eliminate nuclear materials and ensure sound management principles for materials that remain. This includes minimizing the civilian use, and or production, of highly enriched uranium (HEU) and plutonium; removing or eliminating nuclear material internationally; and disposing of excess nuclear material in the United States. The M3 Budget Request presents an integrated approach to addressing the persistent threat posed by the global stockpile of nuclear materials.

M3 directly contributes to and plays a critical role in reducing global nuclear security threats and promoting U.S. national security. The M3 program is a key component of the Department of Energy/National Nuclear Security Administration (DOE/NNSA) integrated nonproliferation, counterterrorism, and emergency response strategies. M3 makes these strategic contributions through the conversion of research reactors and medical isotope production facilities to use non-weapons-usable nuclear material, the optimization of proliferation resistance in reactor designs, the removal of excess HEU and separated plutonium, and the disposition of HEU and plutonium.

Material Management and Minimization
Funding

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Material Management and Minimization					
Conversion	110,000	110,000	153,260	+43,260	+39.3%
Nuclear Material Removal	40,000	40,000	41,600	+1,600	+4.0%
Material Disposition	190,711	190,711	256,025	+65,314	+34.2%
Laboratory and Partnership Support	60,000	60,000	0	-60,000	-100.0%
Total, Material Management and Minimization	**400,711**	**400,711**	**450,885**	**+50,174**	**+12.5%**

Material Management and Minimization
Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Material Management and Minimization				
Conversion	143,379	132,674	98,376	79,381
Nuclear Material Removal	39,737	44,742	46,975	46,755
Material Disposition	242,528	275,629	282,404	296,831
Laboratory and Partnership Support	0	0	0	0
Total, Material Management and Minimization	**425,644**	**453,045**	**427,755**	**422,967**

Material Management and Minimization
Explanation of Major Changes
(Dollars in Thousands)

	FY 2023 Request vs FY 2021 Enacted ($)
Material Management and Minimization	
Conversion: Increase supports packaging and purification of high-assay low enriched uranium (HALEU) scrap to support DOE/NNSA's Building 9212 exit strategy and to produce HALEU for the Office of Nuclear Energy's (NE's) HALEU Availability Program. Also includes funding for the Uranium Lease and Take Back (ULTB) program which was realigned from Laboratory and Partnership Support (LAPS).	**+43,260**
Nuclear Material Removal: No significant change	**+1,600**
Material Disposition: The increase supports the activities associated with the removal of plutonium from the state of South Carolina, activities to ramp up the existing pit disassembly and processing capability (PDP), and planning for additional capability for the dilute and dispose (D&D) strategy.	**+65,314**
Laboratory and Partnership Support: The decrease reflects sufficient available prior-year balances to support molybdenum-99 (Mo-99) cooperative agreements (CAs). No new funds are required for the CAs. It also reflects the realignment of the ULTB to the Conversion subprogram.	**-60,000**
Total, Material Management and Minimization	**+50,174**

Material Management and Minimization
Conversion

Description

The Conversion subprogram, referred to as the Convert subprogram, will support the implementation of key international nuclear nonproliferation activities addressing HEU and/or plutonium minimization. The Convert subprogram supports the conversion of domestic and international civilian research reactors and isotope production facilities to use non-weapons-usable nuclear materials. These efforts result in permanent threat reduction by minimizing and, to the extent possible, eliminating the use of HEU in civilian applications.

Currently, the Convert subprogram has converted or verified the shutdown of 107 HEU research reactors and isotope production facilities worldwide. In support of this effort, Convert will work to qualify high-density low enriched uranium (LEU) fuels and to demonstrate and set up the fabrication capability necessary to convert six U.S. high performance research reactors (USHPRR) from HEU to LEU fuel. These USHPRRs cannot be converted to use existing LEU fuels. Therefore, the Convert subprogram will procure Major Items of Equipment (MIE) to support making high-density LEU fuels to enable conversion of the USHPRRs. Beyond the USHPRR program, the Convert subprogram is continuing efforts to convert and verify the shutdown of HEU-fueled reactors around the world. In support of this effort, the program will provide technical support for the European Fuel Development program. Funding will also support the continued development and implementation of the Proliferation Resistance Optimization (PRO-X) program. The Convert subprogram will identify and work with partners around the world on the design of new-build research reactors, and associated facilities, to explore technical options to reduce the ability for these facilities to be misused for proliferation purposes.

Given the significant progress by M3 supporting the advancement of non-HEU-based Mo-99 production facilities in the United States, the program is not requesting additional Cooperative Agreement (CA) funding. The CAs are currently funded within the Laboratory and Partnership Support (LAPS) subprogram, as is the laboratory expertise to support domestic production of Mo-99 and the management of the Uranium Lease and Take-Back (ULTB) program, which leases LEU to domestic Mo-99 producers as needed. M3 intends to separate the laboratory expertise and ULTB work from the CAs (which will remain funded under the LAPS subprogram) and realign them into the Convert subprogram. This realignment will increase flexibility to overcome any final technical hurdles associated with bringing Mo-99 to market as the CA funding winds down.

In December 2021 DOE/NNSA concluded the first contract under the ULTB Program with SHINE Technologies. In addition, prior-year CA funding is assisting in the development of several diverse non-HEU technologies and construction of domestic facilities for Mo-99 production. In August 2021, the Convert subprogram issued four new CA awards under the 2020 Funding Opportunity Announcement (FOA), totaling $85M. These awards will support U.S. entities to bring their non-HEU-based Mo-99 projects to commercial production by December 2023 and become long-term producers in the U.S. Mo-99 market. All Mo-99 CAs will expire by the end of calendar year (CY) 2023. DOE/NNSA anticipates that at least two U.S. companies will be producing Mo-99 for the U.S. market by the end of CY 2023. Actual quantities of Mo-99 produced and distributed to U.S. patients, however, will be driven by the Mo-99 market. The last major Mo-99 global producer will convert to 100 percent LEU Mo-99 production in CY 2022, ending the need for the Convert subprogram's assistance in converting international Mo-99 facilities from using HEU to LEU targets.

Additionally, the Convert subprogram supports DOE and DOE/NNSA's uranium supply and uranium enrichment initiatives. In coordination with NE, the Convert subprogram is working to identify and repurpose unused or scrap material to produce HALEU to increase the supply of HALEU for research reactors, medical isotope producers, and the DOE Office of Clean Energy Demonstrations' advanced reactor demonstrations until domestic capability to produce HALEU is established. In FY 2023, DOE/NNSA will gather, characterize, and repackage for shipment 1,500 containers of HALEU scrap currently at Y-12. This project will produce ~2.2 metric tons of HALEU, support the Y-12 transition to the Uranium Processing Facility (UPF) by clearing a large amount of material out of Building 9212, and will advance the Convert subprogram by demonstrating BWXT's scrap recovery process, which could be used to recover future HALEU scrap material. This project also helps ensure that the United States will continue to supply HALEU for those facilities that use HALEU fuel and that HALEU will be available for future conversions and new reactor builds. The Convert program will purchase and install a Major item of equipment (MIE) at BWXT to support this effort during the FYNSP.

Highlights of the FY 2023 Budget Request

- Convert research reactors from the use of HEU fuel to LEU fuel, or verify the shutdown of HEU fueled research reactors, both domestically and internationally. One facility will be converted or verified as shutdown in FY 2023.
- Continue campaign to qualify first-of-a-kind high-density LEU fuels to convert USHPRRs.
- Provide U.S. National Laboratory technical support to domestic Mo-99 commercial partners to establish a reliable commercial supply of Mo-99 produced without HEU.
- Pack and deliver scrap material from Y-12 to a domestic commercial processor and begin production of limited quantities of HALEU.

FY 2021 Accomplishments

- Given travel constraints related to COVID, held more than 100 virtual exchanges with over 10 bilateral partners and the International Atomic Energy Agency (IAEA) on a range of HEU minimization issues, including conversion of Mo-99 and research reactor facilities, proliferation resistance, and LEU fuel qualification efforts.
- Verified the shutdown of the ORPHEE research reactor in France, bringing the lifetime program total to 107 facilities converted or shutdown.
- Completed foil production at BWXT to support production of LEU fuel plates that will be used for several major upcoming fuel qualification experiments under the USHPRR project.
- Completed analysis of a generic research reactor core that demonstrates a reduction in the production of plutonium while increasing the reactor performance, confirming the objectives of the PRO-X project.

Conversion

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Conversion $110,000,000	**Conversion $153,260,000**	**Conversion +$43,260,000**
• Verified the shutdown of one HEU facility. • Completed key post-irradiation examination (PIE) activities of the MiniPlate-1 (MP-1) experiment. • Conducted fabrication of key full-size irradiation test plates for the new, high-density LEU fuel for irradiation in early 2022. • Conducted LEU fuel plate and assembly fabrication demonstration activities in support of converting USHPRRs. • Supported DOE and DOE/NNSA's HALEU supply initiatives.	• Conduct activities to support converting or verifying the shutdown of one facility. • Conduct LEU fuel qualification and fabrication activities both domestically and internationally. • Support DOE's and DOE/NNSA's HALEU supply initiatives. • Pack and ship material from Y-12 to a domestic commercial processor and begin production of limited quantities of HALEU. • Provide technical support to the U.S. private sector to support establishment of a reliable domestic production capability for Mo-99 without the use of HEU. • Conduct PRO-X activities addressing HEU and/or plutonium to reduce the risk of potential misuse or production of weapons-usable material. • Implement the ULTB program.	• The increase supports packaging and purification of HALEU scrap to support the Building 9212 exit strategy and to produce HALEU for other DOE programs.

Material Management and Minimization
Nuclear Material Removal

Description

The Nuclear Material Removal subprogram, referred to as the Remove subprogram, supports the removal, consolidation, and disposal of nuclear material internationally to support permanent threat reduction. Each kilogram of excess nuclear material that is removed from civilian sites worldwide reduces the risk of a terrorist or other malevolent actor acquiring HEU or plutonium for use in an improvised nuclear device. The subprogram directly advances U.S. and global HEU minimization objectives.

This subprogram consists of two primary lines of effort: 1) Nuclear Material Removal and Consolidation and 2) Mobile Packaging. Under Nuclear Material Removal and Consolidation, the Remove subprogram supports the removal, consolidation, and disposal of weapons-usable nuclear material from civilian facilities around the world. This material includes unirradiated and irradiated HEU of U.S.-origin, Russian-origin, and other origins, as well as separated plutonium. On a case-by-case basis, in support of nonproliferation objectives, some U.S.-origin LEU that previously fell under the Foreign Research Reactor Spent Nuclear Fuel Acceptance Program (also known as the U.S.-origin program), may be repatriated to the United States. The subprogram is also developing new capabilities, such as the Mobile Melt-Consolidate (MMC) system, to address inventories of weapons-usable nuclear material that do not currently have a disposition pathway and avoid bringing the material to the United States. Once operational in FY 2022, MMC will serve as a mobile platform for stabilizing excess nuclear material and converting it into a more proliferation-resistant, low-attractiveness waste form that can be readily disposed in a storage facility or repository outside the United States. The subprogram plans to construct a second MMC system in FY 2023 to support downblending activities in other partner countries. This project may qualify as minor construction, pending further planning and analysis.

The Remove subprogram evaluates excess civilian nuclear material located abroad to prioritize candidate material for removal or disposition. The subprogram evaluates material attractiveness, site- and country-level threats, and other factors to determine which materials are most at-risk and prioritizes them for removal or disposal. Furthermore, the subprogram works with foreign partners to obtain regulatory permits; characterize, stabilize, package, and transport material; and provide replacement LEU or other incentives for other than high income economy countries to encourage elimination of these materials. Additionally, the subprogram coordinates all future U.S. receipts with relevant Department of Energy stakeholders, such as the Office of Environmental Management (EM) and NE, to enable long-term planning and appropriate resource allocation.

The Remove subprogram will work closely with international partners to eliminate excess weapons-usable nuclear material and to support either removal or in-country solutions that best meet this objective. Throughout the COVID-19 pandemic, the Remove subprogram has continued to execute nuclear material removals and support planning for future removals, though some projects and exercises have been, or will be, delayed due to restrictions on international travel. In FY 2023, the Remove subprogram will support HEU minimization activities in Central Asia that will be funded through an international contribution received in FY 2022.

Under Mobile Packaging, the Remove subprogram maintains the capability to promptly respond to enable the safe and secure removal of nuclear material worldwide. This specialized capability focuses on addressing HEU and plutonium inventories using the Mobile Uranium Facility (MUF) and the Mobile Plutonium Facility (MPF). Both MUF and MPF include specialized teams and mobile facilities needed to conduct in-country characterization, stabilization, packaging, and removal of nuclear materials. The Mobile Packaging program undertakes full-scale training exercises with the MUF and MPF to maintain team proficiency and ensure both facilities are ready to be deployed on short notice.

Highlights of the FY 2023 Budget Request

- Eliminate excess HEU and plutonium, including removing and/or confirming the disposition of 10 kilograms of nuclear material.

FY 2021 Accomplishments

- Despite the travel constraints presented by COVID-19, successfully executed multiple shipments and removed more than 15 kilograms of HEU to the United States for downblending and disposition.
- Collaborated with international partners to plan for future removal and downblending campaigns of weapons-usable nuclear material from countries in Asia, Europe, and North America.
- Executed Exercise Relentless Rook, a domestic, full-scale exercise of the MUF and MPF to improve team training and mission readiness.

Nuclear Material Removal

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Nuclear Material Removal $40,000,000	**Nuclear Material Removal $41,600,000**	**Nuclear Material Removal +$1,600,000**
• Removed more than 15 kilograms of HEU. • Sustained the MPF and MUF equipment and performed readiness exercises. • Completed procurement and construction of several major MMC system components and carried out operational process R&D and optimization activities to enable future MMC deployment.	• Remove and/or confirm the disposition of an additional 10 kilograms of HEU and/or plutonium. • Sustain the MUF and MPF equipment and perform off-site readiness exercises that practice the MUF and MPF's capabilities.	• No significant change.

Material Management and Minimization
Material Disposition

Description

The Material Disposition subprogram, referred to as the Dispose subprogram, is responsible for disposing of excess nuclear material in the United States and managing the provision of nuclear material for peaceful uses. The subprogram includes activities to disposition 34 metric tons (MT) of surplus plutonium using the dilute and dispose strategy, whereby plutonium is mixed with a multicomponent adulterant and packaged, characterized, and disposed of as transuranic (TRU) waste at the Waste Isolation Pilot Plant (WIPP). The subprogram also includes activities to disposition 186 MT of HEU by downblending it and making the resulting low enriched uranium (LEU) available as fuel for commercial reactors or making supplies of high-assay LEU available for research reactors.

In addition to the efforts to disposition 34 MT of surplus plutonium, the subprogram is also supporting activities to address inventories of plutonium that were consolidated at Savannah River Site (SRS). In FY 2022, the Dispose subprogram will continue activities to disposition plutonium from the state of South Carolina including increasing staffing for downblend and waste characterization operations in K-Area at SRS. Several minor construction projects are underway at SRS to support the plutonium disposition effort. The minor construction project for a storage, characterization, and shipping pad within K-Area was completed, and storage of TRU waste containers began, in FY 2021. Startup testing and certification of the TRU waste characterization equipment was conducted in FY 2021 and FY 2022, with the first shipment to WIPP planned for late-FY 2022. During the FYNSP, the Dispose subprogram will initiate hiring, training, and qualification for operators of the new gloveboxes being installed in K-Area as part of the Surplus Plutonium Disposition (SPD) project.

An Environmental Impact Statement (EIS) for the 34 MT mission is ongoing and is expected to be complete in FY 2023. The data collection and environmental analysis is currently underway. This EIS is required for the full 34 MT mission, though previous National Environmental Policy Act (NEPA) analysis provides coverage for all activities currently underway, including Advanced Recovery and Integrated Extraction System (ARIES) operations, the SPD line-item project, and the downblending of 13.1 MT of surplus plutonium.

The Dispose subprogram includes other activities necessary to support the overall program to dispose of 34 MT of surplus weapons-grade plutonium including surveillance, monitoring, and packaging of surplus pits at Pantex and surplus pit disassembly and conversion of resultant metal to oxide, which is being conducted in the ARIES at LANL.

The Dispose subprogram will continue ongoing plutonium oxide production operations at LANL, and procurement and installation of several MIE at LANL, to improve material movement efficiency, reduce worker radiation dose exposure, and address the risk of single points of failure in the ARIES process. The subprogram will increase the rate of plutonium oxide production over the next 10 years until steady-state operations are achieved. Furthermore, the Dispose subprogram will continue activities to improve PF-4 vault storage including the disposition of legacy mixed oxide (MOX) fuel materials to make that space available for higher-priority materials.

To disposition the 34 MT of surplus plutonium, an expanded PDP capability will be necessary. An *Approval of Mission Need* Critical Decision (CD-0) was approved for this project in July 2021. DOE/NNSA subsequently initiated an Analysis of Alternatives (AoA) during FY 2021 to evaluate options to expand the PDP capability. The AoA is expected to complete in late spring of 2022.

DOE/NNSA is collaborating with the U.S. National Laboratories on a Strategic Laboratory Assessment (SLA) to continuously develop opportunities for application of state-of-the-art science and technology into the surplus plutonium disposition program to ensure that the system for processing plutonium from storage through WIPP emplacement is as efficient as possible throughout the lifetime of the program. This subprogram will evaluate system-level engineering and technical improvements to improve the efficiency of the dilute and dispose process flowsheet and material handling activities, including the potential use of robotic and virtual reality technology.

The Dispose subprogram is also responsible for preparation of the Japan Fast Critical Assembly (FCA) plutonium fuel for disposition. DOE/NNSA is pursuing the selected approach of electrolytic dissolution using H Canyon. Physical

modifications, including installation of the spare electrolytic dissolver, began in FY 2021. The Japan Atomic Energy Agency (JAEA) is providing the funding for disposition of the FCA fuel.

Furthermore, the Dispose subprogram will focus on international plutonium management strategies by developing and maintaining bilateral and multilateral working arrangements. Participating countries will work together at a technical level to support efforts to manage plutonium inventories in a way that minimizes stockpiles of excess plutonium and maximizes the security and protection of the material.

The subprogram has substantially reduced excess holdings of HEU throughout the DOE/NNSA complex. The subprogram is supporting the Down-blending Offering for Tritium (DBOT) contract, which runs from FY 2019 through FY 2025. Although DBOT primarily is a DP contract, the Dispose subprogram is responsible for managing and funding a portion to support excess HEU disposition. In addition, the Dispose subprogram manages enriched uranium supply and demand needs in support of Office of Defense Nuclear Nonproliferation (DNN) statutory obligations, international commitments or assurances, and to advance nonproliferation mission goals. This includes management oversight of contractors to downblend HEU into HALEU for research reactors and medical isotope production.

The Dispose subprogram will continue disposition of legacy material and low-equity discards stored at Y-12 to reduce risk due to the deteriorating infrastructure and to support the timely transition to the UPF. The HEU Thorium/Building 9206, Area 5 De-inventory (A5D), and Building 9212 discards will be completed in FY 2025, with offsite shipments occurring by 2026. Prior acceleration efforts for this scope have been offset by the continued Nevada National Security Site (NNSS) pause in waste receipts from Y-12 and COVID-19 pandemic safety measures. This timeline has no impact to the overall Area-5 de-inventory or transition to UPF.

Highlights of the FY 2023 Budget Request

- Continue efforts to disposition plutonium from the state of South Carolina and continue the dilute and dispose strategy to fulfill the United States' commitment to dispose of 34 MT of surplus plutonium.
- Conduct conceptual design activities for PDP expansion.
- Conduct small project installation and operational ramp-up to increase plutonium oxide production.
- Eliminate surplus HEU by downblending it to LEU, or through direct disposal with a priority on legacy material to reduce operating risk in deteriorating infrastructure.

FY 2021 Accomplishments

- Initiated downblend processing of NNSA plutonium materials, consistent with the August 2020 Amended Record of Decision.
- Transitioned to four-shift operations of the existing SRS K-Area downblend process which culminated from several years of hiring, training, and qualification of operations staff.
- Completed construction of the Characterization and Storage Pad in SRS's K Area and initiated pad storage operations of downblended plutonium in criticality control overpack containers (CCOs).
- Produced 75 kg of plutonium oxide in preparation for ultimate disposition using ARIES at LANL.
- Completed upgrades to the plutonium downblend process at SRS, improving efficiency and reducing worker radiation dose.
- Achieved *Approval of Mission Need* (CD-0) for the PDP project to address the capability needed for the 34 MT mission.
- Issued a Notice of Intent to initiate an EIS for the 34 MT mission and completed public scoping.
- Issued a Supplement Analysis and Amended Record of Decision affirming the change in the disposition path for the Japan FCA material to the electrolytic dissolution approach.
- Dispositioned HEU through downblending, leveraging the DBOT contract.

Material Disposition

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Material Disposition $190,711,000	**Material Disposition $256,025,000**	**Material Disposition +$65,314,000**
U.S. Plutonium Disposition $155,946,000	**U.S. Plutonium Disposition $204,869,000**	**U.S. Plutonium Disposition +$48,923,000**
• Provided surveillance and packaging capabilities for surplus pits and plutonium. • Conducted pit disassembly and oxide conversion activities to prepare plutonium for disposition. • Continued expediting the removal of plutonium from the state of South Carolina. • Continued transition to the dilute and dispose strategy, including technical development and analysis. • Maintained the Waste Solidification Building (WSB) facility in a lay-up configuration while the Department determines options for future use. • Supported the ongoing maintenance of critical programmatic documents including the Program Execution Plan, integrated schedules, performance measures, memoranda of agreement, analysis for plutonium disposition, and interface control documents; and require infrastructure and erosion control maintenance to comply with safety and environmental standards.	• Carry out activities to process and dispose of plutonium from the state of South Carolina. • Resume shipments to WIPP from the storage and characterization pad in K-Area. • Increase pit disassembly and oxide conversion activities to prepare plutonium for disposition. • Provide surveillance and packaging capabilities for surplus pits and plutonium. • Conduct technical baseline management and maturity for the dilute and dispose strategy. • Perform NEPA analysis for the 34 MT mission. • Support the ongoing maintenance of critical programmatic documents.	• The increase supports activities associated with the removal of plutonium from the state of South Carolina, activities to ramp up the existing pit disassembly and processing (PDP) capability, and planning for additional capability for the dilute and dispose strategy.
U.S. Uranium Disposition $32,886,000	**U.S. Uranium Disposition $49,909,000**	**U.S. Uranium Disposition +$17,023,000**
• Downblended or shipped for downblending HEU to produce LEU consistent with specifications. • Downblended HEU into high assay LEU metal for research reactor fuel and for Mo-99 targets. • Conducted cleanup of legacy material in Y-12's Building 9206, Building 9212, and the A5D to reduce risk.	• Downblend or ship for downblending HEU to produce LEU consistent with specifications. • Downblend HEU into high-assay LEU metal for research reactor fuel and for Mo-99 targets. • Conduct cleanup of legacy material in Y-12's Building 9206, Building 9212, and the A5D to reduce risk.	• The increase supports the DBOT contract to support excess HEU disposition.

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
• Supported tracking and analyzing enriched uranium supply and demand needs and commitments of DNN mission goals. • Completed HEU-Thorium discards.	• Support tracking and analyzing enriched uranium supply and demand needs and commitments to meet DNN mission goals.	
International Plutonium Disposition $1,879,000	**International Plutonium Disposition $1,247,000**	**International Plutonium Disposition -$632,000**
• Implemented plutonium management strategies with international partners.	• Implement plutonium management strategies with international partners.	• Decrease reflects the use of prior year uncosted balances to continue the same level of effort. These balances are available due to the international travel restrictions associated with the COVID pandemic.

Material Management and Minimization
Laboratory and Partnership Support

Description

The Laboratory and Partnership Support (LAPS) Program was established by Congress to capture funding for CAs to support the domestic production of molybdenum-99 (Mo-99). No additional funding is required for the Mo-99 CAs. Building on prior-year support, the LAPS subprogram's CA partners continue to make progress toward commercially producing Mo-99 in the United States without the use of HEU. Prior-year CA funding is assisting in the deployment of several diverse non-HEU technologies and domestic facilities for Mo-99 production. The LAPS subprogram awarded four new CAs in CY 2021 under the 2020 FOA, totaling $85M. These awards will support U.S. entities to bring their non-HEU-based Mo-99 projects to commercial production by December 2023 and become long-term producers in the U.S. Mo-99 market. All Mo-99 CAs will expire by the end of CY 2023. DOE/NNSA anticipates that at least two U.S. companies will be producing Mo-99 in the United States by the end of CY 2023. Actual quantities of Mo-99 produced and distributed to U.S. patients, however, will be driven by the Mo-99 market. Additionally, the last major Mo-99 global producer is expected to convert to 100 percent LEU Mo-99 production in CY 2022, ending the need for the assistance in converting international Mo-99 facilities from using HEU to LEU targets.

Highlights of the FY 2023 Budget Request

- No funds are requested for Mo-99 CAs. Funding for laboratory expertise to support the advancement of non-HEU-based Mo-99 and the management of the ULTB program is being realigned to the Conversion subprogram.

FY 2021 Accomplishments

- Awarded two new CAs.

Laboratory and Partnership Support

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Laboratory and Partnership Support $60,000,000	**Laboratory and Partnership Support $0**	**Laboratory and Partnership Support -$60,000,000**
• Provided technical and financial support to the U.S. private sector to support establishment of a reliable domestic production capability for Mo-99 without the use of HEU. • Awarded two new CAs. • Implemented the ULTB program.	• No funding is requested for Mo-99 CAs. The laboratory technical support for the Mo-99 program and the ULTB program is being realigned under the Conversion Program.	• The decrease reflects sufficient available prior-year balances to support the Mo-99 CAs. No new funds are required for the CAs. It also reflects the realignment of funding for the ULTB to the Conversion subprogram.

Material Management and Minimization
Capital Summary

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))						
Capital Equipment >$500K (including MIE)	N/A	N/A	27,685	24,833	42,693	+15,008
Minor Construction	N/A	N/A	10,748	3,265	14,337	+3,589
Total, Capital Operating Expenses	**N/A**	**N/A**	**38,433**	**28,098**	**57,030**	**+18,597**
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (>$500K and <$5M)	N/A	N/A	16,663	17,030	17,405	+742
Simple Pit Cutter, LANL	13,728	11,501	2,227	0	0	-2,227
Material Intro Hood #1, LANL	11,178	5,000	6,178	0	0	-6,178
Material Intro Hood #2, LANL	11,220	0	0	0	0	0
Upgrade Thermogravimetric Analyzer (TGA) System, LANL	5,035	2,418	2,617	0	0	-2,617
Calorimeter #2 for Large Containers (formerly Install Second Calorimeter), LANL	7,803	0	0	7,803	0	0
Transfer Glovebox for Inline Storage, LANL (previously New Transfer/Storage GB, LANL	12,162	0	0	0	0	0
Install In-Line NDA Capability, LANL	22,388	0	0	0	22,388	+22,388
SAVY Packaging and Bagout GB, LANL	19,328	0	0	0	0	0
Inline NDA in existing GB, LANL	13,943	0	0	0	0	0
Conversion to Oxide Furnace (BWXT)	2,900	0	0	0	2,900	+2,900
Upgrade Uranium Decontamination System in Existing GBs, LANL	16,082	0	0	0	0	0
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**27,685**	**24,833**	**42,693**	**+15,008**

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Minor Construction Projects (Total Estimated Cost (TEC)						
Total Minor Construction Projects (TEC <$5M)	N/A	N/A	3,195	3,265	3,337	+142
Mobile Melt-Consolidate System, SRS	10,564	5,485	5,079	0	0	-5,079
Mobile Melt-Consolidate System 2.0, SRS	11,000	0	0	0	11,000	+11,000
Characterization and Storage Pad, SRS	19,957	19,922	35	0	0	-35
105-K Material Access Area (MAA) Entry Control Facility (ECF) Expansion, SRS	18,439	16,000	2,439	0	0	-2,439
Total, Minor Construction Projects	**N/A**	**N/A**	**10,748**	**3,265**	**14,337**	**+3,589**
Total, Capital Summary	**N/A**	**N/A**	**38,433**	**28,098**	**57,030**	**+18,597**

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	Outyears
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))					
Capital Equipment >$500K (including MIE)	33,870	29,399	32,522	31,150	19,328
Minor Construction	3,410	3,485	3,562	3,640	N/A
Total, Capital Operating Expenses	**37,280**	**32,884**	**36,084**	**34,790**	**19,328**
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (>$500K and <$5M)	17,788	18,179	18,579	18,988	N/A
Material Intro Hood #2, LANL	0	11,220	0	0	0
Transfer Glovebox for Inline Storage, LANL (previously New Transfer/Storage GB, LANL	0	0	0	12,162	0
SAVY Packaging and Bagout GB, LANL	0	0	0	0	19,328
Inline NDA in existing GB, LANL	0	0	13,943	0	0
Upgrade Uranium Decontamination System in Existing GBs, LANL	16,082	0	0	0	0
Total, Capital Equipment (including MIE)	**33,870**	**29,399**	**32,522**	**31,150**	**19,328**
Minor Construction Projects (Total Estimated Cost (TEC)					
Total Minor Construction Projects (TEC <$5M)	3,410	3,485	3,562	3,640	0
Total, Minor Construction Projects	**3,410**	**3,485**	**3,562**	**3,640**	**0**
Total, Capital Summary	**37,280**	**32,884**	**36,084**	**34,790**	**19,328**

Global Material Security

Overview

The Global Material Security (GMS) program directly contributes to national security efforts to reduce global nuclear and radiological security threats. GMS focuses on preventing terrorists and other actors from obtaining nuclear and radioactive material to use in an improvised nuclear device (IND) or a radiological dispersal device (RDD). GMS works with partner countries to improve the security of vulnerable materials and facilities and to improve partners' capacity to detect, disrupt, and investigate illicit trafficking of these materials. GMS promotes long-term sustainability of its capacity-building support by working with partners to develop their own regulations and inspections processes, training infrastructure, maintenance approaches, exercise and performance testing programs, life-cycle planning, and nuclear security culture. To enhance its reach and effectiveness, GMS provides technical and policy support to multilateral organizations, including the International Atomic Energy Agency (IAEA), the Global Initiative to Combat Nuclear Terrorism (GICNT), and International Criminal Police Organization (INTERPOL). As part of an ongoing strategic analysis process, GMS is also exploring innovative approaches, technologies, and tools to adapt to emerging threats and the growing demand for nuclear energy and technology. GMS supports U.S. national security priorities to reduce global nuclear security threats and sustain access to needed peaceful applications of nuclear technology that support climate change, energy security, and global health priorities.

GMS consists of three subprograms: International Nuclear Security (INS), Radiological Security (RS), and Nuclear Smuggling Detection and Deterrence (NSDD).

Global Material Security
Funding (Comparable)[a]

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Global Material Security					
International Nuclear Security	78,939	78,939	81,155	+2,216	+2.8%
Radiological Security	275,000	275,000	244,827	-30,173	-11.0%
Nuclear Smuggling Detection and Deterrence	175,000	175,000	178,095	+3,095	+1.8%
Total, Global Material Security	**528,939**	**528,939**	**504,077**	**-24,862**	**-4.7%**

Global Material Security
Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Global Material Security				
International Nuclear Security	82,822	85,886	86,556	86,519
Radiological Security	251,764	261,080	263,118	263,009
Nuclear Smuggling Detection and Deterremce	181,311	188,020	189,485	189,408
Total, Global Material Security	**515,897**	**534,986**	**539,159**	**538,936**

[a] The international contributions received by the GMS program in FY 2021 totaled $5,513,621 including $5,171,497 from the United Kingdom, $99,979 from Norway, and $242,145 from Finland.

Global Material Security
Funding (Non-Comparable)

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Global Material Security					
International Nuclear Security	78,939	78,939	81,155	+2,216	+2.8%
Domestic Radiological Security	185,000	185,000	0	-185,000	-100.0%
International Radiological Security	90,000	90,000	0	-90,000	-100.0%
Radiological Security	0	0	244,827	+244,827	+0.0%
Nuclear Smuggling Detection and Deterrence	175,000	175,000	178,095	+3,095	+1.8%
Total, Global Material Security	**528,939**	**528,939**	**504,077**	**-24,862**	**-4.7%**

Global Material Security
Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Global Material Security				
International Nuclear Security	82,822	85,886	86,556	86,519
Domestic Radiological Security	0	0	0	0
International Radiological Security	0	0	0	0
Radiological Security	251,764	261,080	263,118	263,009
Nuclear Smuggling Detection and Deterremce	181,311	188,020	189,485	189,408
Total, Global Material Security	**515,897**	**534,986**	**539,159**	**538,936**

Global Material Security
Explanation of Major Changes
(Dollars in Thousands)

	FY 2023 Request vs FY 2021 Enacted ($)
Global Material Security	
International Nuclear Security: No major change.	**+2,216**
Radiological Security: Decrease reflects the completion of remediation efforts following the 2019 container breach in Seattle as well as the initiation of several radiological security projects in the United States and in partner countries earlier than planned.	**-30,173**
Nuclear Smuggling Detection and Deterrence: No major change.	**+3,095**
Total, Global Material Security	**-24,862**

Global Material Security
International Nuclear Security

Description

The mission of the International Nuclear Security (INS) subprogram is to lead U.S. international nuclear security efforts by working with partner countries, international organizations, and non-governmental organizations to prevent theft and sabotage of nuclear material and nuclear facilities worldwide.

For more than 20 years, DOE/NNSA has leveraged the expertise of the U.S. National Laboratories to mitigate the risks of terrorists acquiring nuclear material. While these efforts have dramatically improved nuclear security around the world, gaps remain. Global expansion of the civilian nuclear fuel cycle, evolving adversary capabilities and tactics, and the availability of technologies to execute attacks presents a significant concern for global nuclear security.

INS is evolving with these risks. While highly enriched uranium and weapons-grade plutonium remain a top priority, INS is also concerned with other high-risk materials and the impacts of attacks on facilities that could adversely impact U.S. national security. INS also examines emerging issues and technologies that could present risks or opportunities for nuclear security in the future and develops innovative approaches to integrate these findings into partner country engagements.

Accordingly, INS works across the globe to secure weapons-usable nuclear materials, nuclear power plants and nuclear fuel cycle facilities, research and non-power reactors, and materials in transit. INS is developing a strategy to promote nuclear security best practices with countries interested in pursuing civil nuclear energy programs. INS also partners with U.S. industry on Security-by-Design activities to enhance security of advanced reactor designs. These measures are part of a broader DOE/NNSA effort to support future nuclear energy technology development and deployment that meets climate change goals and applies graded security measures and nonproliferation considerations.

Across all these areas, INS employs a risk-informed approach to prioritize engagements with partner countries to identify and reduce threats and risks by enhancing or building effective, comprehensive nuclear security regimes with its partners. Effective and comprehensive nuclear security regimes must include laws, regulations, procedures, people, organizations, training, and technologies—all of which must be integrated with operations, safety, the public, and the international community.

Based on a careful assessment of threats and vulnerabilities, INS implements nuclear security upgrades in select partner countries. INS also assists partner countries with developing and implementing effective nuclear security regulations, training and educational programs, secure transportation, protective force capabilities, material control and accounting capabilities, cyber security programs for nuclear facilities, and insider threat mitigation programs, which include strong nuclear security culture and performance evaluations.

INS leverages a variety of partnerships in pursuit of its mission, including partnerships with the IAEA, the World Institute for Nuclear Security (WINS), the Global Partnership against the Spread of Weapons and Materials of Mass Destruction, INTERPOL, non-governmental organizations, and U.S. industry. Partnering with the IAEA is of particular importance to ensure that global nuclear security norms and standards are strong and to reinforce bilateral nuclear security risk-reduction work. INS works with the IAEA on the development of nuclear security guidance documents, advanced training, advisory missions, technical meetings, and major conferences. INS also partners with the IAEA to develop nuclear security support centers (NSSCs) that help maintain expertise and serve as resources for nuclear security capacity-building.

Highlights of the FY 2023 Budget Request

- Deepen existing bilateral relationships with nearly 60 countries through virtual engagements or in-person technical exchanges and training on a wide range of nuclear security topics (e.g., physical security, insider threat mitigation, transportation security, nuclear material accounting and control, cyber security), while identifying and collaborating with nuclear newcomers interested in developing nuclear energy infrastructure.
- Sustain and build upon previous upgrades at nuclear facilities.
- Sustain previous investments by the Office of Radiological Security (ORS) at key nuclear research reactors worldwide.

- Analyze and develop innovative risk mitigation approaches for a range of fuel cycle facilities, including select nuclear power plants, and addressing emerging nuclear security challenges such as drones, cyber security, and artificial intelligence.
- Partner with the IAEA to enhance training capabilities, develop guidance, and conduct outreach to nuclear newcomers.
- Partner with INTERPOL to identify and develop training for law enforcement agencies that engage with or support nuclear facilities worldwide.
- Implement a strategy to raise nuclear security awareness for countries embarking on new or expanding existing civil nuclear power programs.
- Partner with relevant U.S. Government partners and the U.S. nuclear industry on Security by Design for advanced reactors to support climate change and innovation goals in a secure manner.
- Expand efforts to promote the roles of women in nuclear security and develop the next generation of nuclear security experts.

FY 2021 Accomplishments

- Demonstrated resiliency and adaptability in 2020-2021 during the ongoing COVID-19 pandemic that supported continuity of international engagements and execution of the INS mission in a virtual environment; actions include holding more than 250 virtual exchanges with nearly 60 bilateral partners on a range of nuclear security issues, such as insider threat mitigation, response, transportation security, counter unmanned aerial systems, cyber security, and sabotage mitigation.
- Expanded bilateral cooperation on a wide range of nuclear security topics to nearly 60 countries, several of which are embarking on new nuclear energy infrastructure.
- Conducted upgrades at nuclear facilities in key locations to reduce risks of sabotage and theft, while helping sustain previous upgrades in countries such as Malaysia, Romania, and Czechia.
- Started new upgrades at nuclear facilities in Morocco and Jordan based on assessments of risks and potential vulnerabilities.
- Developed a new sabotage mitigation initiative for key partners where nuclear power plants are critical to energy security.
- Partnered with the IAEA to support international virtual engagements including international training courses and revision of IAEA technical guidance.
- Worked with the IAEA to strengthen and support the NSSCs, advisory missions, and educational programs, and provided subject matter expert assistance to build sustainable, effective global nuclear security.
- Launched the 12-country Steering Committee of the International Working Group for the Advancing Information Circular 908 on Mitigating Insider Threats and the INS Nuclear Security Women (NSW) initiative.
- Conducted Over the Horizon assessments of emerging threats and technologies and completed investigations into impacts of technologies such as artificial intelligence on nuclear security.
- Completed a multi-part series of virtual transport security workshops for three regions in support of Information Circular 909: Europe, South America, and Southeast Asia.
- Performed Security by Design efforts in support of global deployment of advanced and small modular reactors.
- Conducted outreach to four nuclear embarking and/or expanding countries: Kenya, Sudan, Indonesia, and South Africa.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
International Nuclear Security $78,939,000	**International Nuclear Security $81,155,000**	**International Nuclear Security +$2,216,000**
• Collaborated with international partners to conduct six regional workshops related to cyber security for nuclear facilities, transport security, and insider threat mitigation. • Expanded and deepened bilateral engagement with approximately 60 total countries, including nuclear newcomers. • Commenced upgrades on four sites in high-risk environments. • Partnered to sustain upgrades at sites completed in previous years. • Partnered with IAEA to support the implementation of three international training courses, the revision of IAEA technical documents and guidelines, and the capabilities of five NSSCs. • Secured nuclear material in five partner countries. • Led U.S. international engagement with over 10 partners on solutions to counter the threat that unmanned aerial systems may pose to nuclear facilities. • Developed innovative solutions to address nuclear security concerns and create risk reduction opportunities, including consideration of security impacts of emerging technologies such as advanced reactors.	• Expand collaboration with nearly 60 countries on a wide range of nuclear security issues. • Sustain and build upon previous upgrades at nuclear facilities. • Sustain and build upon previous upgrades to reduce the risk of sabotage at facilities in key locations. • Implement a sabotage mitigation initiative with key partners where nuclear power plants are critical to energy security. • Continue adapting to a virtual training and engagement environment due to COVID-19, including launching a Learning Management System for foreign partners. • Expand engagements with nuclear newcomer countries on nuclear security infrastructure development and capacity-building to meet sustainable development goals. • Engage in technical partnerships with industry on Security by Design for advanced reactors for future global deployments, in support of sustainable energy goals. • Further innovation in nuclear security to address emerging risks and develop sustainable security options for our partners. • Expand INS' Nuclear Security Women (NSW) initiative to promote the role and visibility of women in nuclear security by providing education, training, research, and other	• No major change.

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
	professional development opportunities to create the next generation of nuclear security experts. • Support for IAEA international training courses and workshops, expert positions, guidance development, and engagement with nuclear newcomers. • Support INTERPOL's law enforcement training efforts to improve engagement/support of nuclear facilities worldwide. • Support WINS in areas such as emerging threats and technology engagements, cyber security, and performance evaluation. • Develop strategies, tools, and processes for cyber security, insider threat mitigation, and other dynamic nuclear security functional areas, as well as new areas of engagement including countering unmanned aerial systems, artificial intelligence, and other emerging technical areas.	

Global Material Security
Radiological Security

Description

The Radiological Security (RS) subprogram supports U.S. national security and plays an important role in preventing radiological terrorism at home and abroad by working with partners to secure high-risk radioactive materials that could be used in acts of terrorism. Radioactive materials are used worldwide to diagnose and treat diseases such as cancer, sterilize medical instruments, and monitor the structural integrity of materials. However, these same radioactive materials pose a risk to the safety and security of our Nation if not properly protected, removed, or replaced with alternative technologies.

RS reduces the risk of radioactive materials falling into the wrong hands and being used in a radiological dispersal device (RDD)—better known as a "dirty bomb." An RDD could have devastating economic and psychological consequences for our country and create panic. To mitigate that risk, RS applies a "cradle-to-grave" approach to radioactive source security by addressing vulnerabilities during all phases of the lifecycle of radioactive sources, including production, transportation, use, and end-of-life. RS leverages the unique technical capabilities of the U.S. National Laboratories to develop and implement sustainable security solutions that take into consideration the needs of radioactive source users. RS has developed an integrated and comprehensive approach to security by working closely with government partners, the response community, and the private sector.

To mitigate the risk of radiological terrorism, RS employs a three-pronged strategy, which includes protecting high-activity sources, removing disused or orphaned sources, and reducing the reliance on radioactive sources to achieve permanent risk reduction.

RS protects high-activity radioactive materials located at vulnerable locations (e.g., hospitals, universities) in the United States and worldwide. Domestically, RS works in close cooperation with licensees, industry partners, state regulators, and the Nuclear Regulatory Commission. Internationally, RS works in close cooperation with national, regional, and multilateral partners, including the IAEA and INTERPOL. RS implements state-of-the-art security solutions to protect radioactive material at volunteer sites, including implementing mobile source transit security systems for sources used in the well logging and radiography industries.

Next, where appropriate, RS addresses the vulnerability of disused or orphan radioactive sources by removing, consolidating into secure storage and, if possible, disposing of those sources that pose a potential risk to national security, public health, and safety through the Off-Site Source Recovery Program (OSRP). On a case-by-case basis, RS also repatriates high-risk U.S.-origin sources from international locations.

Finally, RS prioritizes the Reduce mission, which focuses on reducing reliance on radioactive sources by encouraging the transition away from radioactive sources to more secure alternatives. Reducing reliance on such sources permanently reduces risk either by eliminating high-activity sources or by obviating the need to introduce sources in the first place. Technologies for alternatives are maturing, and new technologies are entering the market. Domestically, RS disseminates information on these alternative technologies and provides cost-sharing incentives to volunteer organizations willing to transition away from cesium irradiators to non-radioisotopic technologies through its Cesium Irradiator Replacement Project (CIRP). RS is on track to eliminate cesium-137 blood irradiators in the United States by December 31, 2027, as outlined in the FY 2019 National Defense Authorization Act. Participation in CIRP is voluntary; the program fully covers the costs of the recovery of the radioactive source through the OSRP and provides a financial incentive towards the purchase price of a new non-radioisotopic device.

RS prioritizes efforts to ensure effective security for cesium-based devices worldwide, including replacing cesium-137 irradiators with proven X-ray technology, enhancing physical protection of cesium-137 and cobalt devices by collaborating with manufacturers to design and install kits that significantly delay an adversary's access to the source (known as In-Device Delay, or IDD). Finally, RS helps build national infrastructure in partner countries to effectively respond to an attempted theft of a source.

In 2016, RS integrated this three-pronged approach to reducing radiological risk under the 2020 Cities Initiative, which focused on the 20 largest cities in the United States. Beginning in FY 2021, the new RadSecure 100 Initiative expanded these efforts to numerous additional cities. RadSecure 100 continues the work of the 2020 Cities Initiative by bringing the same scalable radiological security trainings and activities to 100 major metropolitan areas. RadSecure 100 also continues voluntary security enhancements for radioactive sources in use, incentivizes replacing radioactive sources with more secure alternatives, and trains law enforcement responders. Furthermore, RadSecure 100 includes an increased focus on security enhancements for mobile sources, local law enforcement response activities, transportation security, and insider threat awareness.

Highlights of the FY 2023 Budget Request

- Replace 85 cesium devices (70 domestically under CIRP and 15 internationally) with alternative technologies and expand the Reduce mission to include cobalt devices.
- Support the transition from high-activity radioactive sources to non-radioisotopic alternative technologies and expanding education and outreach to encourage broader adoption of technologies that do not use high-activity radioactive sources.
- Remove an additional 700 unwanted sealed sources (500 domestically and 200 internationally) excess and unwanted sealed sources for disposition or long-term storage.
- Enhance capabilities to manage disused sources safely and securely and build international partner capacity to manage disused sources themselves.
- Protect an additional 35 buildings (20 domestically and 15 internationally) with high-priority radioactive sources.
- Maintain and expand partnerships with industry to identify new security solutions to address risks and increase security of radioactive materials.

FY 2021 Accomplishments

- Demonstrated resiliency and adaptability by conducting more than 570 virtual exchanges under pandemic conditions with over 100 domestic and international partners on a range of radiological security topics including insider threat mitigation, response, transportation security, cyber security, and alternatives to radioactive source-based technologies.
- Completed decontamination and remediation efforts at the building affected by the breached cesium-137 source in Seattle, Washington.
- Replaced 50 devices (39 domestically and 11 internationally) that use high-activity radioactive sources with non-radioisotopic alternative technologies.
- Expanded education and outreach to encourage broader adoption of technologies that do not use high-activity radioactive sources.
- Recovered and disposed of over 721 excess and unwanted sealed sources from locations throughout the United States and 388 disused or orphaned radioactive sources in other countries.
- Launched the RadSecure 100 Initiative and continued to secure volunteer buildings with high-risk quantities of radioactive sources in major metropolitan areas of the United States.
- Secured a total of 48 buildings (28 domestic and 20 international) with high-priority radioactive sources.
- Increased coordination between sites that have high-priority radioactive material and local law enforcement agencies responsible for protecting those sites.
- Deployed six mobile source tracking systems for use on field-deployed sources.
- Collaborated with industry on Security by Design to make source-based devices and facilities inherently more secure in the manufacturing process.
- Initiated IDD installations at Gamma Knife facilities internationally.
- Worked with appropriate authorities and sites domestically and internationally to sustain previously installed security upgrades.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Radiological Security (as separate Domestic and International Radiological Security subprograms) $275,000,000	**Radiological Security $244,827,000**	**Radiological Security -$30,173,000**
• Replaced 50 devices (39 domestically and 11 internationally) that use high-activity radioactive sources with non-radioisotopic alternative technologies. • Removed an additional 721 excess and unwanted sealed sources from locations throughout the United States. • Secured a total of 48 buildings (28 domestic and 20 international) with high-priority radioactive sources. • Expanded deployment of security and tracking solutions for mobile sources and worked with new industry partners to develop security solutions for other makes and models of mobile sources. • Led cybersecurity initiatives at high-priority radioactive material sites in the United States, providing partners with best practices, training, and other technical assistance. • Worked with industry and regulators to enhance security of high-activity radioactive sources during transportation across the United States. • Expanded the Security by Design cooperation with industry to make source-based devices and facilities inherently more secure. • Provided local law enforcement with the capability to train their officers locally on the threat of radioactive materials and how to	• Replace 85 devices (70 domestically and 15 internationally) that use high-activity radioactive sources with non-radioisotopic alternative technologies. • Remove an additional 700 (500 domestically and 200 internationally) excess and unwanted sealed sources for disposition or long-term storage • Protect an additional 35 buildings (20 domestically and 15 internationally) with high-priority radioactive sources. • Through the RadSecure 100 Initiative, continue to expand response training and coordination efforts with local law enforcement in additional metropolitan areas across the United States. • Support the secure and peaceful use of advanced nuclear technologies by facilitating access to non-radioisotopic alternative technologies which can be achieved through device installation, infrastructure improvements, outreach, and education. • Work with industry, regulators, and operators to enhance security of high-activity radioactive sources during transportation. • Maintain focus on cyber security, insider threat mitigation, and security culture in the United States and abroad, providing partners with training and other technical assistance to keep radioactive materials secure.	• Decrease reflects the completion of remediation efforts following the 2019 container breach in Seattle as well as the initiation of several radiological security projects in the United States and in partner countries earlier than planned.

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
respond to the potential theft of radioactive materials.	• Work to complete the priority site physical protection upgrades and engagements with industry partners that were impacted by the COVID pandemic.	

Global Material Security
Nuclear Smuggling Detection and Deterrence

Description

The Nuclear Smuggling Detection and Deterrence (NSDD) subprogram works to build the capacity of partner countries to detect, disrupt, and investigate smuggling of nuclear and radioactive materials that could be used in acts of terrorism. NSDD provides partners with tailored radiation detection systems based on assessments of high-risk smuggling pathways and operational environments. NSDD partners include international law enforcement, intelligence, and border security organizations. To facilitate long-term systems operability, NSDD works with partners to develop their capabilities across five performance areas: policies and procedures, operations, training, maintenance, and assessment. NSDD coordinates closely with other U.S. Government agencies (e.g., Departments of Homeland Security, State, Defense, and Justice) to maximize the impact of U.S. Government resources, and collaborates with international organizations such as INTERPOL, IAEA, the Border Monitoring Working Group, the World Customs Organization (WCO), and GICNT, to promote consistency in global efforts to counter nuclear smuggling.

NSDD addresses remaining gaps in global counter nuclear smuggling capabilities by expanding program initiatives and partnerships to address the evolving geopolitical landscape and emergence of new global threats. NSDD cooperates with partners to establish and sustain a defense-in-depth detection strategy at:

- High-priority points of entry, including land border crossings, rail crossings, airports, and seaports,
- Along frontier areas, working with border and maritime security agencies at green and blue borders, and
- Within the interior of states, partnering with police and security services.

NSDD works with partners to build necessary capabilities in a manner commensurate with partners' existing security practices by conducting trainings, workshops, drills, exercises, and related events designed to test, evaluate, and improve system performance and effectiveness.

NSDD will work to expand and deepen existing relationships with partner country agencies that enhance policies and procedures, operations, training, maintenance, and assessment of deployed systems. These collaborations are also designed to enhance the partner's investigation support capabilities to include capacity-building focused on isotopic identification and analysis of detected material. Together, these tools contribute to building a practical, comprehensive, and effective counter nuclear smuggling capability.

Highlights of the FY 2023 Budget Request

- Equip priority points of entry with radiation detection systems and provide associated training and maintenance support to help counter the threat of illicit trafficking of special nuclear material; Central Asia, the Sahel, and Eastern Europe are priority regions.
- Strengthen radiation detection and interdiction capabilities in high-risk frontier areas through the Green Border Security Initiative and Maritime Vector Partnership projects.
- Strengthen interdiction and inspection capabilities of Internal Security and Law Enforcement (ISLE) units making intelligence-driven decisions to patrol and protect internal checkpoints, major public events, and possible adversary targets of interest such as critical infrastructure.
- Build and evaluate partner agencies' capabilities in five performance areas critical to achieving baseline counter nuclear smuggling operability: policies and procedures, operations, training, maintenance, and assessment.

FY 2021 Accomplishments

- Demonstrated resiliency and adaptability during the pandemic that supported continuity of international engagements and execution of the NSDD mission in a completely virtual environment, including holding more than 60 virtual exchanges with nearly 50 bilateral partners.
- Provided five additional mobile and portable systems for use at internal checkpoints in countries along known smuggling routes.

- Strengthened radiation detection and interdiction capabilities of green border security teams and improved surveillance capabilities near sensitive and high-risk areas on green borders by completing three Green Border Security Initiative projects.
- Provided enhanced capabilities to interior law enforcement and intelligence agencies responding to counter smuggling information alerts and investigations.
- Provided identification, inspection, and radiation detection tools for interdiction of small maritime vessels in the Indian Ocean and the Arabian Sea.
- Established three new bilateral partner country engagements to strengthen nuclear investigation support capabilities, bringing the total number of current investigation support engagements to 35 partners.
- Conducted outreach engagements in over 25 countries in South and Southeast Asia, Africa, and the Middle East, and completed six new agreements with high-priority partners.
- Equipped an additional 29 official crossing points to close key gaps in the global nuclear detection architecture in eight countries and connected radiation detection sites to national communications systems in one country.
- Supported capacity-building activities in five performance areas (policies and procedures, operations, training, maintenance, and assessment) in partner countries where systems have been installed but are not yet indigenously sustained.
- Completed recapitalization efforts with three partner countries.
- Met the FY 2021 target for 75% of partner agencies to demonstrate operational capability of counter nuclear smuggling systems.
- Conducted over 25 events, workshops, and exercises to advance partner country capabilities in radiation detection operations and sustainability, equipment maintenance, and investigation support.
- Conducted over 35 training courses to advance partner country capabilities in operating, maintaining, and managing radiation detection measures, to include investigations.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Nuclear Smuggling Detection and Deterrence $175,000,000	**Nuclear Smuggling Detection and Deterrence $178,095,000**	**Nuclear Smuggling Detection and Deterrence +$3,095,000**
• Deployed counter nuclear smuggling systems at 36 interdiction points including: • Completed a total of 29 projects along points of entry, enhancing radiation detection capabilities at: 20 large-scale border crossing points, six man-portable Passenger Rail Initiative deployments, one seaport, and two airports. • Enhanced frontier area interdiction and inspection capabilities by completing four projects providing radiation localization and identification equipment, along with ancillary interdiction equipment, to enforcement units by completing: three Green Border Security Initiative projects and one Maritime Vector Partnership project. • Strengthened interdiction, inspection, and investigation capabilities of internal security and law enforcement units by completing three pilot projects providing radiation detection equipment, ancillary equipment, and human resource development. • Conducted over 25 drills, workshops, or exercises and completed over 35 training courses, to advance partner country capabilities in operating, maintaining, and managing radiation detection systems, to include investigations. • Supported capacity-building activities in prioritized partner countries to promote and evaluate system operability.	• Meet the FY 2023 target for 77% of partner agencies to demonstrate operational capability of counter nuclear smuggling systems. • Deploy counter nuclear smuggling systems at 23 interdiction points • Complete a total of 10 projects along points of entry, enhancing radiation detection capabilities at: six large-scale border crossing points, one seaport, and three airports. • Enhance frontier area interdiction and inspection capabilities by completing five projects providing radiation localization and identification equipment, along with ancillary interdiction equipment, to enforcement units by completing four Green Border Security Initiative projects and one Maritime Vector Partnership project. • Strengthen interdiction, inspection, and investigation capabilities of internal security and law enforcement units by completing eight projects providing radiation detection equipment, ancillary equipment, and human resource development. • Support capacity-building activities in five performance areas (policies and procedures, operations, training, maintenance, and assessment) in partner countries to promote system operability. • Conduct assessments of partners' baseline counter nuclear smuggling operability.	• No major change.

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
	• Conduct over 60 drills, workshops, or exercises and complete over 50 training courses to advance partner country capabilities in operating, maintaining, sustaining, and managing radiation detection measures, to include investigations. • Initiate new, high-priority engagements with law enforcement, intelligence, and border security agencies in the Sahel and Southeast Asia. • Establish regional technical and maintenance providers in new areas to further sustainability efforts and pursue new investigation support partnerships, including with nuclear newcomer states.	

Nonproliferation and Arms Control

Overview

The Nonproliferation and Arms Control (NPAC) program enhances U.S. national security and facilitates legitimate civil nuclear cooperation by reducing global nuclear proliferation threats. NPAC applies its unique technical and policy expertise residing in NNSA to support U.S. nonproliferation and arms control objectives to prevent proliferation, ensure peaceful nuclear uses, and enable verifiable nuclear reductions. The NPAC program pursues these objectives through four subprograms: (1) International Nuclear Safeguards; (2) Nuclear Export Controls; (3) Nuclear Verification; and (4) Nonproliferation Policy. Respectively, these offices: strengthen international nuclear safeguards; control the proliferation of nuclear material, equipment, technology, and expertise; verify nuclear reductions and compliance with nonproliferation and arms control treaties and agreements; and develop programs and strategies to anticipate and address nuclear nonproliferation and arms control challenges and opportunities. Across these programmatic functions, NPAC continues to play a leading role in addressing current threats while also drawing upon its expertise to anticipate emerging nonproliferation challenges and develop technical approaches and potential policy solutions.

Nonproliferation and Arms Control Funding

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Nonproliferation and Arms Control					
International Nuclear Safeguards	62,235	62,235	84,179	+21,944	+35.3%
Nuclear Export Controls	35,710	35,710	40,621	+4,911	+13.8%
Nuclear Verification	33,745	33,745	67,240	+33,495	+99.3%
Nonproliferation Policy	16,310	16,310	15,616	-694	-4.3%
Total, Nonproliferation and Arms Control	**148,000**	**148,000**	**207,656**	**+59,656**	**+40.3%**

Nonproliferation and Arms Control Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Nonproliferation and Arms Control				
International Nuclear Safeguards	76,452	74,125	74,486	73,156
Nuclear Export Controls	43,095	48,127	48,286	48,049
Nuclear Verification	72,101	75,199	75,352	75,970
Nonproliferation Policy	15,540	17,403	18,405	19,264
Total, Nonproliferation and Arms Control	**207,188**	**214,854**	**216,529**	**216,439**

Nonproliferation and Arms Control
Explanation of Major Changes
(Dollars in Thousands)

	FY 2023 Request vs FY 2021 Enacted ($)
Nonproliferation and Arms Control	
International Nuclear Safeguards: The increase in funding supports continued development of the nonproliferation enrichment testing and training platform and peaceful uses activities related to non-energy (e.g., medical and agricultural) uses of nuclear technology.	**+21,944**
Nuclear Export Controls: The increase in funding enables technical support for U.S. Government participation in multilateral export control regimes and international arrangements such as the Wassenaar Arrangement and the Biological and Toxin Weapons Convention (BWC); supports efforts to evaluate emerging and foundational technologies for proliferation risks; and addresses specific proliferation challenges through targeted training.	**+4,911**
Nuclear Verification: The increase in funding supports establishment of dedicated facilities and projects and development of additional experts within NNSA to allow for expanded activities to develop, test, and evaluate the additional and stretch approaches for warhead and weapons material monitoring and verification procedures and technologies as part of a monitoring and verification initiative that bolsters the expertise and technology critical to sustaining NNSA's arms control mission and accelerate the development of new technologies and approaches.	**+33,495**
Nonproliferation Policy: No major changes.	**-694**
Total, Nonproliferation and Arms Control	**+59,656**

Nonproliferation and Arms Control
International Nuclear Safeguards

Description

The International Nuclear Safeguards (NS) subprogram strengthens the international nuclear safeguards regime and the International Atomic Energy Agency's (IAEA's) ability to verify peaceful uses of nuclear materials and facilities and detect non-compliance. NS manages programs to strengthen the technology and human capital base to support safeguards, oversees activities of the U.S. Support Program (USSP) to IAEA Safeguards, collaborates with the IAEA and other partners to enhance the implementation of safeguards norms and best practices, promotes Safeguards by Design elements with the U.S. nuclear industry, oversees implementation of U.S. Additional Protocol (AP) and Voluntary Offer Agreement (VOA) safeguards requirements and activities at DOE sites and facilities, and assesses the physical protection of U.S.-obligated nuclear materials overseas. NS also provides support to the IAEA to implement its monitoring and verification mandate in Iran.

Highlights of the FY 2023 Budget Request

- Implement ongoing DOE/NNSA statutory and treaty/agreement obligations and authorities, including: physical security assessment visits for U.S.-obligated materials at foreign facilities; implementing U.S. safeguards obligations under the U.S. VOA/AP; and international safeguards training.
- Support effective IAEA safeguards and verification of Iran's nuclear program in accordance with its IAEA safeguards commitments, relevant international agreements, and applicable United Nations (UN) Security Council resolutions.
- Prepare the nonproliferation enrichment testing and training platform to develop and test technologies and approaches for transfer to the IAEA in collaboration with select international partners.
- Strengthen the U.S. safeguards technology and human capital base to meet projected U.S. and IAEA resource requirements.
- Continue implementation of Advanced Reactor International Safeguards Engagement (ARISE) program, including working with key stakeholders (i.e., the Nuclear Regulatory Commission, DOE's Office of Nuclear Energy, industry, U.S. National Laboratories) to incorporate Safeguards by Design elements into advanced reactor designs.
- Promote universal adherence to the highest standard of IAEA Safeguards Agreements: A Comprehensive Safeguards Agreement with an AP, and a modified Small Quantities Protocol (where applicable).
- Provide customized training and outreach to more than 50 international partners to enable effective and efficient IAEA safeguards implementation around the world.
- Work with the interagency and the IAEA to implement changes to the safeguards approach for plutonium subject to the VOA for surplus plutonium disposition from K-Area Material Storage to Waste Isolation Pilot Plant to enable ongoing transparency.
- Facilitate legitimate nuclear cooperation and minimize the proliferation risks of the expansion of civil nuclear power through capacity-building in nuclear safeguards.
- Enhance nonproliferation opportunities with international partners through targeted peaceful uses engagement projects.

FY 2021 Accomplishments

- Maintained implementation of safeguards obligations at DOE facilities through remote means, after the onset of the COVID-19 pandemic.
- Transitioned 50 domestic and international safeguards engagement workshops to remote/virtual delivery.
- Promoted peaceful uses of nuclear technology globally, including through projects with U.S. nuclear medical societies to provide targeted peaceful uses assistance with Tanzania and Ghana, and provided funding to the IAEA to facilitate over a dozen projects with partner countries.
- Completed phase 1 activities associated with the infrastructure preservation and decommissioning plan for the nonproliferation enrichment testing and training platform.
- Transferred seven safeguards technology tools to international partners, including particle reference standards for environmental sample analysis and radiation-tolerant memory cards for surveillance cameras.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
International Nuclear Safeguards $62,235,000	**International Nuclear Safeguards $84,179,000**	**International Nuclear Safeguards +$21,944,000**
• Developed safeguards technologies and approaches to: (1) address electrochemical processing based on research and development conducted with international partners; (2) improve efficiencies of safeguards; and (3) enhance inspector capabilities in high-priority areas such as enhanced in-field collection analysis and detection of undeclared activities. • Transferred seven safeguards tools to foreign partners or international organizations to meet identified safeguards deficiencies. • Continued developing a nonproliferation enrichment testing and training platform for the development and testing of technologies approaches for transfer to the IAEA. • Improved safeguards concepts and approaches for new facilities and fuel cycles; strengthened Safeguards by Design approaches directly with designers and nuclear industry, especially for advanced reactor designs; and analyzed the implications of emerging technology to international safeguards applications. • Enhanced partnerships with the IAEA and advanced nuclear partners to field test advanced safeguards technologies to enhance state declarations and optimize safeguards resource allocations. • Expanded and enhanced efforts to promote universal adherence to IAEA safeguards agreements and good practices in safeguards implementation by providing customized training and outreach to more than 50 countries.	• Develop safeguards technologies and approaches to: (1) promote integration of features into advanced reactor designs to facilitate the application of IAEA safeguards; (2) improve efficiencies of safeguards; and (3) enhance inspector capabilities in high-priority areas such as enhanced in-field collection analysis and detection of undeclared activities. • Transfer safeguards tools to international partners or organizations to meet identified safeguards deficiencies. • Prepare the nonproliferation enrichment testing and training platform for commissioning in FY 2024 for the development and testing of technologies for transfer to the IAEA. • Improve safeguards concepts and approaches for new facilities and fuel cycles and analyze the implications of emerging technology to international safeguards applications. • Develop and promote integration of Safeguards by Design elements into U.S. advanced reactor and fuel cycle facility designs to facilitate opportunities for international deployment. • Expand and enhance efforts to promote universal adherence to IAEA safeguards agreements and good practices in safeguards implementation by providing customized training and outreach to more than 70 countries. • Expand non-power peaceful uses activities to other areas of the developing world as a means to strengthen the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and further enhance	• The increase in funding supports the continued development of the nonproliferation enrichment testing and training platform and peaceful uses activities related to non-energy (e.g., medical and agricultural) uses of nuclear technology.

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
• Supported non-power peaceful uses activities in the developing world as a means to further enhance safeguards implementation and regulatory effectiveness. • Maintained support for accredited IAEA Network of Analytical Laboratories at U.S. National Laboratories. • Maintained qualified and knowledgeable safeguards staff at the U.S. National Laboratories and the IAEA through maintenance of early and mid-career safeguards positions at the U.S. National Laboratories and safeguards training courses. • Cooperated with Department of State (DOS), Department of Defense (DOD), the NRC, and the IAEA to develop guidelines and policies to help prioritize the allocation of safeguards resources in ways that will strengthen the IAEA's ability to detect, deter, and investigate undeclared nuclear activities. • Provided on an as-requested basis, technical and technology assistance to the IAEA to monitor Iran's nuclear program, and to prepare for possible involvement in denuclearization activities in DPRK. • Implemented U.S.-IAEA safeguards obligations at DOE facilities, including annual reporting requirements as required by U.S. law and treaty obligations. • Led planning for four U.S. Government assessments of the physical protection of U.S.-obligated nuclear materials at foreign facilities.	safeguards implementation and regulatory effectiveness. • Maintain support for accredited IAEA Network of Analytical Laboratories at the U.S. National Laboratories. • Maintain qualified and knowledgeable safeguards staff at the U.S. National Laboratories and IAEA through early and mid-career safeguards positions at the U.S. National Laboratories and safeguards training courses. • Cooperate with DOS, DOD, the NRC, and the IAEA to develop guidelines and policies to help prioritize the allocation of safeguards resources in ways that will strengthen the IAEA's ability to detect, deter, and investigate undeclared nuclear activities. • Provide on an as-requested basis, technical and technology assistance to the IAEA to monitor Iran's nuclear program, and to prepare for possible involvement in denuclearization activities in DPRK. • Implement U.S.-IAEA safeguards obligations at DOE facilities, including annual reporting requirements as required by U.S. law and treaty obligations. • Lead U.S. Government assessments of the physical protection of U.S.-obligated nuclear materials at foreign facilities. • Continue to implement remote or virtual engagements when necessary and where practical and enhance e-learning opportunities to expand outreach capabilities.	

Nonproliferation and Arms Control
Nuclear Export Controls

Description

The Nuclear Export Controls subprogram facilitates peaceful nuclear cooperation by strengthening domestic and global capacity to detect and prevent the illicit transfer of nuclear and dual-use materials, equipment, and technology. The subprogram implements and oversees programs that: provide technical and end-user evaluations of U.S. export license applications; provide technical support that enhances the U.S. Government's capacity to detect and interdict illicit nuclear and dual-use commodity technology transfers to foreign programs of concern; provide technical support to the multilateral nonproliferation export control regimes; and strengthen foreign partner national systems of export control consistent with U.S. policy and the multilateral supplier regimes.

Highlights of the FY 2023 Budget Request

- Implement ongoing DOE/NNSA statutory obligations and authorities, including U.S. nonproliferation and export control activities (export license reviews and interdiction case technical reviews).
- Facilitate legitimate nuclear cooperation and minimize the proliferation risks of the expansion of civil nuclear power through international capacity-building and engagement in export controls.
- Provide nonproliferation assessments of emerging nuclear technologies and other emerging strategic risks and challenges to anticipate and prevent nuclear technological surprises.
- Develop and deploy new training materials for international and domestic audiences to raise awareness of the potential proliferation risks of new emerging technologies.
- Expand technical support to the multilateral regimes (i.e., Wassenaar) and other arrangements (i.e., IAEA technical cooperation projects).
- Continue the Export Compliance Assistance Program (ECAP) to raise awareness of export compliance responsibilities, assist in developing strategies for complying with all U.S. export control laws and regulations, and provide export compliance training to federal employees, their staff and contractors at DOE & NNSA Headquarters, Field & Site Offices, and sites and facilities.

FY 2021 Accomplishments

- Delivered nine emerging technologies virtual seminars focusing on implementation of Section 1758 of the Export Control Reform Act.
- Conducted 51 export control training events for U.S. enforcement agencies and international partners, while developing more online training courses for use in FY 2021 and beyond.
- Partnered with DOS, and the Department of Commerce, and the Government of Malaysia to hold the 10th anniversary hybrid celebration of Malaysia's Strategic Trade Act, which drew together nearly 1,000 attendees and highlighted the importance of strategic trade controls in combating the proliferation of weapons of mass destruction.
- Completed approximately 6,800 technical reviews of U.S. export licenses for nuclear and dual-use commodities and more than 2,000 technical analyses for interdiction cases and unique analytical products regarding proliferation trends.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Nuclear Export Controls $35,710,000	**Nuclear Export Controls $40,621,000**	**Nuclear Export Controls +$4,911,000**
• Engaged 45 foreign partners on a bilateral and regional basis to strengthen their national export control systems to help prevent illicit trafficking in nuclear and weapons of mass destruction-related (WMD-related) materials, commodities, and technology. This was accomplished through training and technical cooperation to exchange export control best practices and build the capacity of key countries to serve as trainers for their region. • Trained U.S. export enforcement officials to familiarize them with controlled nuclear and dual-use material, equipment, and technology, which could be used for WMD purposes, and collaborated with the U.S. Customs and Border Protection's (CBP) National Targeting Center (NTC). Provided technical reach back to U.S. export enforcement agencies. • Performed 6,800 technical reviews of U.S. export licenses for nuclear and dual-use commodities, continued to provide state-of-the-art technology assessments to the multilateral control regimes, and provided training courses for DOE and other U.S. Government officials regarding evolving export-controlled technologies and proliferation concerns. • Supported the U.S. Government enforcement community by providing approximately 2,000 technical analyses for interdiction cases per year and unique analytical products regarding proliferation trends.	• Engage foreign partners on a bilateral and regional basis to strengthen their national export control systems to help prevent illicit trafficking in nuclear and WMD-related materials, commodities, and technology. This is accomplished through training and technical cooperation to exchange export control best practices and build the capacity of key countries to serve as trainers for their region. • Train U.S. export enforcement officials to familiarize them with controlled nuclear and dual-use material, equipment, and technology, which could be used for WMD purposes, and collaborate with the CBP's NTC. Provide technical reach back to U.S. export enforcement agencies. • Perform technical reviews of U.S. export licenses for nuclear and dual-use commodities, perform reviews of nuclear software code requests and U.S. Munitions List cases, continue to provide state-of-the-art technology assessments to the multilateral export control regimes, review IAEA technical cooperation (TC) projects for proliferation concerns, and provide training courses for DOE and other U.S. Government officials regarding evolving export-controlled technologies and proliferation concerns. • Support the U.S. Government enforcement community by providing technical analyses for interdiction cases per year and unique analytical products regarding proliferation trends.	• The increase in funding enables technical support for U.S. Government participation in multilateral export control regimes and international arrangements such as the Wassenaar Arrangement and the BWC; supports efforts to evaluate emerging and foundational technologies for proliferation risks; and addresses specific proliferation challenges through targeted training.

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
• Maintained and supported information technology systems to support export control licensing, interdiction analysis, and the multilateral nonproliferation export control regimes. • In coordination with DOS, provided technical reviews of proposed transfers of items, materials, goods, and technology to Iran in accordance with applicable UN Security Council resolutions. • Supported ECAP which deploys export control awareness training across DOE and NNSA facilities targeted at the Federal workforce, their staff, and contractors.	• Maintain and support information technology systems to support export control licensing, interdiction analysis, and the multilateral nonproliferation export control regimes. • Provide technical reviews of proposed transfers of items, materials, goods, and technology to Iran in accordance with applicable UN Security Council resolutions. • Support ECAP which deploys export control awareness training and provides export compliance guidance and assistance across DOE and NNSA facilities targeted at the Federal workforce, their staff, and contractors. • Work to address potential proliferation risks associated with emerging and foundational technologies in cooperation with the U.S. interagency and international partners, as appropriate. • Support the U.S. Government's interest in strengthening the BWC by conducting a study to look at ways to strengthen this international convention, including the feasibility of a potential BWC verification regime.	

Nonproliferation and Arms Control
Nuclear Verification

Description

The Nuclear Verification subprogram reduces proliferation concerns by enabling verifiable arms reductions, including through support for negotiation and implementation of U.S. nonproliferation and arms control treaties and agreements. The subprogram conducts applied technology development, testing, evaluation, maintenance, and deployment of monitoring technologies and develops monitoring and verification approaches that are informed through analysis of the potential impacts of initiatives on DOE and NNSA National Laboratories, plants, and sites. Additionally, the subprogram maintains technical readiness to negotiate and implement future nuclear fuel cycle transparency agreements and conducts U.S.-led missions to monitor, verify, disable, and dismantle proliferant nuclear fuel cycle programs around the world. The subprogram performs monitoring activities under existing agreements and supports U.S. Government review of other countries' compliance with their treaty and agreement obligations. The subprogram also contributes to U.S. policy development for treaty and agreement implementation while ensuring U.S. requirements for maintaining a safe, secure, and reliable nuclear weapons stockpile are met.

Highlights of the FY 2023 Budget Request

- Initiate and implement a monitoring and verification initiative to develop the needed NNSA facilities, projects and personnel to bolster the expertise and technology critical to sustaining NNSA's arms control mission and accelerate the development of new technologies and approaches.
- Initiate the development of an arms control user facility to support NNSA's arms control monitoring and verification stretch approach, which draws upon additional measures and data to greatly complicate any efforts to circumvent monitoring regimes.
- Implement ongoing DOE/NNSA treaty/agreement obligations and authorities, including implementing DOE obligations under the Plutonium Production Reactor Agreement (PPRA), Chemical Weapons Convention (CWC), and the NPT.
- Support compliance analysis and implementation of the New Strategic Arms Reduction Treaty (New START) and other arms control agreements.
- Maintain technical and manpower readiness for future U.S.-led monitoring and verification of denuclearization activities through strategic tool maintenance and regular verification team exercise and training events.
- Continue development of a U.S. field verification capability to confirm aspects of a nuclear weapons development program.
- Develop and maintain monitoring and verification teams to build readiness for future U.S.-led on-site monitoring and verification activities.

FY 2021 Accomplishments

- Implemented DOE/NNSA treaty/agreement obligations and authorities, including DOE obligations under the PPRA, the CWC, and the NPT.
- Supported negotiations, compliance analysis, and implementation of New START and other arms control agreements, including the CWC.
- Supported multiple Administration-directed national security policy reviews: arms control policy, U.S.-Russia strategic stability dialogue, the Comprehensive Nuclear-Test-Ban Treaty (CTBT), and Nuclear Posture Review (NPR).
- Supported work to address the long-term technical challenges of nuclear disarmament verification.
- Maintained technical and manpower readiness for future U.S.-led monitoring and verification of denuclearization activities through strategic tool maintenance and regular verification team exercise and training events.
- Continued development of a U.S. field verification capability to confirm whether a suspect event is an underground nuclear explosion, and if so, determine and assess key event parameters.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Nuclear Verification $33,745,000	**Nuclear Verification $67,240,000**	**Nuclear Verification +$33,495,000**
• Supported U.S. implementation, compliance analyses, and policy development for the New START Treaty and the Open Skies Treaty, and ensured DOE/NNSA equities and interests were protected. • Under the terms of the PPRA, supported implementation, but due to the COVID-19 pandemic were unable to conduct the three monitoring visits in Russia to ensure that Russian plutonium oxide was stored securely and that shutdown Russian plutonium production reactors remained in a non-operational status or to host Russian monitors on annual PPRA monitoring visit to shutdown U.S. plutonium production reactors at the Savannah River Site. • Conducted national security and nuclear nonproliferation activities related to nuclear testing limitations, including those that support monitoring and verification capabilities under the CTBT International Monitoring System and International Data Centre that complement and strengthen U.S. nuclear explosion monitoring and verification capabilities. • Provided seismic monitoring capacity-building under the Seismic Cooperation Program to foreign partner institutions to enhance their abilities to detect and analyze possible nuclear explosions, as well as mitigate geophysical hazards. • Developed, tested, and evaluated verification procedures and technologies; trained and exercised specialized U.S. verification teams; and	• Support U.S. implementation, compliance analyses, and policy development for the New START Treaty, the CWC, and other arms control agreements, and ensure DOE/NNSA equities and interests are protected. • Implement U.S. and DOE/NNSA legal obligations under the CWC, including maintaining accreditation of the OPCW laboratory at LLNL. • Under the terms of the PPRA, if feasible, conduct up to three monitoring visits in Russia to ensure that Russian plutonium oxide is stored securely and that shutdown Russian plutonium production reactors remain in a non-operational status, and, if required, host Russian monitors on annual PPRA monitoring visit to shutdown U.S. plutonium production reactors at the Savannah River Site. • Continue national security and nuclear nonproliferation activities related to nuclear testing limitations, including those that support monitoring and verification capabilities under the CTBT International Monitoring System and International Data Centre that complement and strengthen U.S. nuclear explosion monitoring and verification capabilities. • Provide seismic monitoring capacity-building under the Seismic Cooperation Program to foreign partner institutions to enhance their abilities to detect and analyze possible nuclear explosions, as well as mitigate geophysical hazards.	• The increase in funding supports establishment of dedicated facilities and projects and development of additional experts within NNSA to allow for expanded activities to develop, test, and evaluate the additional and stretch approaches for warhead and weapons material monitoring and verification procedures and technologies as part of a monitoring and verification initiative that bolsters the expertise and technology critical to sustaining NNSA's arms control mission and accelerate the development of new technologies and approaches.

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
conducted operations planning to maintain short-notice readiness for U.S.-led monitoring and verification of nuclear weapons material production programs and associated denuclearization efforts around the world. • Developed, tested, and evaluated warhead and weapons material monitoring and verification procedures and technologies, and supported international technical engagements to address long-term verification challenges. • Collaborated with the United Kingdom under the 1958 Mutual Defense Agreement (MDA) and with other partner countries to develop potential common approaches to nuclear verification issues. • Implemented U.S. and DOE legal obligations under the CWC, including maintaining accreditation of the Organization for the Prohibition of Chemical Weapons (OPCW) laboratory at Lawrence Livermore National Laboratory (LLNL).	• Develop, test, and evaluate verification procedures and technologies; train and exercise specialized U.S. verification teams; and conduct operations planning to maintain short-notice readiness for U.S.-led monitoring and verification of nuclear weapons material production programs and associated denuclearization efforts around the world. • Develop, test, and evaluate warhead and weapons material monitoring and verification procedures and technologies, and support international technical engagements to address long-term verification challenges. • Collaborate with the United Kingdom under the 1958 MDA and with other partner countries to develop potential common approaches to nuclear verification issues. • Expand training and e-learning where possible to maintain on-site verification readiness capabilities. • Initiate and implement a monitoring and verification initiative that bolsters the expertise and technology critical to sustaining NNSA's arms control mission and accelerate the development of new technologies and approaches.	

Nonproliferation and Arms Control
Nonproliferation Policy

Description

The Nonproliferation Policy subprogram continues its longstanding role in developing and implementing programmatic efforts that anticipate and address enduring and emerging nuclear nonproliferation challenges and opportunities. The subprogram continues to serve as the DOE/NNSA lead in supporting the negotiation and implementation of nonproliferation agreements and requirements set forth in the Atomic Energy Act of 1954 (AEA), as amended; the 1978 Nuclear Nonproliferation Act; National Defense Authorization Acts (NDAAs); and stemming from national nonproliferation initiatives, agreements, and treaties, including the NPT. In addition, the subprogram continues to lead efforts to develop DOE/NNSA nonproliferation policy guidance on nuclear technology transfer and nuclear fuel cycle issues, undertakes activities to improve and update multilateral nuclear supplier arrangements, and identifies supplier vulnerabilities and potential gaps in supplier arrangements. The subprogram also implements the regulations at 10 CFR Part 810 (Part 810), which control the export of unclassified nuclear technology and assistance, pursuant to Section 57b(2) of the AEA, as amended. Additionally, the subprogram supports activities focused on reducing the danger of nuclear war and preventing the proliferation of nuclear weapons in critical regions and preparing DOE/NNSA for cross-cutting and emerging changes to the threat environment.

Highlights of the FY 2023 Budget Request

- Implement ongoing DOE/NNSA statutory obligations and authorities, including U.S. nonproliferation and export control activities (123 Agreements, and Part 810 authorizations).
- Provide technical leadership as part of the U.S. delegation to the Nuclear Suppliers Group (NSG) through the provision of expertise to ensure NSG controls keep pace with technological, industry, and proliferation developments.
- Develop technical and policy solutions that support the implementation of high-level Administration initiatives to address pressing proliferation concerns, including the effective implementation of the NPT and related elements of the nonproliferation regime.
- Facilitate legitimate civil-nuclear commerce and minimize the proliferation risks of the expansion of civil nuclear power through international outreach.
- Provide nonproliferation assessments of emerging nuclear technologies and other emerging strategic risks and challenges.
- Implement legal authority to impose monetary civil penalties for violations of the Part 810 regulation.
- Develop, expand, and improve e810 to respond to industry and internal feedback.
- Continue to consider high-assay low-enriched uranium (HALEU) and fuel supply issues and options in conjunction with current proliferation and global political considerations.

FY 2021 Accomplishments

- Processed 55 Part 810 specific authorization applications and requests for amendments, including end-use and technical reviews, and reviewed 572 reports and notifications for compliance with Part 810.
- Finalized a Federal Register Notice and Communications Plan for the regulatory rule change to impose monetary civil penalties for violations of the 10 CFR Part 810 as directed by the FY 2019 NDAA.
- Provided key technical support as required by the AEA (or "as legally required") for the U.S.-UK 123 Agreement to ensure that significant U.S. and UK civil nuclear cooperation, previously conducted under the auspices of the U.S.-Euratom 123 Agreement, continues uninterrupted.
- Concluded analysis on advanced reactor technologies that will proactively inform the creation of a U.S. strategy on how to approach advanced technology proposals in the NSG, which ultimately furthers innovative U.S. technical and policy support in strengthening the international nonproliferation regime.
- Provided foundational understanding of cross-cutting and emerging changes to the nonproliferation threat environment, for example on China's civil-military fusion efforts, further supporting U.S. policies towards China.
- Conducted Track 1.5 engagements in South Asia, East Asia, and the Middle East to reduce the danger of nuclear war and discourage the spread of nuclear weapons in critical regions.
- Expanded the reach of South Asia-focused social media and web-based projects to promote U.S. interests in the region to 3.8 million viewers.

- Launched a Track 1.5 initiative to focus on strengthening support for the NPT by developing a community of transatlantic deterrence experts and cultivating the next generation of deterrence experts.
- Completed development on version 1.1 of the NSG Information Sharing System (NISS) Web Application.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Nonproliferation Policy $16,310,000	**Nonproliferation Policy $15,616,000**	**Nonproliferation Policy -$694,000**
• Processed 55 Part 810 specific authorization applications and requests for amendments, including end-use and technical reviews. Reviewed specific authorization reports and notifications for compliance with Part 810 and the scope of the existing license. • Reviewed hundreds of Part 810 general authorization reports for compliance with Part 810 regulations and responded to requests for determination. • Conducted Part 810 Process Improvement procedures, focusing on expanding external outreach and reducing processing times. • Conducted Track 1.5 engagements with India, Pakistan, Saudi Arabia, the United Arab Emirates, Egypt, and Burma, to reduce the danger of nuclear war and discourage the spread of nuclear weapons in critical regions. • Grew South Asia-focused social media and web-based projects to promote U.S. interests in the region. • Worked with the NSG to strengthen controls on nuclear exports, including amendments of the NSG Guidelines and control lists, consistent with advancements in the technology, commercial, and proliferation domains. • Executed a U.S.-led advanced nuclear technology review of the NSG control lists. • Conducted NSG industry outreach activities to establish a consistent dialog with industry on the impacts of technological and commercial developments on the NSG Guidelines.	• Support the ongoing statutory responsibility for regulating the export of civil nuclear technology and assistance under 10 CFR Part 810 by processing specific authorization applications and requests for amendments and renewals, including end-use and technical reviews. • Expand enforcement and compliance efforts and implementation of new (FY 2022) civil penalty authority rulemaking. • Support implementation of U.S. deliverables for the 2025 NPT Review Cycle and associated nonproliferation, disarmament, and peaceful uses objectives. • Conduct track 1.5 deterrence dialogue engagements to provide innovative solutions to NPT challenges. • Provide technical support to strengthen the international export control regimes including the NSG. • Play a critical role on the development of policy initiatives and programming to ensure that the NSG Guidelines and control lists remain effective and credible (e.g., advanced reactors and reprocessing technical studies). • Develop and execute a U.S. strategy for addressing advanced reactor technologies in the NSG. • Conduct targeted NSG industry outreach activities on technological and commercial developments of the NSG Guidelines. • Provide leadership and logistical/meeting planning support for U.S. Chair of the NSG.	• No major changes.

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
• Continued upgrading the NISS Web and Mobile Applications. • Conducted analyses of the impact of NPT-related developments on U.S. nonproliferation interests. • Support implementation of U.S. deliverables for the 10th NPT Review Cycle. • Provided technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding Administrative Arrangements. • Led preparations for the High-Level Bilateral Commission under the U.S.-Republic of Korea 123 Agreement. • Conducted analyses of accountancy information in support of the implementation of 23 bilateral 123 Agreements. • Conducted two track 1.5 deterrence dialogues to encourage support for the NPT and build a transatlantic deterrence community. • Completed scientific analysis the climate effects of nuclear weapons to counter humanitarian arguments underpinning support for the Treaty on the Prohibition of Nuclear Weapons.	• Conduct ongoing U.S. support and maintenance of the NISS Web and Mobile Applications. • Provide statutorily mandated technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding administrative arrangements. • Provide statutorily mandated technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding administrative arrangements. • Develop mechanisms to increase the number of 123 Agreements that balance U.S. nonproliferation norms and support U.S. industry while meeting future partners' desire to access U.S. technology. • Provide technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding Administrative Arrangements. • Lead preparations for the High-Level Bilateral Commission under the U.S.-Republic of Korea 123 Agreement. • Conduct analyses of accountancy information in support of the implementation of bilateral 123 Agreements. • Conduct studies and analyses on current and future nonproliferation challenges in coordination with the national laboratories and prominent industry experts. • Advance program goals utilizing a limited travel environment post-COVID, including through delivery of online trainings and engagements,	

FY 2021 Enacted	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
	and continued development of existing virtual platforms. • Conduct track 1.5 engagements in regions of concern to reduce the danger of nuclear war and dissuade the proliferation of nuclear weapons. • Grow South Asia-focused social media and web-based projects to promote U.S. interests in the region.	

Defense Nuclear Nonproliferation
NNSA Bioassurance Program

Overview

The U.S. Department of Energy's (DOE) National Nuclear Security Administration (NNSA) establishes a national security bioassurance program that focuses on anticipating and detecting threats and scaling response solutions that will enable and assure security of the growing bioeconomy and strengthen biodefense. The program will focus on sustaining and growing core capabilities at NNSA facilities such as high performance computing for threat assessment and rapid countermeasure design, development of detection capabilities, and expertise in biological sciences and engineering; the intersections of biothreats and nuclear activities, including in export controls, which are the specific responsibility of NNSA; the intersection with biothreats and biological-based energy production, , and harnessing DOE capabilities to support efforts across the U.S. Government to safeguard the bioeconomy and strengthen biodefense. In close coordination with DOE's Office of Science (DOE-SC), NNSA will leverage DOE National Laboratories expertise, classified workplaces, and computational capabilities, as well as DOE investments in bioscience, biotechnology, and biomanufacturing. As occurs now in the nuclear mission space, all these capabilities will be able to be leveraged by NNSA's interagency partners.

DOE has the primary responsibility to provide long-term capabilities at its labs for expert, cross-disciplinary, team science, mission delivery and application orientation, distinctive and capable scientific user facilities, intelligence-informed science and technology perspectives, and robust technology transfer that creates new companies and jobs. These capabilities are used widely by other government agencies but are nurtured and sustained by DOE/NNSA.
The NNSA Bioassurance Program has three tracks that integrate across enabling science, addressing national security issues, and transition to mission and private partners. The first track, Threat Anticipation and Assessment, focuses on anticipating destabilizing biological threats, both naturally occurring and anthropogenic, and avoiding technical surprise through predictive modeling and data science. The second track, Signature Discovery and Early Detection, focuses on identifying threat signatures and developing detection technologies. The third track, Threat Mitigation and Safeguards, focuses on rapidly developing and validating safeguards and threat mitigation approaches.

This new program will be coordinated tightly with the biosciences and biotechnology activities within DOE-SC. This coordinated DOE program would include core funding for NNSA and DOE-SC laboratory programs to support staff, specialized infrastructure, and expand capabilities at DOE's user facilities to support these research areas. Having a department-level coordinated program that includes foundational science in bioeconomy, biopreparedness, and biodefense research working together with the NNSA Bioassurance Program has tremendous mutually beneficial value. With the U.S. economy poised to experience significant growth in the use of biomanufacturing and biotechnology to produce biological molecules and materials on a commercial scale, this approach would accelerate knowledge of national security risks in how these technologies could be a threat to the U.S., how the U.S. Government needs to protect efforts in these areas,, and innovation and discovery within the broader set of biosciences, to assure a strong and secure bioeconomy and strengthen biodefense. NNSA and DOE-SC have demonstrated the ability to implement large-scale, integrated cooperative national security programs.

NNSA Bioassurance Program
Funding

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
NNSA Bioassurance Program					
Program Integration and Technology Transfer (PI)	0	0	14,000	+14,000	N/A
Technology Development and Demonstration (TD)	0	0	4,000	+4,000	N/A
Threat Mitigation and Safeguards (TMS)	0	0	2,000	+2,000	N/A
Total, NNSA Bioassurance Program	**0**	**0**	**20,000**	**20,000**	**N/A**

NNSA Bioassurance Program
Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
NNSA Bioassurance Program				
Program Integration and Technology Transfer (PI)	6,000	4,000	4,000	4,000
Technology Development and Demonstration (TD)	8,000	10,000	10,000	10,000
Threat Mitigation and Safeguards (TMS)	6,000	6,000	6,000	6,000
Total, NNSA Bioassurance Program	**20,000**	**20,000**	**20,000**	**20,000**

NNSA Bioassurance Program
Explanation of Major Changes
(Dollars in Thousands)

	FY 2023 Request vs FY 2021 Enacted ($)
Defense Nuclear Nonproliferation	
NNSA Bioassurance Program: Funding establishes the program and supports a risk and infrastructure needs assessment, initial minor equipment purchases, and preliminary exploratory research	**+20,000**
Total, NNSA Bioassurance Program	**+20,000**

Defense Nuclear Nonproliferation
NNSA Bioassurance Program

Description

Funding for the NNSA Bioassurance Program establishes the program and supports a risk and infrastructure needs assessment, initial equipment purchases, and preliminary exploratory research.

Highlights of the FY 2023 Budget Request

- Establish the NNSA Bioassurance Program.
- Perform a biothreats/biotechnology risk assessment that includes the intersections of biothreats with nuclear activities and energy, identifies bioassurance needs and gaps, incorporates a bioassurance research infrastructure needs assessment, and develops a program framework that prioritizes resources to sustain a long-term research and development bioassurance capability in the DOE National Labs.
- Perform a strategic bio-landscape assessment of current interagency priorities and activities and align the program framework with developing national security requirements for strengthening the bioeconomy and biodefense.
- Initiate DOE laboratory pilot technology development projects as prioritized in the Bioassurance program framework.

FY 2024 – FY 2027 Key Milestones

- Develop strategies to address the risks and opportunities associated with emerging and converging biotechnologies to exploit opportunities and mitigate future threats.
- Build upon the Bioassurance program framework and establish phased science plan goals, objectives, requirements, and execute a prioritized list of small equipment procurements and facility upgrades to meet plan objectives.
- Establish multi-year DOE lab research programs to address science plan goals and objectives.
- Identify and leverage state-of-the-art test beds and other research facilities and platforms across DOE, NNSA, and the interagency to evaluate and anticipate threats from emerging and converging technologies.
- Establish a university program to create a pipeline for expertise and to meet strategic workforce needs within the national laboratories in emerging and converging biotechnologies, biosecurity, and biodefense.

FY 2021 Accomplishments

- N/A

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
NNSA Bioassurance Program $0	**NNSA Bioassurance Program $20,000,000**	**NNSA Bioassurance Program $+20,000,000**
• This program starts in FY 2023.	• Establish NNSA Bioassurance Program. • Perform a biothreats/biotechnology risk assessment that includes the intersections of biothreats with nuclear activities and energy, identifies bioassurance needs/gaps, conducts a bioassurance research infrastructure needs assessment, and develops a program framework that prioritizes resources to sustain a long-term research and development bioassurance capability in the DOE National Labs • Perform a strategic bio-landscape assessment of current interagency priorities and activities and continue to align the program framework with the developing national security requirements for strengthening the bioeconomy and biodefense. • Initiate DOE laboratory pilot projects as prioritized in the bioassurance program framework.	• Funding establishes the NNSA Bioassurance Program.

NNSA Bioassurance Program
Capital Summary

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Request ($)
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))						
Capital Equipment >$500K (including MIE)	N/A	N/A	0	0	8,000	8,000
Minor Construction	N/A	N/A	0	0	0	0
Total, Capital Operating Expenses	**N/A**	**N/A**	**0**	**0**	**8,000**	**8,000**
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (>$500K and <$5M)	N/A	N/A	0	0	8,000	8,000
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**0**	**0**	**8,000**	**8,000**

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Request ($)
Minor Construction Projects (Total Estimated Cost (TEC)						
Total Minor Construction Projects (TEC <$5M)	N/A	N/A	0	0	0	0
Total, Minor Construction Projects	**N/A**	**N/A**	**0**	**0**	**0**	**0**
Total, Capital Summary	**N/A**	**N/A**	**0**	**0**	**8,000**	**8,000**

Outyears for NNSA Bioassurance Program

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	Outyears
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))					
Capital Equipment >$500K (including MIE)	4,000	2,000	0	0	N/A
Minor Construction	0	0	0	0	N/A
Total, Capital Operating Expenses	**4,000**	**2,000**	**0**	**0**	**N/A**
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (>$500K and <$5M)	4,000	2,000	0	0	N/A
Total, Capital Equipment (including MIE)	**4,000**	**2,000**	**0**	**0**	**N/A**
Minor Construction Projects (Total Estimated Cost (TEC)					
Total Minor Construction Projects (TEC <$5M)	0	0	0	0	N/A
Total, Minor Construction Projects	**0**	**0**	**0**	**0**	**N/A**
Total, Capital Summary	**4,000**	**2,000**	**0**	**0**	**N/A**

Defense Nuclear Nonproliferation Research and Development

Overview

The Defense Nuclear Nonproliferation Research and Development (DNN R&D) program directly contributes to nuclear security by developing U.S. capabilities to detect and characterize global nuclear security threats in full coordination with the goals and priorities of U.S. Government mission stakeholders across nonproliferation, counterterrorism, and emergency response mission areas. In addition, DNN R&D sustains and develops foundational nonproliferation technical competencies that ensure the technical agility needed to support a broad spectrum of U.S. nonproliferation missions and anticipate threats. To do these activities, DNN R&D leverages the unique facilities and scientific skills of DOE, academia, and industry to perform research and demonstrate advances in capabilities, develop prototypes, and produce sensors for integration into operational systems.

Specifically, the DNN R&D program makes these strategic contributions through the innovation of U.S. technical capabilities to detect, identify, locate, and characterize foreign nuclear material production and weapons development activities; movement and illicit diversion of special nuclear materials; and global nuclear detonations. DNN R&D also supports nuclear forensics R&D that develops and maintains analysis capabilities at the National Laboratories that can support time-critical decisions in the event of a nuclear or radiological incident or assist in determining the origin of interdicted materials or nuclear devices. These technical capabilities are either advanced to higher maturities, transitioned to stakeholders for further development for mission-specific applications, or transferred to operational performers. In addition, DNN R&D sustains and develops foundational nonproliferation technical competencies by providing targeted, long-term support for enabling infrastructure, science and technology, and an expert workforce.

Defense Nuclear Nonproliferation Research and Development (DNN R&D)
Funding

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Defense Nuclear Nonproliferation R&D					
Proliferation Detection	255,000	255,000	287,283	+32,283	+12.7%
Nuclear Detonation Detection	267,000	267,000	279,205	+12,205	+4.6%
Nonproliferation Fuels Development	20,000	20,000	0	-20,000	-100.0%
Forensics R&D[a]	40,000	40,000	44,414	+4,414	+11.0%
Nonproliferation Stewardship Program	59,900	59,900	109,343	+49,443	+82.5%
Total, Defense Nuclear Nonproliferation R&D	**641,900**	**641,900**	**720,245**	**+78,345**	**+12.2%**

(a) For the purpose of comparison, this table includes the $40,000K of FY2021 Enacted funding for National Technical Nuclear Forensics R&D, which was a separate program in FY2021.

Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR):

- FY 2021 Transferred: SBIR: $13,202; STTR: $0
- FY 2022 Annualized CR: SBIR: $13,975; STTR: $0
- FY 2023 Request: SBIR: $14,705; STTR: $0

Defense Nuclear Nonproliferation Research and Development (DNN R&D)
Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Defense Nuclear Nonproliferation R&D				
Proliferation Detection	293,937	304,812	307,190	307,061
Nuclear Detonation Detection	278,743	289,058	291,312	291,192
Nonproliferation Fuels Development	0	0	0	0
Forensics R&D	45,664	47,353	47,722	47,703
Nonproliferation Stewardship Program	94,380	97,872	98,635	98,595
Total, Defense Nuclear Nonproliferation R&D	**712,724**	**739,095**	**744,859**	**744,551**

Defense Nuclear Nonproliferation Research and Development
Explanation of Major Changes
(Dollars in Thousands)

	FY 2023 Request vs FY 2021 Enacted ($)
Defense Nuclear Nonproliferation Research and Development	
Proliferation Detection (PD): The increase expands activities that advance and broaden development of integrated, next-generation nuclear arms control monitoring and verification technology and expertise.	**+32,283**
Nuclear Detonation Detection (NDD): This increase provides systems engineering, integration, and risk analysis support for testbed development and for transition of technologies to operational mission partners.	**+12,205**
Nonproliferation Fuels Development: No funding is requested to continue this activity in FY 2023.	**-20,000**
Forensics R&D: The increase further supports the execution of a nuclear forensics R&D university consortium conducting R&D to address basic research shortfalls and train the next generation of experts in technical nuclear forensics missions.	**+4,414**
Nonproliferation Stewardship Program (NSP): The increase accelerates development of testbeds, including uranium and plutonium sciences and weaponization, to sustain and develop foundational nonproliferation competencies to support a broad spectrum of U.S. nonproliferation missions and anticipate threats.	**+49,443**
Total, Defense Nuclear Nonproliferation Research and Development	**+78,345**

Defense Nuclear Nonproliferation Research and Development
Proliferation Detection

Description

The Proliferation Detection (PD) subprogram develops technologies to detect foreign nuclear weapons programs; support nuclear arms control treaty verification by improving compliance monitoring capabilities; and support national nuclear security and interdiction of nuclear materials outside of regulatory control. PD efforts are aligned along these major functional areas: (1) Nuclear Weapons Development and Material Production Detection efforts targeted toward the detection, identification, location, and characterization of foreign nuclear weapons program activities; (2) Nuclear Weapons and Material Security efforts targeted toward nuclear security and nuclear arms control treaty monitoring and verification tools and applications, operational interdiction, radiological source replacement, and nuclear security efforts across NNSA; and (3) Nonproliferation Enabling Capabilities efforts supporting a broad R&D base to bring new, cross-cutting technologies to multi-use applications across NNSA and the interagency community, including a field experiment and demonstration program and university research program. The field demonstration program integrates research and experimental testbed activities to advance technology in support of the Nation's treaty verification and monitoring needs.

As part of DNN R&D's University Consortia for Nuclear Nonproliferation, PD supports three consortia which link universities and DOE National Laboratories to address basic research shortfalls in nuclear nonproliferation and security and treaty compliance monitoring. All currently funded consortia have a Minority Serving Institution (MSI) component and will place a particular emphasis on encouraging the participation of Historically Black Colleges and Universities (HBCU) and other MSIs through planned funding opportunity announcements (FOA).

Highlights of the FY 2023 Budget Request

- Advance U.S. detection and characterization capabilities of foreign nuclear weapons production activities through 2027.
- Achieve improvements in U.S. capabilities in nuclear weapons and material security applications, including detecting special nuclear material (SNM) and its movement, incident response, and nuclear safeguards.
- Conduct programmatic activities for nonproliferation and foreign weapons program activity monitoring through execution and development of national testbeds for validation of new sensors, equipment, and capabilities.
- Provide a broad, underlying set of technical capabilities that support nuclear nonproliferation and nuclear security, continuing to expand current technical frameworks.
- Execute an integrated approach to broadened strategic arms control & verification R&D to identify key technologies in light of emerging threats.
- Align with the developing interagency requirements for early detection of nuclear proliferation, including SNM production and cross-cutting artificial intelligence and other data science applications.

FY 2021 Accomplishments

- Conducted two field campaigns at Los Alamos National Laboratory to identify signatures associated with alternative manufacturing use in nuclear weapons development.
- Conducted two field experiments at Nevada National Security Site (NNSS) focused on testing newly constructed proliferator-relevant equipment and understanding their associated signatures.
- Executed a field campaign at Idaho National Laboratory (INL) to improve understanding of signatures of special nuclear material (SNM) production.
- Awarded a five-year grant to a new university consortium focused on nuclear engineering and nuclear physics.
- Further advanced the state-of-the-art for applying artificial intelligence and advanced data analytics to the nuclear nonproliferation problem, demonstrated using real-world interagency datasets.
- Completed four workshops focused on developing a roadmap for future arms control monitoring and verification R&D.
- Successfully leveraged DP's Stockpile Stewardship activity at U1a at NNSS to collect signatures from subcritical experiments.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Proliferation Detection $255,000,000	**Proliferation Detection $287,283,000**	**Proliferation Detection +$32,283,000**
• Developed and demonstrated advances in U.S. capabilities to detect and characterize foreign nuclear programs, especially in denied areas, as follows: advanced sensor and algorithm development and demonstrated technologies and methods in operational testbed environments for SNM production detection; Assessed the impact of alternative manufacturing techniques and advanced stand-off detection methods for weaponization activities to monitor the potential technical breakout of foreign weapons programs; Developed new analytic approaches to move proliferation detection to earlier timelines and closed information gaps in denied areas; Accelerated the timeline for large-scale field experimentation to identify and verify signatures of nuclear-related high-explosive tests, collecting against a device that will be built using advanced manufacturing techniques. • Developed and demonstrated advances in U.S. capabilities to strengthen nuclear security across the threat spectrum as follows: advanced detection and imaging for SNM detection, developed and advanced safeguards technology, and addressed nuclear data gaps in support of nuclear security. Expanded ongoing efforts focusing on arms control and warhead verification and monitoring R&D, including initiation of projects to improve the ability to verify warhead declarations under future arms control treaties; to investigate potential new, alternative methods of verify treaties; and to	• Develop and demonstrate advances in U.S. capabilities to detect and characterize foreign nuclear programs, especially in denied areas as follows: advance sensor and algorithm development and demonstrate technologies and methods in operational testbed environments for SNM production detection; Understand the impact of alternative manufacturing techniques and advance stand-off detection methods for weaponization activities to monitor the potential technical breakout of foreign weapons programs; Develop new analytic approaches to move proliferation detection to earlier timelines and close information gaps in denied areas. • Develop and demonstrate advances in U.S. capabilities to strengthen nuclear security across the threat spectrum as follows: advance detection and imaging for SNM detection, develop and advance safeguards technology, and address nuclear data gaps in support of nuclear security. • Expand efforts focusing on arms control and warhead verification and monitoring R&D, and initiate activities to advance expected arms reduction technical frameworks and enable improved vulnerability assessments to expand U.S. technical options and flexibility in future negotiations. • Support three university consortia to address basic gaps in nuclear nonproliferation and treaty compliance monitoring.	• The increase expands activities that advance and broaden development of integrated, next-generation nuclear arms control monitoring and verification technology and expertise.

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
identify arms control gaps and potential future R&D. • Supported three university consortia to address basic gaps in nuclear nonproliferation and treaty compliance monitoring.	• Support an emerging and disruptive technologies initiative focused on building expertise with emerging technologies in the context of varied nuclear nonproliferation missions, to prevent technological surprise and provide opportunities to support nonproliferation and national security more broadly.	

Defense Nuclear Nonproliferation Research and Development
Nuclear Detonation Detection

Description

The Nuclear Detonation Detection (NDD) subprogram develops and builds space sensors for the nation's operational nuclear test treaty monitoring and related capabilities; produces and updates the regional geophysical datasets and analytical understanding of waveform and radionuclide signatures to enable operation of the nation's ground-based nuclear detonation monitoring networks; and supports activities to improve U.S. capabilities to detect and characterize low-yield and evasively conducted underground nuclear explosions.

Highlights of the FY 2023 Budget Request

- Produce nuclear detonation detection satellite payloads in accordance with the negotiated schedule with the Department of the Air Force.
- Support the payload-side technical integration, pre-launch, and on-orbit testing activities for previously delivered payloads in accordance with host satellite schedules.
- Conduct research in seismic and radionuclide detection to support national capability in terrestrial and airborne monitoring and analysis methods.
- Align with requirements for early detection of nuclear proliferation through low-yield nuclear explosion monitoring.

FY 2021 Accomplishments

- Supported launches and early on-orbit testing of two GPS-III satellites containing Global Burst Detector (GBD) payloads.
- Renewed DAF-NNSA memorandum of understanding to formalize U.S. Nuclear Detonation Detection System (USNDS) roles and responsibilities.
- Concluded first phase of site subsurface characterization and mining progress at NNSS in preparation for future integrated field experiments designed to improve U.S. capabilities to detect and characterize low yield and evasively conducted underground nuclear explosions.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Nuclear Detonation Detection $267,000,000	**Nuclear Detonation Detection $279,205,000**	**Nuclear Detonation Detection +$12,205,000**
• Fabricated GBD nuclear detonation detection payloads and tested assets for GPS block IIIF satellites in accordance with the negotiated schedule with the DAF. • Supported payload-side technical integration, pre-launch, and on-orbit testing activities for previously delivered payloads. • Developed and produced sensor-laden payloads for launch into geosynchronous orbit. • Conducted required engineering development and satellite interface coordination to support payload design updates for future satellite blocks for GBDs and other U.S. Nuclear Detonation Detection System payloads. • Improved capabilities of geophysical models, datasets, and analyses of seismic signals from underground detonations and improved technologies to detect radionuclide releases, including integrating research products of field and laboratory test campaigns into methods to improve event discrimination and yield estimation. • Advanced development of a new testbed to support field experiments associated with the Low Yield Nuclear Monitoring effort, designed to improve U.S. capabilities to detect and characterize low yield and evasively conducted underground nuclear explosions.	• Fabricate GBD nuclear detonation detection payloads and test assets for GPS block IIIF satellites in accordance with the negotiated schedule with the DAF. • Support payload-side technical integration, pre-launch, and on-orbit testing activities for previously delivered payloads. • Develop and produce sensor-laden payloads for launch into geosynchronous orbit. • Conduct required engineering development and satellite interface coordination to support payload design updates for future satellite blocks for GBDs and other U.S. Nuclear Detonation Detection System payloads. • Improve capabilities of geophysical models, datasets, and analyses of seismic signals from underground detonations and improve technologies to detect radionuclide releases, including integrating research products of field and laboratory test campaigns into methods to improve event discrimination and yield estimation. • Continue development of a new testbed to support field experiments associated with the Low Yield Nuclear Monitoring effort, designed to improve U.S. capabilities to detect and characterize low yield and evasively conducted underground nuclear explosions. • Continue development of Source Physics Experiment III, aiming to improve the capability to discriminate underground nuclear explosions from natural earthquakes.	• This increase provides systems engineering, integration, and risk analysis support for testbed development and for transition of technologies to operational mission partners.

Description

The Forensics R&D subprogram supports the R&D that develops and maintains advanced technical nuclear forensics analysis capabilities at the National Laboratories that can support time-critical decisions in the event of a nuclear or radiological incident and assist in determining the origin of interdicted materials or nuclear devices. The subprogram's R&D includes the collection, analysis, and evaluation of pre-detonation and post-detonation nuclear and other radioactive materials, devices, and debris, as well as the immediate effects created by a nuclear detonation. It also sustains subject matter expertise to support exercises, mentoring, training, expert reach-back, and real-world contingency operations.

As part of DNN R&D's University Consortia for Nuclear Nonproliferation, the subprogram supports one consortium which links universities and DOE National Laboratories to address basic research shortfalls in science, engineering, and other disciplines relevant to NNSA's technical nuclear forensics missions. All currently funded consortia have a Minority Serving Institution (MSI) component and will place a particular emphasis on encouraging the participation of Historically Black Colleges and Universities (HBCU) and other MSIs through planned funding opportunity announcements (FOA).

Highlights of the FY 2023 Budget Request

- Develop advanced technical nuclear forensics analysis capabilities that support U.S. Government response to a nuclear or radiological event.
- Continue a nuclear forensics R&D university consortium, as part of DNN R&D's University Consortia for Nuclear Nonproliferation, established in FY 2022 to conduct research and development in science, engineering, and other disciplines to address basic research shortfalls and train the next generation of experts needed to support NNSA's technical nuclear forensics missions.

FY 2021 Accomplishments

- Developed new techniques applicable to nuclear forensics through modern analyses of legacy nuclear test fallout debris samples and irradiation experiments at the Nuclear Criticality Experiments Research Center (NCERC).
- Successfully demonstrated the extraction of microscale features from an SNM sample's surface using focused ion beam scanning electron microscopy.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Forensics R&D $40,000,000	**Forensics R&D $44,414,000**	**Forensics R&D +$4,414,000**
• Forensics R&D was fully funded in FY 2021 under the DNN National Technical Nuclear Forensics R&D program.	• Improve technical nuclear forensic capabilities, including the technical means to assess bulk samples of SNM and the technical preparedness for scenarios of surface-interacting nuclear detonations. • Address research priorities that support the technical capability of operational assets and verification and validation activities. • Improve the process to generate actionable information from laboratory measurements, modeling efforts, and expert evaluations in the analysis of fallout debris samples following a nuclear detonation. • Reduce timelines and uncertainties in priority measurements. • Inform future capability requirements by assessing the benefits of incorporating emerging technical methods during operational exercises, baseline assessments, and other targets of opportunity. • Support a nuclear forensics R&D university consortium, partnered with DOE National Laboratories, to conduct research and development in science, engineering, and other disciplines to address basic research shortfalls and train the next generation of experts needed to support NNSA's technical nuclear forensics missions.	• Increase supports execution of nuclear forensics R&D university consortium conducting R&D to address basic research shortfalls and train the next generation of experts in technical nuclear forensics missions.

Defense Nuclear Nonproliferation Research and Development
Nonproliferation Stewardship Program

Description

The Nonproliferation Stewardship Program (NSP) subprogram employs a focused and prioritized strategy, deliberate planning, and dedicated resources to ensure foundational technical competencies at DOE/NNSA are sustained and available to support the Nation's nonproliferation missions. The NSP recognizes that the U.S. nuclear weapons program and domestic nuclear fuel cycle infrastructure has significantly narrowed or declined since the Cold War era, leaving the Nation without the large cadre of DOE/NNSA laboratory personnel with hands-on experience in sensitive fuel-cycle processes and nuclear weapons development and testing. At the same time, advances in manufacturing, computing, and other key areas, combined with easier access to nuclear-related information, are creating more diverse pathways to developing a nuclear weapon and have reduced and evolved the footprint and associated signatures of those activities. The convergence of these trends coupled with the continued threat of covert proliferation is making the task of nuclear nonproliferation more difficult. To ensure the technical agility needed to support nonproliferation missions and anticipate threats, the NSP sustains and develops foundational nonproliferation technical competencies by providing targeted, long-term support for enabling infrastructure, science and technology, and an expert workforce.

Highlights of the FY 2023 Budget Request

- Support experimental capabilities and testbed development needed to address immediate capability shortfalls in support of nonproliferation missions.
- Support additional targeted, long-term activities to ensure the Nation is prepared to meet future nonproliferation goals and anticipate threats through relevant science and technology, testbeds and research environments, and modern expertise needed for high-priority nonproliferation applications, including nonproliferation competencies in uranium and plutonium sciences and weaponization sciences and engineering.
- Construct a Uranium Sciences and Technology Center that establishes a modern science and technology environment to develop technical expertise.

FY 2021 Accomplishments

- Complete preliminary designs for a Uranium Sciences and Technology Center that establishes a modern science and technology environment to develop technical expertise.
- Began development of two data centers to provide high-performance computing capability to develop next-generation uranium enrichment models and technical expertise.
- Completed the first quadrennial Nonproliferation Competency Baseline study to determine nonproliferation priorities and capabilities gaps.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Nonproliferation Stewardship Program $59,900,000	**Nonproliferation Stewardship Program $109,343,000**	**Nonproliferation Stewardship Program +$49,443,000**
• Supported testbed development needed to address immediate capability shortfalls in support of nonproliferation missions. • Supported infrastructure upgrades and hardware initiatives to create a comprehensive, physics-based computational model that can predict the output of an entire uranium enrichment system based on the specific design of a single machine. • Supported additional targeted, long-term activities, including relevant science and technology, testbeds and research environments, and modern expertise needed for high-priority nonproliferation applications, which includes competencies in uranium and plutonium sciences and engineering. • Conducted program planning, including the establishment of a strategic implementation plan to build and sustain foundational nonproliferation technical competencies.	• Support testbed development addressing immediate capability shortfalls in support of nonproliferation missions. • Support infrastructure upgrades and hardware initiatives to create a comprehensive, physics-based computational model that can predict the output of an entire uranium enrichment system based on the specific design of a single machine. • Support additional targeted, long-term activities building foundational technical competencies needed for high-priority nonproliferation applications, including in weaponization, by developing testbeds and research environments, conducting relevant science and technology, and building modern expertise. • Conduct annual reviews evaluating progress toward building foundational nonproliferation technical competencies.	• The increase accelerates additional targeted, long-term testbed development and other activities, including in uranium and plutonium sciences and weaponization, for sustaining and developing foundational nonproliferation competencies to support a broad spectrum of U.S. nonproliferation missions and anticipate threats.

Defense Nuclear Nonproliferation Research and Development
Capital Summary

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))						
Capital Equipment >$500K (including MIE)	N/A	N/A	59,843	64,352	64,451	+4,608
Minor Construction	N/A	N/A	7,500	2,657	21,717	+14,217
Total, Capital Operating Expenses	**N/A**	**N/A**	**67,343**	**67,009**	**86,168**	**+18,825**
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (>$500K and <$5M)	N/A	N/A	59,843	64,352	64,451	+4,608
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**59,843**	**64,352**	**64,451**	**+4,608**

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Minor Construction Projects (Total Estimated Cost (TEC)						
Total Minor Construction Projects (TEC <$5M)	N/A	N/A	2,600	2,657	2,715	+115
Uranium Science and Technology Center, ORNL	23,902	0	4,900	0	19,002	+14,102
Total, Minor Construction Projects	**N/A**	**N/A**	**7,500**	**2,657**	**21,717**	**+14,217**
Total, Capital Summary	**N/A**	**N/A**	**67,343**	**67,009**	**86,168**	**+18,825**

Outyears for Defense Nuclear Nonproliferation Research and Development

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	Outyears
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))					
Capital Equipment >$500K (including MIE)	63,880	65,285	66,722	68,189	N/A
Minor Construction	2,775	2,836	2,898	2,962	N/A
Total, Capital Operating Expenses	**66,655**	**68,121**	**69,620**	**71,151**	**N/A**
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (>$500K and <$5M)	63,880	65,285	66,722	68,189	N/A
Total, Capital Equipment (including MIE)	**63,880**	**65,285**	**66,722**	**68,189**	**N/A**

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	Outyears
Minor Construction Projects (Total Estimated Cost (TEC)					
Total Minor Construction Projects (TEC <$5M)	2,775	2,836	2,898	2,962	N/A
Total, Minor Construction Projects	**2,775**	**2,836**	**2,898**	**2,962**	**N/A**
Total, Capital Summary	**66,655**	**68,121**	**69,620**	**71,151**	**N/A**

Nonproliferation Construction

Overview

The Nonproliferation Construction Program consolidates construction projects that directly contribute to reducing global nuclear security threats and is a key component of the Department of Energy (DOE), National Nuclear Security Administration's (DOE/NNSA) integrated nonproliferation, counterterrorism, and emergency response strategy.

DOE/NNSA pursues a dilute and dispose strategy to fulfill the United States' commitment to dispose of 34 metric tons of plutonium. The dilute and dispose strategy consists of blending plutonium with an inert mixture, packaging it for safe storage and transport, and disposing of it in a geologic repository. The Surplus Plutonium Disposition (SPD) project will add additional glovebox capacity at the Savannah River Site (SRS) to accelerate plutonium dilution and aid in the removal of plutonium from the state of South Carolina.

Nonproliferation Construction Funding

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Nonproliferation Construction					
U.S. Construction					
18-D-150, Surplus Plutonium Disposition Project (SPD), SRNS					
SPD Other Project Costs (OPC)	30,589	30,589	1,279	-29,310	-95.8%
SPD Total Estimated Cost (TEC)	118,000	118,000	70,485	-47,515	-40.3%
Subtotal, 18-D-150, Surplus Plutonium Disposition Project	**148,589**	**148,589**	**71,764**	**-76,825**	**-51.7%**
Total, Nonproliferation Construction	**148,589**	**148,589**	**71,764**	**-76,825**	**-51.7%**

Nonproliferation Construction Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Nonproliferation Construction				
U.S. Construction				
18-D-150 Surplus Plutonium Disposition				
SPD Total Estimated Cost (TEC)	51,441	35,000	0	0
SPD Other Project Costs (OPC)	40,816	0	0	0
Subtotal, 18-D-150 Surplus Plutonium Disposition	92,257	35,000	0	0
24-D-XXX, Pit Disassembly and Processing (PDP) Project				
PDP Total Estimated Cost (TEC)	45,000	67,244	120,000	120,000
PDP Other Project Costs (OPC)	0	0	0	0
Subtotal, 24-D-XXX, Pit Disassembly and Processing (PDP) Project	45,000	67,244	120,000	120,000
Subtotal, U.S. Construction	**137,257**	**102,244**	**120,000**	**120,000**
Total, Nonproliferation Construction	**137,257**	**102,244**	**120,000**	**120,000**

Nonproliferation Construction Projects
Explanation of Major Changes
(Dollars in Thousands)

	FY 2023 Request vs FY 2021 Enacted ($)
Nonproliferation Construction Projects	
U.S. Construction:	
18-D-150, Surplus Plutonium Disposition (SPD) Project: The decrease reflects the completion of long-lead procurement awards associated with Critical Decision (CD) – 3A Phase 2 and the completion of final design work required to support CD 2/3, Approval of Performance Baseline and Start of Construction.	**-76,825**
Total, Nonproliferation Construction Projects	**-76,825**

Nonproliferation Construction
U.S. Construction

Description
The Nonproliferation Construction program pursues the dilute and dispose strategy to fulfill the United States' commitment to dispose of 34 metric tons of plutonium. The dilute and dispose strategy consists of blending plutonium with an inert mixture, packaging it for safe storage and transport, and disposing of it in a geologic repository. The Surplus Plutonium Disposition (SPD) project will add additional glovebox capacity at the SRS to increase plutonium dilution throughput and aid in the removal of plutonium from the state of South Carolina.

In FY 2022, DOE/NNSA reviewed the Management and Operations (M&O) contractor's submittal of a higher confidence, risk-informed plan to achieve CD-2/3 for the SPD project. The plan reflects required design changes identified during the 60-percent design review in FY 2021. These changes will delay final design to support CD-2/3 to FY 2023. The plan includes an updated acquisition strategy in which the M&O contractor will augment a portion of the design activities by involving external design subcontractors to support completion of final design. DOE/NNSA will be evaluating how the contractor's revised forecast to CD-2/3 will impact the total project cost (TPC) through CD-4 to determine if the current high-end range value for TPC and CD-4 date of FY 2028 is still feasible. Additionally, a team of DOE/NNSA subject matter experts (SMEs) from throughout the DOE Complex conducted a Technical Independent Project Review (TIPR) of the project's design, cost, and schedule. The TIPR identified additional design needed to support the safety-related fire protection system. DOE/NNSA is awaiting the final report and recommendations from the TIPR.

Furthermore, in FY 2022, the project will:
- Award all contracts for Long Lead Equipment (LLE) being procured under CD-3A Phase 2,
- Start receiving procured LLE,
- Request approval of CD-3A Phase 3, additional site preparation, and once approved, commence field work, and
- Complete design of all major systems supporting the plutonium processing gloveboxes (i.e., ventilation, electrical, fire detection/suppression, security, etc.).

In FY 2023, the project will complete the final design review and request CD-2/3, Approval of Performance Baseline and Start of Construction, to start construction on project scope not authorized by CD-3A. The first glovebox will be fabricated and shipped along with the diesel generator. The project will also continue supporting technology maturation, risk management, and project management.

Other Project Cost (OPC)
This activity supports all other costs related to a project that are not included in the total estimated cost (TEC). OPCs include, but are not limited to: research and development, conceptual design and conceptual design report, cold start-up and commissioning costs, National Environmental Policy Act (NEPA) documentation, project data sheet preparation, siting, and permitting requirements. These costs are part of the approved baseline and the total project cost (TPC) of the project.

Total Estimated Costs (TEC)
This activity supports the design, long-lead equipment procurement, site preparation, and construction of the project.

Highlights of the FY 2023 Budget Request
- Complete final design to support Critical Decision (CD) – 2/3, Approve Performance Baseline/Approve Start of Construction, for the SPD Project.

FY 2021 Accomplishments
- Completed physical termination activities on the mixed oxide (MOX) fuel fabrication facility (MFFF) project.
- Completed 60% design for the SPD Project.
- Completed CD-3A Phase 1 early site preparation for the SPD Project.
- Completed CD-3A Phase 2 long-lead equipment approval process for the SPD Project.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
U.S. Construction $148,589,000	**U.S. Construction $71,764,000**	**U.S. Construction -$76,825,000**
18-D-150, Surplus Plutonium Disposition (SPD) Project $148,589,000	**18-D-150, Surplus Plutonium Disposition (SPD) Project $71,764,000**	**18-D-150, Surplus Plutonium Disposition (SPD) Project -$76,825**
SPD OPC $30,589,000	**SPD OPC $1,279,000**	**SPD OPC -$29,310,000**
• Supported activities such as project management and project controls support, procurement support, design authority activities, operations and security support, and start-up planning.	• Supports activities such as project management and project controls support, procurement support, design authority activities, operations and security support, and start-up planning.	• Decrease reflects the completion of many CD-1 activities as the project moves to CD-2/3, which is predominately TEC.
SPD TEC $118,000,000	**SPD TEC $70,485,000**	**SPD TEC -$47,515,000**
• Supported Preliminary Design. • Advanced design of gloveboxes and specialized engineered electrical equipment. • Continued the final design and project documentation required to support a third phase of CD-3A.	• Complete the fabrication, receipt, inspection and acceptance of long-lead procurements. • Complete final design for CD-2/3.	• Decrease reflects the completion of awarding long-lead procurements associated with Critical Decision (CD) – 3A Phase 2 and the completion of final design work required to support CD 2/3, Approval of Performance Baseline and Start of Construction.

Nonproliferation Construction
Construction Projects Summary

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Enacted	FY 2023 Request	FY 2023 Request vs FY 2022 Enacted ($)
24-D-XXX Pit Disassembly and Processing (PDP) Project[a]						
Total Estimated Cost (TEC)	3,400,000	0	0	0	0	0
Other Project Cost (OPC)	0	0	0	0	0	0
Total Project Cost, 23-D-XXX Pit Disassembly and Processing (PDP) Project	**3,400,000**	**0**	**0**	**0**	**0**	**0**
18-D-150 Surplus Plutonium Disposition Project, SRS						
Total Estimated Cost (TEC)	474,710	54,000	118,000	145,784	70,485	-75,299
Other Project Cost (OPC)	145,382	62,482	30,589	10,216	1,279	-8,937
Total Project Cost, 18-D-150 Surplus Plutonium Disposition Project, SRS	**620,092**	**116,482**	**148,589**	**156,000**	**71,764**	**-84,236**
Total All Construction Projects						
Total Estimated Cost (TEC)	3,874,710	54,000	118,000	145,784	70,485	-75,299
Other Project Cost (OPC)	145,382	62,482	30,589	10,216	1,279	-8,937
Total Project Cost (TPC) All Construction Projects	**4,020,092**	**116,482**	**148,589**	**156,000**	**71,764**	**-84,236**

[a] Critical Decision (CD)-0 was approved on July 2021 for the Pit Disassembly and Processing (PDP) project with an estimated rough order-of-magnitude (ROM) range from $1 Billion to $3.4 Billion. An independent cost review was conducted by the NNSA Office of Cost Estimating and Program Evaluation (CEPE) that supported the ROM cost range. The funding profile for future years will be updated when estimates are validated and a baseline is approved through the CD process.

Outyears Nonproliferation Construction

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	Outyears to Completion
24-D-XXX Pit Disassembly and Processing (PDP) Project					
Total Estimated Cost (TEC)	45,000	67,244	120,000	120,000	3,047,756
Other Project Cost (OPC)	0	0	0	0	0
Total Project Cost, 23-D-XXX Pit Disassembly and Processing (PDP) Project	**45,000**	**67,244**	**120,000**	**120,000**	**3,047,756**
18-D-150 Surplus Plutonium Disposition Project, SRS					
Total Estimated Cost (TEC)	51,441	35,000	0	0	0
Other Project Cost (OPC)	40,816	0	0	0	0
Total Project Cost, 18-D-150 Surplus Plutonium Disposition Project, SRS	**92,257**	**35,000**	**0**	**0**	**0**
Total All Construction Projects					
TEC	96,441	102,244	120,000	120,000	3,047,756
OPC	40,816	0	0	0	0
TPC All Construction Projects	**137,257**	**102,244**	**120,000**	**120,000**	**3,047,756**

18-D-150, Surplus Plutonium Disposition (SPD)
Savannah River Site, Aiken, South Carolina
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary: The FY 2023 Request for the Surplus Plutonium Disposition (SPD) project is $71,764,000. The high-end of the cost range approved at CD (Critical Decision)-1 is $620,092,000. The project is currently going through a replan that is expected to be approved by Q4 FY 2022. A Federal Project Director Level II has been assigned to this project and has approved this Construction Project Data Sheet. Funding for this project is controlled at the Total Project Cost (TPC) level. Appropriations may be used for design, construction, or other project costs (OPC).

Significant Changes[a]
DOE/NNSA initiated this project in FY 2018. The most recent DOE-approved CD for the project is CD-3A Phase 2, *Long Lead Procurement*, which was approved on December 21, 2020.

In FY 2021, the project:
- Reached the 60 percent design complete milestone,
- Completed CD-3A Phase 1 early site preparation on June 1, 2021, which isolates the project boundary from the operating facility,
- Completed CD-3A Phase 2 long-lead equipment approval process on December 21, 2020 and initiated procurement activities of the equipment,
- Conducted the final design review of CD-3A Phase 3 additional early site preparation on March 29, 2021, and
- Continued progressing the final design and documentation necessary to reach CD-2/3.

In FY 2022, DOE/NNSA reviewed the Management and Operations (M&O) contractor's submittal of a higher confidence, risk-informed plan to achieve CD-2/3 for the SPD project. This plan reflects required design changes identified during the 60 percent design review in FY 2021, delaying final design and CD-2/3 from FY 2022 to FY 2023. The plan includes an updated acquisition strategy in which the M&O contractor will augment a portion of the design activities by involving external design subcontractors to support completion of final design. DOE/NNSA is evaluating how the contractor's revised forecast to CD-2/3 will impact the TPC through CD-4, to determine if the current high-end range value for TPC and CD-4 date of FY 2028 is still feasible. Additionally, a DOE/NNSA team comprised of subject matter experts (SMEs) throughout the DOE Complex conducted a Technical Independent Project Review (TIPR) of the project's design, cost, and schedule. The TIPR identified that the project needed additional design to support the safety-related Fire Protection System. DOE/NNSA is awaiting the final report and recommendations from the TIPR.

Additionally in FY 2022, the project will:
- Award all contracts for Long Lead Equipment (LLE) being procured under CD-3A Phase 2 and will start receiving procured LLE;
- Request approval of CD-3A Phase 3, additional Site Preparation, and once approved, will commence field work; and
- Complete design documentation of all major systems supporting the plutonium processing gloveboxes (i.e., ventilation, electrical, fire detection/suppression, security, etc.).

In FY 2023, the project will:
- Complete the final design review and request CD-2/3, *Approval of Performance Baseline and Start of Construction*, to start construction on project scope not authorized by CD-3A;
- Complete environmental documents and permits, fire protection documents, and obtain approval of them from the Head of Field Element;
- Complete nuclear safety and criticality documentation, and obtain approval from the Safety Basis Approval Authority;
- Complete the operations plan and final vulnerability and dose assessments;

[a] Funding and schedules shown throughout the CPDS are estimates and consistent with the high end of the cost range.

- Continue risk and project management; and
- Continue planning for construction, testing, start-up, and operations.

The funding profile for future years will be updated when the estimates are validated, and a baseline has been approved as part of the critical decision process.

Critical Milestone History

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2018	10/31/1997	2/2/2017	3QFY2018	1QFY2022	4QFY2021	1QFY2022	N/A	4QFY2027
FY 2019	10/31/1997	2/2/2017	4QFY2018	4QFY2022	4QFY2021	4QFY2022	N/A	4QFY2027
FY 2020	10/31/1997	2/2/2017	1QFY2020	4QFY2022	4QFY2021	4QFY2022	N/A	4QFY2028
FY 2021	10/31/1997	9/30/2019	12/19/2019	4QFY2022	4QFY2021	4QFY2022	N/A	2QFY2028
FY 2022	10/31/1997	9/30/2019	12/19/2019	4QFY2022	2QFY2022	4QFY2022	N/A	2QFY2028
FY 2023	10/31/1997	9/30/2019	12/19/2019	4QFY2023	2QFY2023	4QFY2023	N/A	2QFY2028

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete (d)
CD-3 – Approve Start of Construction
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Closeout

Fiscal Quarter or Date

Fiscal Year	Performance Baseline Validation	CD-3A	CD-3A Phase 1	CD-3A Phase 2	CD-3A Phase 3
FY 2018	1QFY2022	1QFY2020	N/A	N/A	N/A
FY 2019	4QFY2022	4QFY2019	N/A	N/A	N/A
FY 2020	4QFY2022	2QFY2020	N/A	N/A	N/A
FY 2021	4QFY2022	2QFY2020	N/A	N/A	N/A
FY 2022	4QFY2022	2/13/2020	N/A	N/A	N/A
FY 2023	4QFY2023	12/21/2020	2/13/2020	12/21/2020	4QFY2022

CD-3A – Early site preparations and long lead procurement for glovebox and specialized engineered equipment.

Project Cost History

Fiscal Quarter or Date

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2018	165,000	255,000	420,000	80,000	N/A	80,000	500,000
FY 2019	154,820	261,780	416,600	83,400	N/A	83,400	500,000
FY 2020	71,044	365,440	436,484	152,319	N/A	152,319	588,803
FY 2021	89,189	385,521	474,710	145,382	N/A	145,382	620,092
FY 2022	89,189	385,521	474,710	145,382	N/A	145,382	620,092
FY 2023	187,106	287,604	474,710	145,382	N/A	145,382	620,092

2. Project Scope and Justification

Scope

Approximately 15,000 ft^2 of processing space in the existing Hazard Category 2 K-Area Facility will be utilized for the project, which will expand the dilution capability. In addition, a 10,000 ft^2 support building will be located adjacent to the existing structure. To increase dilution throughput capacity, gloveboxes, equipment, and support systems (i.e., glovebox ventilation, fire suppression, glovebox rooms with airlocks, material control and accountability equipment, monitoring equipment, lag storage, etc.) will be installed in the existing KArea Facility.

Justification

The mission of the dilute and dispose strategy is to remove plutonium from the State of South Carolina by providing processing, characterization, and storage capabilities to efficiently and permanently dispose of 34 metric tons of plutonium, thereby eliminating excess nuclear weapons materials.

It is a Departmental priority to remove certain inventories of plutonium from the State of South Carolina. Therefore, the removal of plutonium from Savannah River Site (SRS) for final disposition is a key objective of the program. Although the dilute and dispose strategy relies on mature technologies currently in use at DOE facilities, additional capacity is required to increase throughput in order to remove plutonium from SRS and disposition the full 34 metric tons of plutonium to meet NNSA's commitments to the state of South Carolina. The additional capacity will be provided by the SPD Project. The project will include new gloveboxes and associated process and process support equipment and security features for the diluted plutonium product until eventual characterization, packaging, and shipment for disposal.

A quantitative risk analysis was completed to confirm a bounding cost range based on conceptual design. A Risk Management Plan (RMP) and a Risk and Opportunity Assessment Report (ROAR) were approved for the project and are updated as needed. The contingency included in this data sheet is consistent with the criteria found in the Association for Advancement of Cost Engineering International (AACEI) recommended practices and DOE G 413.3-21 for a Class 3 estimate.

In accordance with DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, an appropriate National Environment Policy Act (NEPA) review is required to support the project. DOE Order 413.3B requires final NEPA documentation prior to CD-2 for the project with a Record of Decision (ROD) after CD-2 approval, but prior to CD-3. In April 2015, DOE issued the *Surplus Plutonium Disposition Supplemental Environmental Impact Statement* (SPD SEIS, DOE/EIS-0283-S2). Although the SPD SEIS ROD does not contain a reference to the installation of any specific number of gloveboxes for the purpose of implementing the Dilute and Dispose strategy for the 6 metric tons (MT) of non-pit plutonium, the information contained in the *Savannah River Site and Los Alamos National Laboratory Timing and Throughput Assumptions Used for the Surplus Plutonium Disposition Supplemental EIS* (April 2015) indicates that installation and operation of three additional glovebox lines were analyzed as part of the development of the SPD Supplemental EIS. Because the installation of three additional glovebox lines for implementing the Dilute and Dispose strategy for the six metric tons (MT) of non-pit plutonium was previously analyzed and is consistent with the conceptual design for the SPD Project, no additional NEPA analyses or decisions are required to design, procure, and construct the SPD Project.

The SPD project is being conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, and has met all appropriate project management requirements to date.

Key Performance Parameters (KPPs)

Performance Measure[a]	Threshold	Objective
Dilution throughput capacity	1.5 metric tons per year	N/A

3. Financial Schedule

(Dollars in Thousands)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC) [b]			
Design			
FY 2020	29,000	29,000	23,877[a]
FY 2021	72,000	72,000	61,397
FY 2022	61,189	61,189	55,916
FY 2023	24,917	24,917	45,916
FY 2024	0	0	0
Total Design	**187,106**	**187,106**	**187,106**
Construction			
FY 2020	25,000	25,000	6,983[a]
FY 2021	46,000	46,000	9,909
FY 2022	84,595	84,595	20,489
FY 2023	45,568	45,568	12,001
FY 2024	51,441	51,441	73,883
FY 2025	35,000	35,000	77,991
FY 2026	0	0	62,616
FY 2027	0	0	23,732
Total, Construction	**287,604**	**287,604**	**287,604**
Total Estimated Costs (TEC)			
FY 2020	54,000	54,000	30,860[a]
FY 2021	118,000	118,000	71,306
FY 2022	145,784	145,784	76,405
FY 2023	70,485	70,485	57,917
FY 2024	51,441	51,441	73,883
FY 2025	35,000	35,000	77,991
FY 2026	0	0	62,616
FY 2027	0	0	23,732
Total TEC	**474,710**	**474,710**	**474,710**
Other Project Costs[c]			

[a] Key Performance Parameters will be finalized upon approval of the project baseline.

[b] FY 2020 actual costs have been corrected from the FY 2022 PDS to reflect the correct split between design and construction actual costs.

[c] Budget authority shown for FY 2017 through FY 2019 for other project costs was appropriated in the Material Management and Minimization program to support planning and design activities for the dilute and dispose strategy.

	Budget Authority (Appropriations)	Obligations	Costs
FY 2017	5,750	5,750	4,225
FY 2018	6,732	6,732	7,415
FY 2019	25,000	25,000	20,267
FY 2020	25,000	25,000	21,241[a]
FY 2021	30,589	30,589	13,238
FY 2022	10,216	10,216	12,324
FY 2023	1,279	1,279	12,500
FY 2024	40,816	40,816	12,750
FY 2025	0	0	10,035
FY 2026	0	0	10,529
FY 2027	0	0	10,099
FY 2028	0	0	10,759
Total OPC	**145,382**	**145,382**	**145,382**
Total Project Costs (TPC)			
FY 2017[a]	5,750	5,750	4,225
FY 2018[a]	6,732	6,732	7,415
FY 2019	25,000	25,000	20,267
FY 2020[b]	79,000	79,000	52,101
FY 2021	148,589	148,589	84,544
FY 2022	156,000	156,000	88,729
FY 2023	71,764	71,764	70,417
FY 2024	92,257	92,257	86,633
FY 2025	35,000	35,000	88,026
FY 2026	0	0	73,145
FY 2027	0	0	33,831
FY 2028	0	0	10,759
Grand Total	**620,092**	**620,092**	**620,092**

[a] FY 2017 and 2018 actual costs corrected from the FY 2020 and FY 2021 PDS

[b] Includes funds for early procurement of engineered equipment.

4. Details of Project Cost Estimate

(Budget Authority in Thousands of Dollars)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	150,106	80,314	N/A
Contingency	37,000	8,875	N/A
Total, Design	**187,106**	**89,189**	**N/A**
Construction			
Site Work	27,255	61,255	N/A
Long Lead Equipment	21,329	21,329	N/A
Equipment	21,737	21,737	N/A
Other Construction	157,511	209,150	N/A
Contingency	59,772	72,050	N/A
Total, Construction	**287,604**	**385,521**	**N/A**
Total Estimated Cost	**474,710**	**474,710**	**N/A**
Contingency, TEC	**80,925**	**80,925**	**N/A**
Other Project Cost (OPC)			
OPC except D&D			
R&D	0	0	0
Conceptual Planning	2,340	2,340	N/A
Conceptual Design	25,905	25,905	N/A
Other OPC Costs	N/A	N/A	
NNSA Other Direct Costs	19,600	19,600	N/A
Execution/Start-up Phase	11,139	11,139	N/A
Startup and Training	18,111	18,111	N/A
CD-3A Phase - Support	7,430	7,430	N/A
CD-3A Phase Design OPC Support	6,452	6,452	N/A
Preliminary / Final Design Phase OPC Support	43,659	43,659	N/A
Contingency	10,746	10,746	N/A
Total, OPC	**145,382**	**145,382**	**N/A**
Contingency, OPC	10,746	10,746	N/A
Total Project Cost	**620,092**	**620,092**	**N/A**
Total Contingency (TEC+OPC)	**91,671**	**91,671**	**N/A**

5. Schedule of Appropriations Requests

(Dollars in Thousands)

Request Year	Type	Prior Years	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Total
FY 2018	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	108,000	56,000	85,000	62,000	69,000	59,000	38,000	23,000	500,000
FY 2019	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	132,750	59,000	74,750	62,000	60,000	59,000	35,000	17,500	500,000
FY 2020	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	116,482	65,000	74,750	62,000	62,000	183,000	16,000	9,571	588,803
FY 2021	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	116,482	148,589	115,705	101,779	101,192	36,345	0	0	620,092
FY 2022	TEC	N/A	N/A	N/A	N/A	TBD	TBD	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	TBD	TBD	TBD	N/A	N/A	N/A
	TPC	116,482	148,589	156,000	TBD	TBD	TBD	199,021	0	620,092
FY 2023	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	116,482	148,589	156,000	71,764	92,257	35,000	N/A	N/A	620,092

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	3Q FY 2028
Expected Useful Life (number of years)	20 years
Expected Future Start of D&D of this capital asset (fiscal quarter)	4Q FY 2048

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	58.3	58.3	1,166	1,166

7. D&D Information

Approximately 15,000 ft^2 of processing space in the existing Hazard Category 2 K-Area Facility will be required for the project. In addition, a 10,000 ft^{-2} new support building will be located adjacent to the existing structure. The new square footage is reported below. The MOX-T demolished about 34 temporary buildings. At a minimum, these two buildings would offset the new area being constructed: 285-015F was 7,258 square feet and 717-045F was 8,540 square feet.

	Square Feet
New area being constructed by this project at Savannah River Site (K-Area).	10,000
Area of D&D in this project at Savannah River Site (K-Area).	N/A
Area at Savannah River Site (K-Area) to be transferred, sold, and/or D&D outside the project, including area previously "banked"	N/A
Area of D&D in this project at other sites	N/A
Area at other sites to be transferred, sold, and/or D&D outside the project, including area previously "banked"	15,798
Total area eliminated	N/A

8. Acquisition Approach

The acquisition strategy, which was developed as part of the CD-1 package, is with the M&O contractor for the design and construction of the SPD Project. The M&O contractor will employ other design and construction subcontractors as may be deemed of best value to the project.

Nuclear Counterterrorism and Incident Response Program

Overview

Among the National Nuclear Security Administration's (NNSA) diverse nuclear security roles is the mission to counter the threat of nuclear terrorism and nuclear proliferation and respond to all manner of nuclear incidents and accidents worldwide. The NNSA Nuclear Counterterrorism and Incident Response (NCTIR) Program evaluates and assesses nuclear and radiological threats and uses the scientific knowledge resident at the National Laboratories to inform domestic and international policies and regulations, contingency planning, training, and international capacity building. These activities in turn strengthen national and international counterterrorism, counterproliferation, and nuclear incident response capabilities.

The NCTIR Program includes the following subprograms:

- The **Emergency Operations (EO) subprogram** provides both the structure and processes to ensure a comprehensive and integrated approach to emergency management and continuity of operations, thereby safeguarding the health and safety of workers and the public, protecting the environment, and enhancing the resilience of the Department and the Nation. In addition, EO coordinates a whole-of-community approach to mitigating, preventing, preparing for, responding to, and recovering from all-hazards emergencies, improving readiness and effectiveness of the DOE Emergency Management System on a programmatic and performance level, while promoting unity of effort and a culture of continuous improvement. In FY 2021, responsibility and oversight for the Emergency Communication Network (ECN) shifted to the NNSA Office for Information Management.

- The **Counterterrorism and Counterproliferation (CTCP) subprogram** reduces the threat of nuclear and radiological terrorism and proliferation through innovative science, technology, and policy solutions. Further, CTCP maintains the capability to avert, respond to, or mitigate the consequences of nuclear and radiological incidents and accidents in the United States and abroad. The following subprograms support CTCP:

    - The Nuclear Incident Response / Nuclear Emergency Support Team (NEST) subprogram provides flexible and effective response and technical reach-back capabilities for any nuclear/radiological incident or accident in the United States or abroad by applying the unique technical expertise in NNSA's nuclear security enterprise. These missions require that highly trained response personnel and specialized technical equipment are on continuous standby to deploy to provide an integrated response for nuclear weapon accidents, counter-weapons of mass destruction (WMD) operations, radiological/nuclear public health emergencies, national exercises, and security operations for National Special Security Events and other national significant events.

    - The National Technical Nuclear Forensics (NTNF) subprogram provides nuclear forensics technical and operational capabilities in response to nuclear/radiological incidents, including identifying and assessing high-value samples; device disposition; device assessment; analysis of interdicted nuclear materials; and maintenance of the National Nuclear Material Archive (NNMA). These missions involve specialized personnel, equipment, and facilities as well as the use of highly sophisticated tools and techniques. In addition, the NTNF subprogram shares leadership of the interagency nuclear forensics mission, ensuring a U.S. Government integrated, coordinated nuclear forensics capability through strategic planning, program coordination, and continual capability improvement.

    - The Counterterrorism Response and Capacity Building subprogram leverages NNSA's technical expertise to strengthen domestic and international partners' preparedness and capabilities to respond to radiological or nuclear incidents, accidents, and terrorism. These activities exercise and expand state and local radiological and nuclear incident response capabilities and enable key international partners to effectively address radiological or nuclear incidents in their region with or without U.S. involvement as far from U.S. territory as possible.

    - The Nuclear Threat Science subprogram provides the Nation's technical capability to understand and defeat nuclear threat devices, including improvised nuclear devices (IND), radiological dispersal devices (RDD), and lost or

stolen foreign nuclear weapons, as well as to develop foundational technologies supporting nuclear counterproliferation efforts. Nuclear Threat Science maintains this technical capability by 1) assessing nuclear threat device concepts; 2) evaluating protection requirements for nuclear materials; 3) conducting classified Nuclear Threat Reduction (NTR) technical and policy exchanges with the United Kingdom and France; and 4) improving WMD device defeat capabilities. Technical work on device assessment also supports the Department of Defense (DoD), Federal Bureau of Investigation (FBI), and Intelligence Community in policy, planning, analytic, and operational capabilities.

Nuclear Counterterrorism and Incident Response Program
Funding

(Dollars in Thousands)

	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)	FY 2023 Request vs FY 2021 Enacted (%)
Nuclear Counterterrorism & Incident Response Program					
Emergency Operations	36,000	36,000	29,896	-6,104	-17.0%
Counterterrorism and Counterproliferation					
Nuclear Incident Response / Nuclear Emergency Support Team	206,558	206,558	223,472	+16,914	+8.2%
National Technical Nuclear Forensics	40,000	40,000	42,555	+2,555	+6.4%
Counterterrorism Response and Capacity Building	9,655	9,655	11,167	+1,512	+15.7%
Nuclear Threat Science	85,300	85,300	131,880	+46,580	+54.6%
Subtotal, Counterterrorism and Counterproliferation	**341,513**	**341,513**	**409,074**	**+67,561**	**+19.8%**
Total, Nuclear Counterterrorism & Incident Response Program	**377,513**	**377,513**	**438,970**	**+61,457**	**+16.3%**

Nuclear Counterterrorism and Incident Response Program
Outyear Funding

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request
Nuclear Counterterrorism & Incident Response Program				
Emergency Operations	15,123	15,683	15,805	15,798
Counterterrorism and Counterproliferation				
Nuclear Incident Response / Nuclear Emergency Support Team	227,446	235,553	236,559	235,417
National Technical Nuclear Forensics	44,363	45,911	46,145	45,984
Counterterrorism Response and Capacity Building	11,809	12,242	12,281	12,197
Nuclear Threat Science	137,591	144,498	146,323	147,220
Subtotal, Counterterrorism and Counterproliferation	**421,209**	**438,204**	**441,308**	**440,818**
Total, Nuclear Counterterrorism & Incident Response Program	**436,332**	**453,887**	**457,113**	**456,616**

Nuclear Counterterrorism and Incident Response Program
Explanation of Major Changes
(Dollars in Thousands)

	FY 2023 Request vs FY 2021 Enacted ($)
Nuclear Counterterrorism and Incident Response Program	
Emergency Operations: Reflects a net decrease resulting from the following changes: • A decrease of $21.1 million associated with the realignment of management responsibility and authority for IT and Cyber services and solutions for the Emergency Communications Network (ECN) from the NCTIR program to the IT and Cybersecurity program within Weapons Activities. • An increase of $15.0 million for investments in consolidated emergency operations center and alternate operations centers' infrastructure and supporting communications equipment, and classified communications system improvements to support continuity operations and infrastructure improvements required by OMB/OSTP Directive 16-1 and EO 13961.	**-6,104**
Counterterrorism and Counterproliferation: The increase will address critical gaps identified in requirements and responsibility to execute the DOE Primary Mission Essential Function – 2, *Respond to Nuclear Incidents*. Funding will enhance CTCP's ability to identify and address WMD response across agencies. In addition, funding will bolster CTCP's effort to provide solutions for countering nuclear proliferation through applied analysis, testing, concept development, technology development, predictive modeling, and testing.	**+67,561**
Total, Nuclear Counterterrorism and Incident Response Program	**+61,457**

Nuclear Counterterrorism and Incident Response Program
Emergency Operations

Description

The Emergency Operations subprogram is DOE's Office of Primary Interest (OPI) for several unique and mandated Emergency Management and Continuity functions, offices, and capabilities including:

- Consolidated Emergency Operations Center
- Unified Coordination Group
- Enterprise-wide emergency management policy, procedure, training, and exercise responsibilities
- Continuity of Operations and Government Programs
- Emergency Management Advisory Committee
- Enduring Constitutional Government Programs
- Federal Mission Resilience Strategy implementation

The FY 2023 Budget Request will focus HQ EO activities and resources across five subprograms:

- The Emergency Management Policy subprogram develops and implements emergency management policy, directives, guidance, and plans for DOE and NNSA; assists Headquarters, Field Elements, and facility contractors in implementing effective emergency management programs in compliance with DOE policies; leads the exchange of Management and Operating (M&O) best practices via the Emergency Management Issues Special Interest Group (EMI-SIG).

- The Emergency Management Programs subprogram implements, manages, and coordinates a readiness assurance program to ensure the DOE emergency management program is executed in accordance with directives, regulations, policies, and applicable laws. The subprogram develops, leads, and evaluates national level exercises, performs periodic oversight functions on behalf of Field Element Managers in accordance with the Chief of Defense Nuclear Safety and facilitates cross-cutting emergency management related collaboration via the Federal Officials Emergency Management Advisory Committee (EMAC).

- The Continuity Programs subprogram executes DOE and NNSA Continuity of Operations (COOP), Continuity of Government (COG), and Enduring Constitutional Government (ECG) programs to advance the National Continuity Policy and ensures availability and interoperability of continuity communications systems across DOE/NNSA. In addition, the subprogram, along with interagency partners, deploys continuity capabilities during "with-notice" or "no-notice" emergencies and National Special Security Events, including the Presidential Inauguration and State of the Union Address, and in accordance with Executive Order 13961, "Governance and Integration of Federal Mission Resilience", advances implementation of the Federal Mission Resilience Strategy (FMRS) across the enterprise

- The Consolidated Emergency Operations Center (CEOC) subprogram operates and maintains the Department's Emergency Watch Office, a single point-of-contact regarding local and national emergencies, heightened international tension, Departmental emergencies, natural disasters, and acts of terrorism. The program ensures that the Secretary of Energy, the Deputy Secretary, the Administrator, Program Secretarial Officers, and Field and Site Managers are kept fully and currently informed about emergency matters, serves as Unified Coordination Structure (UCS) Activation and Coordination Element (ACE), and staffs a cadre of Emergency Management Specialists responsible for whole-of-department emergency management support.

- The Emergency Management Front Office provides all administrative, financial, and operational activities to ensure the efficiency and effectiveness of the Office of Emergency Operations. The subprogram manages business functions for all EO programs, to include human resources, budget, and logistics, and provides administrative support to EO leadership. Additional responsibilities within this subprogram include overseeing the strategic plan implementation and management of the continuous improvement program. This subprogram confirms EO programs are properly staffed and resourced to enable the successful accomplishment of their respective missions.

Highlights of the FY 2023 Budget Request

- Lead, manage, and operate the DOE/NNSA Consolidated Emergency Operations Center.
- Achieve Full Operational Capability of the Emergency Management Readiness Assurance Reporting Dashboard (EMRAD).
- Mature the Emergency Management Readiness Assurance Reporting Program.
- Advance emergency management, continuity of operations, higher-level continuity programs and technical qualification programs.
- Lead the design and development of DOE participation in key exercises, including Eagle Horizon.
- Institutionalize Executive Order 13961 and the related Federal Mission Resilience Strategy (FMRS), to include a viable Devolution capability.
- Ensure interoperability of emergency communications systems across DOE/NNSA and with interagency partners.
- Update and validate emergency management and continuity directives, guides, and technical planning basis standards.
- Enhance the security and resilience of the Department and Nation.

FY 2021 Accomplishments

- Served as a lead in the COVID-19 response for the Department, to include providing daily situational awareness to and issuing coordination with DOE and NNSA, hosting recurring task force meetings, development of the Senior Leadership Briefing distributed across the emergency management enterprise, and creating several mitigation and recovery plans.
- Implemented and encouraged a proactive response during the initial stages of the coronavirus pandemic, resulting in public health-focused engagements with Department leadership and the development, promulgation, and distribution of a Pandemic Response Plan during the onset of the COVID-19 pandemic that has helped guide DOE and NNSA activities since March 2020.
- Developed over 500 Pandemic Situation Reports and Senior Leadership Briefings.
- Delivered comprehensive COVID-19 Common Operating Picture to all headquarters elements, labs, plants, and sites, their surrounding communities, and the interagency.
- Established and led an NNSA COVID-19 Recovery Working Group.
- Drafted substantial portions of NNSA's COVID-19 Recovery Plan.
- Developed the DOE Reopening Reporting Criteria, also referred to as the "Stoplight Chart."
- Institutionalized the Emergency Management Readiness Assurance Reporting Tool.
- Drove Federal Mission Resilience Strategy (FMRS) creation and initial implementation across the Department and the inter-agency.
- Improved interoperability of continuity communications systems across DOE/NNSA and with interagency partners by approximately 30 percent as reported by the White House Communications Office's D-16-1 quarterly compliance rating.
- Updated and validated emergency management and continuity orders, directives, guides, and technical planning basis standards.
- Hosted the 35th offering of the longest standing cooperative organization through a DOE-wide emergency management-based forum, referred to as the Emergency Management Issues Special Interest Group, which has met annually since 1986. Participants met to discuss a variety of topics, focused on preparedness, mitigation, response, and recovery, and based on the DOE Comprehensive Emergency Management System. Participation in the FY 2021 session included over 2,300 participants.
- In response to a March 2021 tasker from the Assistant to the President and Homeland Security Advisor, initiated and guided a complete assessment of the Department's essential functions, to include the Primary Mission Essential Functions (PMEFs) reportable to key White House officials during continuity events, and overseeing multiple updates to the DOE/NNSA Continuity of Operations and Continuity of Government overarching plan and procedures. These, in turn, helped position the Department as a leader in the National Security Council's development of and proposed implementation strategy for the Federal Mission Resilience across all Federal executive agencies.
- Developed and promulgated the FY 2020 Annual Report on the Status of the Department's Emergency Management System, capturing input from 38 sites, facilities, and activities within the DOE/NNSA enterprise, and reflecting readiness assurance results for eight key DOE entities and 12 NNSA entities.

- Developed and received approval on a framework establishing a standardized process to evaluate the readiness of the DOE/NNSA emergency management programs to respond at a programmatic and performance level while promoting a culture of continuous improvement across DOE.

Emergency Operations

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Emergency Operations $36,000,000	**Emergency Operations $29,896,000**	**Emergency Operations -$6,104,000**
• Executed Continuity of Operations and Government Programs. • Implemented a Unified Coordination Structure. • Provided ECN dedicated communications capabilities in support of the global emergency management and response mission of the DOE/NNSA and its Government partners. • Operated the CEOC which manages the 24 hours/day, 7 days/week, 365 days/year (24/7/365) single-point-of-contact for Departmental and interagency notifications regarding situations requiring unified coordination. • Ensured all DOE/NNSA Headquarters, Labs', Plants', and Sites' Emergency Management Programs will be ready to guarantee a comprehensive and integrated approach to emergency management, including planning, mitigation, preparedness, response, and recovery.	• Provide emergency management expertise, leadership, and guidance across the entire DOE/NNSA emergency management enterprise. • Execute Continuity of Operations and Continuity of Government Programs. • Operate and maintain the Consolidated Emergency Operations Center to receive, coordinate, validate, and disseminate emergency information to various DOE, NNSA, interagency, and other program offices and related entities. • Host the 37th annual Department-wide emergency management forum. • Reinstitute and strengthen the site liaison program in implementing revised DOE/NNSA emergency management and continuity orders, to include site training and exercises postponed during the COVID travel pause. • Provide two additional nodes to an unclassified communications network and improved support to classified communications systems. • Assess key site readiness assurance levels, culminating in the development and promulgation of the annual report for the Department's Emergency Management System, based on FY 2022 evaluations and submissions. • Refine and host the Unified Coordination Structure.	• The overall decrease of $6.1 million reflects a transfer of the Emergency Communications Network (ECN) from EO to the IT and Cybersecurity program in Weapons Activities. • The decrease associated with the ECN is offset by an increase of $15 million. This includes $9.7 million for infrastructure upgrades to EO and Continuity facilities, emergency equipment, and installation costs in several locations. It also includes $3.1 million for upgraded unclassified communications systems and $1.1 million for support to secure communications networks. In support of emergency responders, $1.1 million will convert a critical information system to a relational database.

Description

The Counterterrorism and Counterproliferation (CTCP) subprogram provides technical expertise, practical tools, and scientifically informed policy recommendations to advance U.S. nuclear counterterrorism and counterproliferation objectives. CTCP focuses on nuclear and radiological incidents and accidents, with the core mission to prepare for and respond to such events.

The **Nuclear Incident Response (NIR) / Nuclear Emergency Support Team (NEST)** subprogram serves as the nation's last line of defense against a nuclear or radiological incident or accident. Its mission is to apply the unique technical expertise within NNSA's nuclear security enterprise to prepare for, prevent, respond to, and where possible mitigate nuclear or radiological incidents domestically and abroad. NNSA's strategic approach to incident response activities is to ensure a central point of contact and an integrated response to all emergencies involving radionuclides.

This subprogram works closely with other DOE elements as well as other federal organizations, including the Department of Homeland Security (DHS), the Federal Emergency Management Agency (FEMA), the Environmental Protection Agency (EPA), the Nuclear Regulatory Commission (NRC), DoD, FBI, and the Intelligence Community to provide technical assistance to respond domestically or abroad to nuclear and radiological incidents, including terrorist threats involving nuclear materials, and to conduct exercises and provide support to the NEST programs to ensure safe incident resolution and the protection of public safety and the environment. CTCP accomplishes this mission by ensuring the appropriate infrastructure is in place to provide command, control, coordination, and communications of NNSA nuclear incident response assets. Incident response personnel must be properly organized, trained, and equipped to rapidly deploy in response to an incident.

Specialized NEST response teams are trained and equipped to execute a variety of national security and public health and safety missions, to include searching for, identifying, characterizing, defeating, and taking possession of a nuclear or radiological device; supporting efforts to recover nuclear material outside of regulatory control; and providing preventive radiological and nuclear detection support to federal, state, and local public safety organizations for major public events. NEST provides technical support to the FBI to respond to nuclear threat devices, including specialized technology and training for regional teams to locate and identify radiological/nuclear devices and prevent these devices from detonating. This Budget Request transitions the Capability Forward initiative to a steady state sustainment mode based on the anticipated completion of comprehensive program activities in FY 2022 to enhance the capabilities of regional FBI counter-WMD teams to take decisive action against a WMD device, and enhance 14 cities with decisive WMD defeat capabilities, accelerating life-saving responses to nuclear and radiological threats.

Funding in the FY 2023 Request will continue to address NEST public health and safety capability needs. NEST is also trained and equipped to support federal, state, and local entities' response to accidents and incidents involving the release of nuclear or radiological materials. These teams provide technical analysis to support protective action guidance – such as evacuation, shelter-in place, and medical treatment – during a radiological response. NEST analysis is based on predictive modeling of atmospheric dispersal, real-time radiological measurements, and the latest medical science.

The **National Technical Nuclear Forensics (NTNF)** subprogram directly maintains the nuclear forensics technical and operational capabilities that support the U.S. Government nuclear forensics core mission areas of pre-detonation device, post-detonation, and pre-detonation materials analysis through implementation of specialized programs. The NTNF subprogram holds key roles in supporting ground sample collection, performing in-field sample processing, device disassembly, nuclear material analysis, and device assessment through reverse engineering. The NTNF subprogram sustains mission readiness through training, drills, and exercises for responders, maintenance and development of highly sophisticated equipment, tools, and techniques, technical integration, and maintenance of specialized pre- and post-detonation response teams and facilities. Additionally, continued development of the National Nuclear Material Archive (NNMA) ensures high-value historical nuclear material samples are identified, prioritized, analyzed, and characterized. Comparative analysis of material characteristics significantly aids assessment of interdicted materials and thus enhances technical nuclear forensics capabilities for attribution.

The FY 2023 Budget Request supports the NTNF programs' continued development and maintains operational and scientific expertise at the National Laboratories to provide whole-of-government nuclear forensics response activities and support to attribution. Credible nuclear forensics capabilities constitute an essential element of the nation's nuclear deterrence strategy, helping to dissuade foreign states from supporting or facilitating non-state actors' acquisition of nuclear materials, either wittingly or unwittingly. National-level requirements to support nuclear forensics are outlined in presidential policies that specify interagency roles and responsibilities to maintain mission readiness and provide capabilities for operational response, analysis, and assessment in support of attribution. These requirements have been updated in FY 2022.

The **Counterterrorism Response and Capacity Building** subprogram mission is to strengthen preparedness for all radiological or nuclear incidents, accidents, and terror threats posing a potential risk to the United States territory, citizens, or its interests. This subprogram works domestically with federal, state, and local officials to expand their capabilities to respond to a radiological or nuclear threat or incident. As part of a robust strategy to protect America from potential radiological or nuclear threats, this program also cooperates with key international partners to strengthen their ability to effectively address radiological or nuclear incidents in their region—with or without U.S. involvement—as far from U.S. territory as possible.

Counterterrorism Response and Capacity Building subprogram activities include technical exchanges, joint technical experiments, workshops, exercises, technical assistance and support, policy development, and training with partners. These activities address the full range of potential radiological or nuclear threats. This subprogram assesses global security trends, risks, and requirements annually to plan, prioritize, and implement radiological/nuclear counterterrorism and incident response joint activities.

The FY 2023 Budget Request sustains and expands preparedness training both domestically and internationally which contributes to the NNSA mission to strengthen emergency preparedness and response capabilities for Federal, State, local, and international stakeholders. This budget request will also continue to support NNSA's Laboratory capabilities, including but not limited to, plume modeling, training, and support for the cytogenetics biodosimetry laboratory.

The **Nuclear Threat Science** subprogram provides the nation's technical capability to understand and defeat nuclear threat devices, including improvised nuclear devices (INDs), radiological dispersal devices (RDD), and lost or stolen foreign nuclear weapons. Nuclear Threat Science maintains and advances this technical capability through partnerships with NNSA's nuclear weapons design laboratories and production facilities and through technical and policy exchanges with the United Kingdom and France. Nuclear Threat Science also conducts focused science on explosive and nuclear material behaviors. In particular, Nuclear Threat Science performs integrated experiments as part of risk assessments of nuclear materials and nuclear threat devices in support of interagency and international partners. Collectively, this work shapes the United States' understanding of nuclear terrorism threats and nuclear proliferation threats. This understanding is used to support policies and procedures to improve nuclear material protection and the technical capabilities available for crisis operations.

The Nuclear Threat Science subprogram informs policies and procedures across multiple departments and agencies and is coordinated across NNSA and within the U.S. interagency to ensure maximum alignment with agreed-upon joint goals and ongoing programs.

This FY 2023 Budget Request will continue to enhance NNSA's laboratory capabilities (e.g., modeling/simulation, tools, expertise) for highly specialized nuclear threat science assessments, while improving predictive capabilities in support of crisis operations. Nuclear Threat Science will conduct scientific studies, including integrated experiments with the NNSA Office of Defense Programs, to ensure that material security and risk management policies and missions are informed by defensible and relevant assessments of potential threats. This subprogram will support the requirement to perform technical assessments in support of the Design Basis Threat (DBT) that governs DOE's nuclear material security posture. Similar technical expertise will continue to support Defense Nuclear Nonproliferation (DNN) international nuclear security engagements by providing technical inputs for risk prioritization. This Budget Request also continues the technical work plans under the bilateral and trilateral classified channels that enable the sharing of best practices with foreign partners to reduce nuclear terrorism and nuclear proliferation risks.

Highlights of the FY 2023 Budget Request

- Ensure NEST is prepared to successfully respond to successfully respond to radiological/nuclear incidents with key personnel, trained and equipped.
- Addresses NEST staffing shortfalls, improves operational integration and full spectrum training and exercises in accordance with interagency objectives, and enables critical technology development and supporting infrastructure requirements.
- Maintain and improve NEST capabilities internally and through coordination with interagency partners in planned and emergent training, exercises, and response operations.
- Increase participation in national level and interagency exercises.
- Sustain operational response capabilities of NEST and interagency partners.
- Meet coordinated program milestones and equipment recapitalization goals.
- Provide security and assessment capabilities for nuclear threat device designs across the entire counterterrorism and counterproliferation mission space, including improvised nuclear devices by evaluating nuclear threat device concepts and materials, developing, and maintaining predictive modeling capabilities, and executing selected focused and integrated experiments.
- Evaluate unique nuclear technologies for counterterrorism and counterproliferation applications. Develop and validate tools, perform contingency planning efforts, implement training, and maintain expertise to support NNSA, DoD, and FBI capabilities for the counterterrorism and counterproliferation mission.
- Address a critical gap in nuclear counterproliferation with NNSA expertise and technology.
- Enable new approaches to inform and provide solutions to the USG to counter and disrupt nuclear proliferation.
- Address the demand for broader counterproliferation analysis and approaches which benefits USG partners.
- Increase capacity to perform assessments of nuclear threat device designs and materials in support of DoD strategic partnership.
- Maintain and develop technical and operational nuclear forensics capabilities and operational readiness through its nuclear forensics programs.
- Lead the USG National Nuclear Forensics Program, including capability development, assessment, and interagency coordination of all program facets to support the characterization and attribution of nuclear material, device, accident, or attack.
- Initiate operational capability to conduct Design Heritage assessments for support to attributing origin of a device used in an attack
- Expand national security work relevant to nuclear forensics at the laboratories to rebuild diminishing essential nuclear forensics expertise and expertise in assessment of detonation prompt effects.
- Increase participation in national level and interagency exercises and participation in international technical exchanges with U.S. allies.
- Conduct in person and virtual trainings, technical exchanges, workshops, and exercises with domestic and foreign partners and international organizations to improve global capacity to respond to nuclear and radiological events.
- Strengthen domestic and international emergency preparedness and response through nuclear counterterrorism and incident response training, exercises, exchanges, and development of emergency management programs.
- Conduct analysis of radiological dispersal device experiments to improve response to such terror events.
- Expand international collaboration for medical response to radiological events.
- Develop new trainings and exercises to address emerging needs, combining virtual and in-person methods, and incorporating advanced learning techniques.

FY 2021 Accomplishments

- Identified safe and innovative ways in a pandemic environment to train and maintain NEST readiness to respond to a radiological or nuclear emergency, including nuclear forensics operations.
- Advanced U.S. nuclear threat reduction and emergency preparedness policy objectives through engagements with international organizations and foreign partners, bolstering global response capabilities and reinforcing mechanisms for cooperation.

- Conducted virtual training in partnership with the FBI to enhance emergency preparedness and response capabilities domestically.
- Designed seven new virtual training courses to expand knowledge base for domestic and international radiological first responders.
- Conducted joint International Atomic Energy Agency (IAEA) training courses on incident and nuclear security preparedness and response.
- Conducted training and exercises to support nuclear security preparedness and response with the North Atlantic Treaty Organization (NATO).
- Advanced radiological/nuclear emergency preparedness response domestically and internationally by conducting 50 virtual or in-person training events on topics including crisis communication, nuclear incident response, medical response, and security of major public events. Achieved increased confidence in new energetic disablement tools and improved accuracy in predictive modeling capabilities in support of the counter-WMD mission.
- Delivered two specialized readiness assessments to the national nuclear incident response teams.
- Executed two major integrated experiments in support of nuclear materials characterization assessments.
- NEST continued equipment recapitalization, innovation, and delivery of equipment to first responders while participating in an interagency process to identify response gaps and potential remediation options .
- Improved and integrated NEST Public Health and Safety programs to ensure an agile and interoperable capability that is mutually supportive across all mission areas, including mission partner engagement, anomaly detection, analysis, and assessment.
- In cooperation with the NNSA Office of Defense Nuclear Nonproliferation Research and Development program, continued to support the development of new tools that support WMD device defeat, nuclear search, detection, and remediation.
- Conducted strategic messaging efforts to educate interagency partners, congressional audiences, and member of the general public about the CTCP mission, as well as influence adversary perceptions of the U.S. Government counterterrorism and counterproliferation capabilities.
- NEST conducted 12 unscheduled operations and 26 scheduled operations, including Preventive Radiological/Nuclear Detection support to the Presidential Inauguration, Presidential Address to a Joint Session of Congress, New Year's Eve celebrations in Las Vegas and New York City, Super Bowl LV, the 2021 Independence Day celebration on the National Mall, and the 76th Session of the United Nations General Assembly.
- NEST continued to hone operational readiness through participation in 27 exercises and joint drills, as well as numerous small-footprint and virtual training venues.
- NEST continued to test and field new tools for FBI regional teams as part of the NNSA-FBI "Capability Forward" initiative to accelerate life-saving responses to nuclear and radiological threats.
- Continued AMS Phase II recapitalization procurement efforts to replace two aging two rotary-wing aircraft, with delivery of new aircraft expected in the first quarter of FY 2024.
- Completed three demonstration projects for technologies to address emerging proliferation threats.
- Completed the initial identification of high-value nuclear forensics specimens needed for the NNMA and improved analytical capacity.
- Effectively maintained cooperative relationships with international partners for nuclear forensics technical exchanges by utilizing a suite of virtual capabilities.
- Improved nuclear forensics infrastructure, equipment, technology, and capabilities through increased investments.

Activities and Explanation of Changes

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Counterterrorism and Counterproliferation $341,513,000	**Counterterrorism and Counterproliferation $409,074,000**	**Counterterrorism and Counterproliferation +$67,561,000**
Nuclear Incident Response/Nuclear Emergency Support Team $206,558,000	***Nuclear Incident Response/Nuclear Emergency Support Team $223,472,000***	***Nuclear Incident Response/Nuclear Emergency Support Team +$16,914,000***
• Provided technical assistance to federal, state, tribal, local, and international government agencies to deal with incidents, including terrorist threats that involve potential use of nuclear materials. • Provided technical assistance to a Lead Federal Agency to search for or detect illicit radiological or nuclear material. • Continued collection and expert analysis of radiological material signatures through DOE Radiological Triage Program. • Supported lead federal agencies to address threats posed by domestic and foreign terrorists likely to have both the will and means to employ nuclear devices and weapons-usable nuclear materials. • Sustained WMD defeat capabilities for an identified critical mission area. This effort includes predictive capability. • Provided DOE/NNSA technical assistance for the planning, execution, and evaluation of national level exercises, including but not limited to: Marble Challenge, Nuclear Weapons Accident/Incident Exchange (NUWAIX), and other DoD-led exercises in which DOE/NNSA is not the lead. • Implemented advanced training for consequence management response teams and	• Rapidly respond to locate and identify radiological/nuclear devices and prevent these devices from detonating: Rapidly respond to evaluate and recover any damaged U.S. nuclear weapons. • Detect nuclear or radiological materials during high-profile events or in response to a threat. Lead the Federal Government's monitoring and technical assessment efforts after a nuclear or radiological incident or accident. • Procurement mission critical equipment to recapitalize equipment that has exceeded its useful life. • Priorities include handheld and vehicle-borne radiation detection equipment, high resolution spectroscopic identification systems, correlated neutron detectors, high-energy radiography equipment, and contamination survey meters. • Sustain enhancements of render safe capabilities to current Stabilization cities in conjunction with the FBI. • Provide improved technical equipment and additional training to address the increased demand for radiological/nuclear device stabilization capabilities. • Deliver training and maintain equipment to sustain and enhance the ability of specialized	• Addresses staffing shortfalls, improves operational integration and full-spectrum training and exercises in accordance with interagency objectives. • Enables critical technology development and supporting infrastructure requirements. • Expands depth and expertise of critical NEST skillsets through increased frequency of Remote Technical Assistance activations and training. • Enhances remote technical assistance capability within the Public Health and Safety mission area in support of field operations conducted by interagency partners and NEST operators.

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
home teams based on requirements of updated mission analyses that reflect lessons learned from responses and exercises. Sustain data communications systems for communications between the field teams and home teams. • Provided continued decision support tools to radiological response efforts, in the event of the intentional or accidental release of radiological or nuclear material, as well as, informing recovery planning efforts. • Improved clarity of guidance provided to public health officials on evacuation recommendations and health effects from the accidental or intentional release of radiological materials based on the latest science. • Worked jointly with the federal coordinating agency, which is usually DHS/FEMA, during any radiological accident or incident. • Coordinated with the EPA/NRC and other elements within DOE, to provide support to safeguard the public and environment and mitigate the effects of a nuclear or radiological accident or incident. • Conducted recapitalization efforts for critical incident response equipment that is beyond its planned life cycle. • Sustained capability for existing and increased number of stabilization cities including training and equipment maintenance. • Deployed to additional cities and upgrade infrastructure and specialized technical equipment, as needed.	regional teams (Stabilization teams) to respond to a nuclear terrorism threat. • Develop science and technologies that are most promising to improve the quality or speed of nuclear terrorism threat response.	

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
National Technical Nuclear Forensics ***$40,000,000***	***National Technical Nuclear Forensics*** ***$42,555,000***	***National Technical Nuclear Forensics*** ***+$2,555,000***
• Provided technical and operational capabilities in support of the U.S. Government interagency NTNF program. • Led and coordinated the interagency Nuclear Forensics Steering Committee. • Advanced analysis methodologies for interdicted materials. • Maintained readiness to respond to pre- and post- detonation nuclear events. • Participated in one Ground Collection Task Force field exercise and one enhanced training event. • Fully supported two Post-Detonation device assessment training and exercise events. • Conducted two DFEAT exercises. • Conducted preventative and corrective facility maintenance at P-Tunnel, NNSS for support to the Pre-Detonation Device Program. Continue to address broader infrastructure improvements at the NNSS. • Continued LANL PF-4/TA-55 plans and procedure development in support of Pre-Detonation Device Program requirements. • Conduct operational capability enhancements for Bulk Special Nuclear Materials Analysis Program (BSAP). • Identified, consolidated, and analyzed historical nuclear material samples for the NNMA. • Led U.S. nuclear forensics technical collaboration efforts with the United Kingdom under the Nuclear Threat Reduction channel.	• Provide technical and operational capabilities in support of the U.S. Government interagency NTNF program. • Lead and coordinate the interagency nuclear forensics mission. • Examine advancing analytic techniques for interdicted materials, ground samples, air samples, and prompt signals. • Maintain readiness to respond to pre- and post-detonation nuclear events. • Participate in one Ground Collection Task Force field exercise and one enhanced training event. • Participate in two Post-Detonation device assessment training and drill events. • Conduct two DFEAT exercises. • Sustain preventative and corrective facility maintenance at P-Tunnel, NNSS for support to the Pre-Detonation Device Program. Continue to address broader infrastructure improvements at the NNSS. • Expand operational capacity for Bulk Special Nuclear Materials Analysis Program (BSAP) laboratories at LANL and LLNL. • Identify, prioritize, analyze, and characterize historical nuclear material samples of value to the technical nuclear forensics program through administration of the NNMA. • Lead U.S. nuclear forensics technical collaboration efforts with the United Kingdom under the Nuclear Threat Reduction channel.	• Transitions the Nuclear Weapon Design Heritage capability to operational status in coordination with DOE-IN. • Supports development, transition, and sustainment of nuclear detonation prompt effects expertise. • Provides additional training for new personnel on deployable and fixed-laboratory response teams. • Supports special nuclear forensics studies to address any capability gaps. •

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
Counterterrorism Response and Capacity Building $9,655,000	***Counterterrorism Response and Capacity Building $11,167,000***	***Counterterrorism Response and Capacity Building +$1,512,000***
• Designed virtual content and conduct three *Silent Thunder* domestic WMD counterterrorism tabletop exercises (TTXs). • Designed seven new virtual training courses to expand knowledge base for domestic and international radiological first responders. • Conducted virtual courses focused on radiological incident response fundamentals and crisis communications to build capacity for NATO allies. • Conducted 20 virtual radiological crisis communications courses for domestic and international first responders. • Designed virtual course content and conducted an *Eminent Discovery* international radiological/nuclear terrorism interdiction response TTX. • Conducted two international incident preparedness and response technical exchange workshops. • Engaged key international partners bilaterally to coordinate nuclear and radiological incident preparedness and response. • Conducted joint IAEA training courses on incident and nuclear security preparedness and response. • Supported international policy development and execution with IAEA to strengthen global harmonization and coordination on nuclear and radiological incident preparedness and response, including public messaging.	• Conduct 18 advanced partnership engagements, specialized technical exchanges, and workshops. • Conduct seven *Silent Thunder* domestic WMD counterterrorism TTXs. • Develop a combined virtual training and in-person instruction program for increased reach and impact for both domestic and international training. • Address additional demand for Policy & Partnership events and sustain strategic outreach, leveraging hybrid training formats to reach a broader audience. • Conduct 13 international nuclear and radiological training courses, operational support, and provide technical support. • Conduct 15 multilateral and bilateral scenario-based policy discussions, CT domestic and international TTXs. • Develop new Counterterrorism Response & Capacity Building Respond initiatives in concert with DNN *Prevent-Counter* mission and support activities.	• Funds two additional advanced partnership engagements to further harmonize international cooperation. • Provides opportunities to redesign specific training courses to combine the strengths of virtual training with in-person instruction, creating resource-effective training to reach larger audiences. • Enhances virtual and augmented reality training tools to expand user experience and retention of information. • Supports increased international collaboration in medical response to radiological events. • Funds analysis of radiological dispersal device experiments conducted to improve response to terror events.

FY 2021 Enacted	FY 2023 Request	Explanation of Changes FY 2023 Request vs FY 2021 Enacted ($)
• Conducted operational training and support missions for foreign major public events.		
Nuclear Threat Science ***$85,300,000***	***Nuclear Threat Science*** ***$131,880,000***	***Nuclear Threat Science*** ***+$46,580,000***
• Performed high-precision threat device modeling and experiments. • Conducted Tier Threat Modeling Archive Validation project. • Conducted technical assessment in support of USG nuclear material security efforts.	• Maintain capability to perform assessments of nuclear threat devices. • Maintain the integrity of sensitive nuclear threat related information protected under the Sigma 20 program, while protecting the information from unauthorized disclosure. • Manage classified bilateral nuclear counterterrorism technical exchanges with the United Kingdom and France and provide leadership to the trilateral P3 Nuclear Threat Reduction framework. • Execute integrated experiments to validate nuclear threat assessments. • Develop predictive modeling tools and nuclear threat device training for the WMD defeat community and other operational partners. • Conduct foundational science to support technical assessments of nuclear materials, explosives, and nuclear threat device designs in support of operational partners and the intelligence and security communities. • Conduct research of technologies in support of U.S. Government CTCP strategic priorities.	• Addresses critical gap and demand from USG partners for broader nuclear counterproliferation analysis and capability development with NNSA expertise and new technology. • Enables new approaches to inform and provide solutions to the USG to counter and disrupt nuclear proliferation. • Increases support for technical assessments in support of interagency priorities, including nuclear materials security initiatives, threat characterization activities, and DoD operational planning efforts. All of which aids in growing and maintaining a steady cadre of technical experts for such priorities.

Nuclear Counterterrorism and Incident Response Program
Capital Summary

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))						
Capital Equipment >$500K (including MIE)	N/A	N/A	3,622	3,701	3,783	+161
Minor Construction	N/A	N/A	2,250	2,300	2,351	+101
Total, Capital Operating Expenses	**N/A**	**N/A**	**5,872**	**6,001**	**6,134**	**+262**
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (>$500K and <$5M)	N/A	N/A	3,622	3,701	3,783	+161
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**3,622**	**3,701**	**3,783**	**+161**

(Dollars in Thousands)

	Total	Prior Years	FY 2021 Enacted	FY 2022 Annualized CR	FY 2023 Request	FY 2023 Request vs FY 2021 Enacted ($)
Minor Construction Projects (Total Estimated Cost (TEC)						
Total Minor Construction Projects (TEC <$5M)	N/A	N/A	2,250	2,300	2,351	+101
Total, Minor Construction Projects	**N/A**	**N/A**	**2,250**	**2,300**	**2,351**	**+101**
Total, Capital Summary	**N/A**	**N/A**	**5,872**	**6,001**	**6,134**	**+262**

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	Outyears
Capital Operating Expenses Summary (including (Major Items of Equipment (MIE))					
Capital Equipment >$500K (including MIE)	3,866	3,951	4,038	4,127	N/A
Minor Construction	2,403	2,456	2,510	2,565	N/A
Total, Capital Operating Expenses	**6,269**	**6,407**	**6,548**	**6,692**	**N/A**
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (>$500K and <$5M)	3,866	3,951	4,038	4,127	N/A
Total, Capital Equipment (including MIE)	**3,866**	**3,951**	**4,038**	**4,127**	**N/A**

(Dollars in Thousands)

	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	Outyears
Minor Construction Projects (Total Estimated Cost (TEC)					
Total Minor Construction Projects (TEC <$5M)	2,403	2,456	2,510	2,565	N/A
Total, Minor Construction Projects	**2,403**	**2,456**	**2,510**	**2,565**	**N/A**
Total, Capital Summary	**6,269**	**6,407**	**6,548**	**6,692**	**N/A**