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# **Energy and Water Development Appropriations for Defense Nuclear Nonproliferation: In Brief**

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## Summary

The Department of Energy's (DOE's) nonproliferation and national security programs provide technical capabilities to support U.S. efforts to "prevent, counter, respond" to the proliferation of nuclear weapons worldwide, including by both states and non-state actors. These programs are administered by the National Nuclear Security Administration (NNSA), a semi-autonomous agency established within DOE in 2000. NNSA is responsible for maintaining the U.S. nuclear weapons stockpile, providing nuclear fuel to the Navy, nuclear and radiological emergency response, and nonproliferation. NNSA recently reorganized the Office of Defense Nuclear Nonproliferation, which is funded under the Defense Nuclear Nonproliferation (DNN) account.

This report addresses the programs in the NNSA's DNN account, appropriated by the Energy and Water appropriations bill. The FY2020 Consolidated Appropriations bill (P.L. 116-94) funded the NNSA DNN accounts at \$2.164 billion.

The FY2021 request for DNN appropriations was \$2.031 billion. The proposal would include unobligated prior year balances. The reduction continues an earlier trend to reduce prior-year carryover balances. According to the budget justification, the decrease of 6.2% from the FY2020-enacted level is due to "completion of funding for contractual termination" of the mixed-oxide fuel (MOX) project at the Savannah River Site.

## Budget Structure

The Defense Nuclear Nonproliferation (DNN) programs were reorganized starting with the FY2016 request. There are two main mission areas under the DNN appropriation: the Defense Nuclear Nonproliferation Program and the Nuclear Counterterrorism and Incident Response Program (NCTIR). NCTIR was previously funded under Weapons Activities. According to the FY2016 budget justification, “These transfers align all NNSA funding to prevent, counter, and respond to nuclear proliferation and terrorism in one appropriation.”

The DNN Program is now divided into six functional areas:

- **Materials Management and Minimization (M3)** conducts activities to reduce and, where possible, eliminate stockpiles of weapons-useable material around the world. Major activities include conversion of reactors that use highly enriched uranium (useable for weapons) to low enriched uranium, removal and consolidation of nuclear material stockpiles, and disposition of excess nuclear materials.
- **Global Material Security** has three major program elements: international nuclear security, radiological security, and nuclear smuggling detection and deterrence. Activities toward achieving those goals include the provision of equipment and training, workshops and exercises, and collaboration with international organizations.
- **Nonproliferation and Arms Control** implements programs that aim to strengthen international nuclear safeguards, control the spread of dual-use technologies and expertise, and verify nuclear reductions and compliance with treaties and agreements. This program conducts reviews of nuclear export applications and technology transfer authorizations.
- **National Technical Nuclear Forensics Research and Development (NTNF R&D)** examines and evaluates nuclear materials and devices, nuclear test explosions or radiological dispersals, and post-detonation debris through nuclear forensics development at the national laboratories. The program includes a field response capability to assist the interagency in the event of a nuclear or radiological incident.
- **Defense Nuclear Nonproliferation Research and Development (DNN R&D)** advances U.S. capabilities to detect and characterize global nuclear security threats such as foreign nuclear material and weapons production, diversion of special nuclear material, and nuclear detonations.
- The **Nonproliferation Construction** program consists of the Surplus Plutonium Disposition Project (SPD) and the Mixed-Oxide (MOX) Fuel Fabrication Facility (MFFF), which was to be built in South Carolina to convert surplus weapons plutonium into nuclear reactor fuel. This project was terminated and replaced with a different disposal method (see below).

The Nuclear Counterterrorism and Incident Response Program (NCTIR) evaluates nuclear and radiological threats and develops emergency preparedness plans, including organizing scientific teams to provide rapid response to nuclear or radiological incidents or accidents worldwide.

**Table I. DOE Defense Nuclear Nonproliferation Appropriation, FY2018-FY2021**  
(\$ thousands)

	<b>FY2018 Enacted</b>	<b>FY2019 Enacted</b>	<b>FY2020 Enacted</b>	<b>FY2021 Request</b>
Material Management and Minimization	308,594	293,794	363,533	400,711
Global Material Security	390,108	407,108	442,909	400,480
Nonproliferation and Arms Control	134,703	129,703	140,000	138,708
National Technical Nuclear Forensics R&D	0	0	0	40,000
Defense Nuclear Nonproliferation R&D	556,504	575,570	533,163	531,651
Nonproliferation Construction	335,000	220,000	299,000	148,589
Legacy Contractor Pensions	40,950	28,640	13,700	14,348
Nuclear Counterterrorism	282,360	319,185	372,095	377,513
Subtotal	2,048,219	1,949,000	2,164,400	2,031,000
Use of Prior Year Balances	0	-25,000	0	-21,000
Rescission of Prior Year Balances	-49,000	-19,000	0	0
<b>Total</b>	<b>1,999,219</b>	<b>1,930,000</b>	<b>2,164,400</b>	<b>2,031,000</b>

**Source:** Department of Energy Congressional Budget Requests, Volume I.

## FY2021 Request

The FY2021 request for DNN appropriations totaled \$2.031 billion, reflecting a 6.2% decrease from FY2020-enacted levels. The budget justification says that this decrease is mainly due to the “completion of funding for contractual termination” of the Mixed Oxide Fuel Fabrication Facility (MOX) project at the Savannah River Site. Funding for that program was decreased by 50% (-\$150 million).

A \$42 million, or 9.65%, decrease to the Global Material Security program was due to an increase in FY2020 funds for the Cesium Irradiator Replace Program.

The budget proposal requests a \$37.2 million, or 10%, increase in funding for the Material Management Minimization program. The increase is mainly in the conversion subprogram, which is working to establish non-HEU based molybdenum-99 production technologies in the United States.

The National Technical Nuclear Forensics Research and Development (NTNF R&D) is a new program in FY2021. The budget request says that the program will allow NNSA to “take on a

more active leadership role” in nuclear forensics. The \$40 million in funding for NTNF was moved from the DNN R&D Nuclear Detonation Detection subprogram.

As in past years, the FY2020 appropriations included a provision prohibiting funds in the Defense Nuclear Nonproliferation account for certain activities and assistance in the Russian Federation. Appropriations bills have prohibited this since FY2015.<sup>1</sup>

## **U.S. Plutonium Disposition**

The FY2021 budget justification requests funds related to the U.S. plutonium disposition program in the M3 Material Disposition subprogram and Nonproliferation Construction Surplus Plutonium Disposition subprogram. The United States pledged to dispose of 34 metric tons of U.S. surplus weapons plutonium, which was originally to be converted into fuel for commercial power reactors.<sup>2</sup> The U.S. facility for this purpose was to be the Mixed Oxide Fuel Fabrication Facility (MFFF), which had been under construction at the DOE Savannah River site in South Carolina. The MFFF faced sharply escalating construction and operation cost estimates, and the Obama Administration proposed to terminate it in FY2017. After congressional approval, in 2018 DOE ended MFFF construction and began pursuing a replacement disposal method, Dilute and Dispose (D&D), for this material.

The D&D method consists of “blending plutonium with an inert mixture, packaging it for safe storage and transport, and disposing of it in a geologic repository,” according to the FY2021 request. The Nonproliferation Construction account’s proposed decrease of \$150 million in FY2021 is due to the final steps in ending construction of the MFFF. In her testimony before the House Appropriations Committee, NNSA Administrator Lisa Gordon-Hagerty said that decrease reflects the completion of the MOX contractual termination settlement. She said that the requested \$148.6 million would be used for the Surplus Plutonium Disposition (SPD) project, in support of the D&D method. FY2021 activities would include “execution of early site preparation and long lead procurements activities, as well as continuing the maturation of the design for all major systems supporting the plutonium processing gloveboxes.”

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<sup>1</sup> See the 2017 version of this report for more detailed background information.

<sup>2</sup> Disposition of surplus plutonium is required by a 1998 agreement, amended in 2010, between the United States and the Russian Federation. Each country agreed to convert 34 metric tons of surplus weapons-grade plutonium to a form that could not be returned to nuclear weapons, to begin in 2018. Russia suspended its participation in the agreement in October 2016 due to what it called “hostile actions” by the United States. Both countries appear to be continuing their plans for surplus plutonium disposition. See CRS Report R43125, *Mixed-Oxide Fuel Fabrication Plant and Plutonium Disposition: Management and Policy Issues*, by Mark Holt and Mary Beth D. Nikitin.

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