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Securing Nuclear Weapons and Materials Worldwide:

Expanded Funding Needed for a More Ambitious Approach

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Securing Nuclear Weapons and Materials Worldwide:

Expanded Funding Needed for a More Ambitious Approach

The Trump administration budget request for programs to reduce the dangers of nuclear theft and terrorism is too small to implement the ambitious approach that is needed. Congress should increase funding in this critical area; direct the administration to develop and implement a comprehensive plan for improving security for nuclear weapons and materials worldwide; and exert expanded oversight of this effort. This brief highlights the importance of ongoing nuclear security work; describes the evolving budget picture; and outlines recommendations for congressional action.

NUCLEAR SECURITY WORK REMAINS A CRITICAL INVESTMENT IN U.S. NATIONAL SECURITY

Every president for a quarter century, Democrat and Republican, has said that preventing nuclear terrorism was a key national security priority. This includes the Trump administration, whose Nuclear Posture Review identified nuclear terrorism as one of “the most significant threats to the security of the United States.”¹ Unfortunately, the United States is not making investments that match this strong rhetoric.

Ensuring effective security for nuclear weapons and the materials needed to make them, to prevent them from being stolen and falling into terrorist hands, is the single most effective tool available to reduce the risk of nuclear terrorism. For decades, the United States has been working with other countries to upgrade measures to secure and account for nuclear weapons and materials. These efforts have ranged from bilateral technical cooperation to broad political initiatives to helping to pay for International Atomic Energy Agency (IAEA) nuclear security activities.

1 *Nuclear Posture Review* (Washington, D.C.: Department of Defense, 2018), <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF> (accessed October 29, 2018), p. 66.

The United States has spent billions of dollars on improving nuclear security around the world over the past quarter century. For context, in the past decade, the amounts the United States has invested have never amounted to as much as 1/600th of U.S. defense spending—a bargain if one considers the importance successive U.S. presidents have placed on preventing nuclear terrorism.

These efforts have been highly successful, leading to substantial improvements in nuclear security around the world. More than half of all the countries around the world that once had weapons-usable nuclear material on their soil have eliminated it. At scores of sites on every inhabited continent, weapons-usable nuclear materials have either been eliminated or have substantially stronger nuclear security measures in place today than they had a quarter century ago. Nearly all the countries that once believed they did not need any armed guards at their nuclear facilities have changed their minds. The result is a substantial reduction in the threat to U.S. nuclear security posed by nuclear terrorism.

Nevertheless, as we document in a recent report, further improvements are needed, and the momentum of progress appears to be slowing.² Many nuclear sites do not have security in place designed to defeat the full range of tactics and capabilities that adversaries have demonstrated in heists from or terrorist attacks on guarded facilities around the world. Many do not have comprehensive, multi-layered programs to protect against insider threats—the most challenging and dangerous nuclear security problem. Many do not have targeted programs to strengthen their organization’s security culture, seeking to ensure that all staff take security seriously and look for ways to improve it. Many do not have sufficient efforts in place to find and fix potential vulnerabilities and carry out realistic tests of their security systems’ performance against

2 For more, see Matthew Bunn, Nickolas Roth, and William H. Tobey, “Revitalizing Nuclear Security in an Era of Uncertainty,” (Cambridge, Mass: Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard Kennedy School, January 2019).

intelligent adversaries looking for the chinks in its armor. And there remain sites where the weapons-usable nuclear material should be removed, as the benefits of maintaining it are small by comparison to its risks and costs.

Nuclear security efforts are moving into a new era in which much of the U.S. role will be as a nuclear security advocate and consultant, convincing countries to do more themselves and advising them on how best to do it. That will be less costly than the nuclear security programs of the past (though nuclear material removal operations are likely to remain a significant expense). But the efforts needed to address all the challenges just described would cost more than either the Obama or Trump administrations have been proposing.

THE EVOLVING BUDGET PICTURE AND THE FISCAL YEAR 2020 REQUEST

Funding for nuclear security programs have been declining for years. Appropriations for some programs have now declined to the lowest levels since the early days of these programs in the mid-1990s. With the exception of a very small amount of money for an insider threat program, the fiscal year 2020 Trump administration budget request does not reverse that trend.

TABLE 1: FY 2020 Budget Requests for Nuclear Theft Prevention Programs (in Thousands of Dollars)

National Nuclear Security Administration Program	FY 2019 Request	FY 2019 Appropriation	FY 2020 Request
Material Management and Minimization			
HEU reactor conversion/DNN R&D (HEU Fuel)	98,300	98,300	114,000
Nuclear material removal	32,925	32,925	32,900
Laboratory and partnership		35,000	
Global Material Security			
International nuclear security	46,339	46,339	48,800
International radiological security	59,576	78,907	60,800
Domestic radiological security	90,764	127,433	90,500
Total, Nuclear Security	327,904	418,904	347,000

Most U.S. international nuclear security work is conducted through the Department of Energy’s National Nuclear Security Administration’s (NNSA’s) Global Materials Security (GMS) and Material Management and Minimization (M3) programs. GMS works with foreign countries to help improve security for nuclear weapons, weapons-usable nuclear materials, and radiological materials.³ M3 is responsible for removing highly-enriched uranium (HEU) and separated plutonium from vulnerable sites; converting research reactors and medical isotope production facilities so they no longer use HEU; and disposing of HEU and plutonium. These are the key programs we count as “nuclear security” programs in assessing budget allocations. The fiscal year (FY) 2019 and 2020 requests and appropriations for these programs are shown in [Table 1](#).

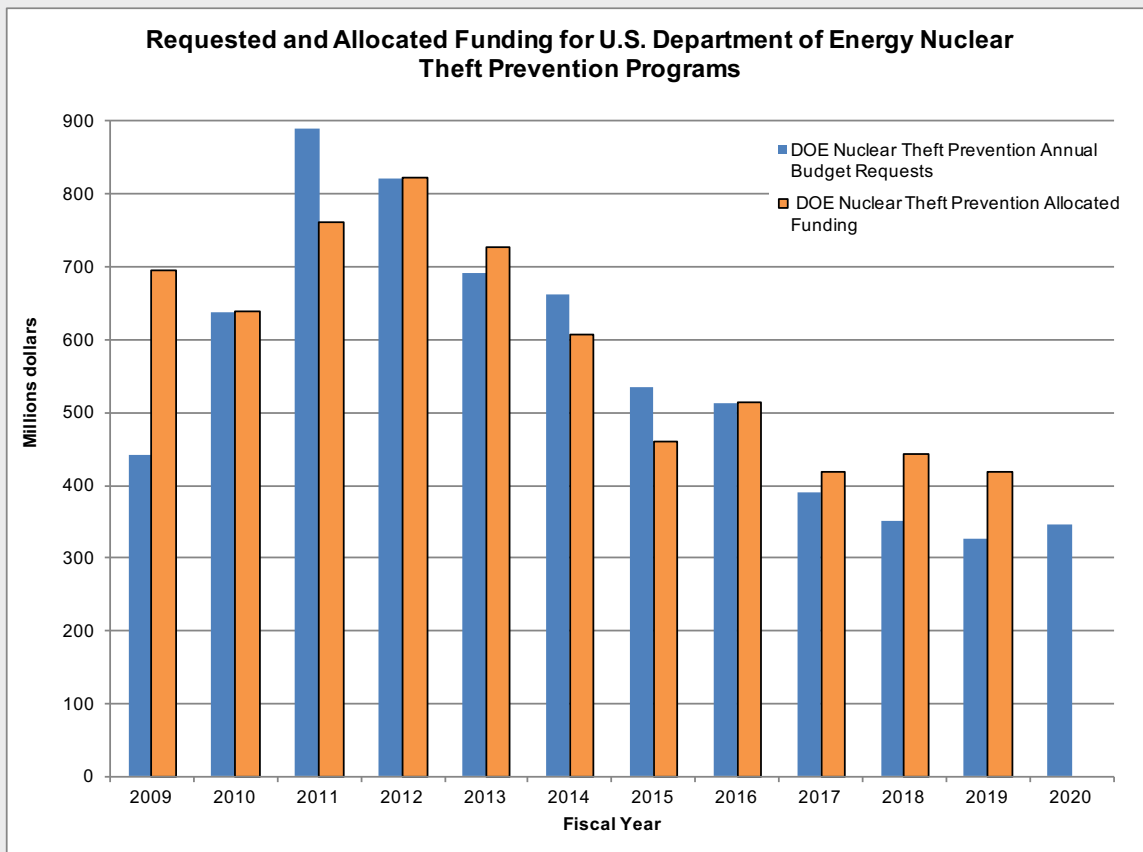
During the Obama administration’s second term, budget requests for nuclear security programs declined every year, and appropriated budgets generally declined with the requests. [See Figure 1](#). The Obama administration’s last (FY 2017) budget request was particularly alarming, proposing to cut NNSA’s International Nuclear Security program, which is most responsible for supporting security upgrades around the world, by two-thirds, to the lowest level since its nascent days in the 1990s.⁴

The Trump administration has cut nuclear security programs even further. The Trump administration proposed spending \$351 million on nuclear security in FY 2018, down from the Obama administration’s \$419 million allocated in FY 2017. Congress rejected the idea of such cuts, increasing nuclear security spending to \$443 million. The Trump administration proposed even deeper cuts, to \$328 million, for FY 2019. Congress responded by rejecting most but not all of the projected cut, with an appropriated budget of \$419 million.

³ The Global Materials Security program includes the Office of Nuclear Security, the Office of Radiological Security (both of which we count as “nuclear security” funding), and Nuclear Smuggling Detection and Deterrence (NSDD, formerly Second Line of Defense), which we count as focused on the next layer of defense when security at nuclear sites and transports has failed.

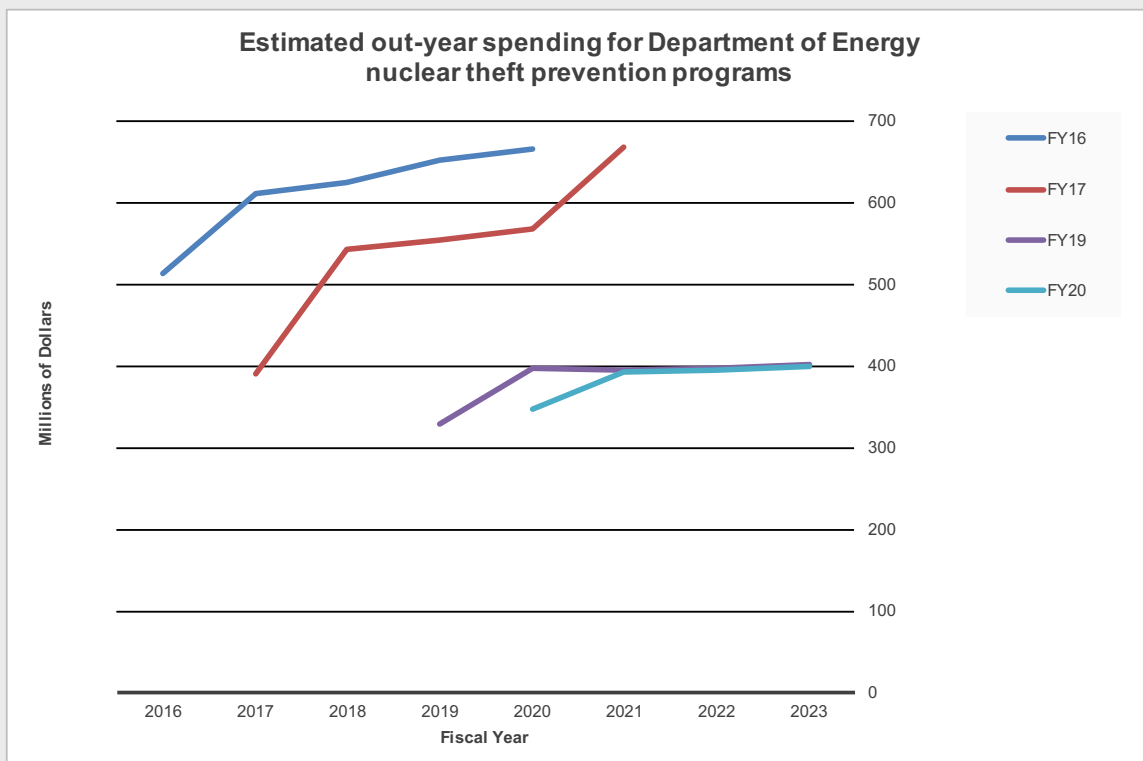
⁴ Matthew Bunn, Martin B. Malin, Nickolas Roth, and William H. Tobey, “Preventing Nuclear Terrorism: Continuous Improvement or Dangerous Decline?” (Cambridge, Mass: Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard Kennedy School, March 2016), p. 83.

FIGURE 1:



Note: Department of Energy Nuclear Theft Prevention Programs include Highly-Enriched Uranium Reactor Conversion, Nuclear Material Removal, International Nuclear Security, and Radiological Security.

FIGURE 2:



For FY2020, the Trump administration has requested \$347 million, a 17 percent reduction from what was appropriated for FY2019. In particular, the administration proposes substantial reductions in both the effort to help other countries improve security for radiological sources that could be used in a “dirty bomb” (or replace them with safer technologies) and the domestic effort to address those issues. The administration, however, is requesting an increase for the effort to convert HEU-fueled reactors to fuel that cannot be used in nuclear weapons, as development of new high-density fuels nears completion. As noted earlier, the administration is also requesting a very small increase for the International Nuclear Security program, to fund a modestly expanded effort to address insider threats.

These cuts are not what the program managers originally planned. Recent requests are far below past projections of what funding for these years would be, and current out-year projections no longer include plans to ramp nuclear security funding back up in the future. See Figure 2.

In short, there appear to be hundreds of millions of dollars of cooperative nuclear security upgrades and materials removals that were included in past budget projections but are no longer included in current plans. As recently as 2018, the United States planned to spend \$49 million more on international nuclear security programs in FY 2020 than the Trump administration has ultimately requested. In 2016, the Obama administration planned to spend \$221 million more in FY 2020 than the Trump administration has requested.

There are a number of reasons for the decline in nuclear security programs. First, Russia suspended almost all U.S.-Russian nuclear security cooperation in 2014, partly in response to the United States suspending nuclear energy cooperation after Russia’s seizure of Crimea. Hence, the world’s two largest nuclear complexes are no longer cooperating to improve nuclear security. Second, political impediments with countries like India and Pakistan limit the scope of what NNSA nuclear security programs can achieve; even in China, where there has been successful cooperation in a number of areas, such impediments have kept U.S. experts from being able to visit Chinese nuclear facilities to advise on security improvements. Third, with limited overall NNSA budgets, the increasing costs of weapons programs are crowding out nonproliferation programs.

While some Trump administration officials have argued that planned funding is sufficient for their limited current nuclear security plans, the proposed budgets are clearly not enough to

fund the more comprehensive and ambitious nuclear security agenda that is needed. This point was emphasized during a recent House Armed Services Committee hearing. When NNSA Administrator Lisa Gordon-Hagerty was asked what she could do with \$80 million more for nuclear security programs, she replied, “I’ll take \$80 million to secure more nuclear materials around the world because that’s nuclear materials that are less likely to fall in the hands of terrorists or adversaries... We can do additional training around the world. We can encourage others and help them with security installations. There are a number of different things we can do around the world.”⁵

RECOMMENDATIONS FOR CONGRESSIONAL ACTION

RECOMMENDATION 1:

Direct the administration to develop a comprehensive U.S. government plan for achieving effective and sustainable security for nuclear stocks worldwide and assign a senior official to take full-time charge of the effort.

Building on existing efforts, the U.S. government should prepare a comprehensive plan focused on the ultimate goal of effective and sustainable security for all of the world’s stocks of nuclear weapons, HEU, and separated plutonium and all of the nuclear facilities whose sabotage could cause a major catastrophe, whether military or civilian. Where there seems little chance of cooperating to improve security of a particular stock—such as in North Korea—the plan should include alternative steps to mitigate the security risks. This plan should be developed and implemented as a whole-of-government effort, led from the White House, as success will require efforts by technical experts, intelligence agencies, diplomats, program managers, and more.

The nuclear security plan should be prioritized based on two factors: (a) the degree of risk posed by each stock of material—determined by the quantity and quality of the material, the quality of the security in place for it, and the severity of the potential adversary threats in the area where it exists—and (b) the scope of the opportunity for reducing that risk, ranging from countries

5 Testimony of Lisa Gordon-Hagerty, Under Secretary for Nuclear Security, U.S. Department of Energy, House Armed Services Committee, April 9, 2019, <https://armedservices.house.gov/hearings?ID=D0024E51-C44F-4E91-8A3D-BDB219CED79>.

that may be totally unwilling to work with the United States to countries that are eager to do so. The plan should include indicators of progress toward the overall objective, and mechanisms for learning from both successes and failures, reacting to obstacles as they arise, and adjusting course accordingly.

Finally, the U.S. government should designate a senior official who is in charge of leading and coordinating the nuclear security effort throughout the government. Past experience suggests that plans without officials accountable for implementing them (and with the resources and authorities needed to do so) contribute little to progress; they tend to gather dust on shelves.

RECOMMENDATION 2:

Revitalize U.S. international nuclear security programs, seeking to work with all countries with nuclear weapons, highly-enriched uranium, separated plutonium, or major nuclear facilities that might be sabotaged to convince them to put effective and sustainable nuclear security measures in place.

As an investment in U.S. national security against the threats of nuclear and radiological terrorism, the U.S. government should expand and revitalize its international nuclear security programs, with broader objectives and more money and personnel to accomplish them. An expanded nuclear security effort should seek to be comprehensive, closing, to the extent possible, key gaps that now exist in U.S. nuclear security programs.⁶ In particular, while past nuclear security programs have focused primarily on developing or former communist countries, the “advocate and consultant” role is equally applicable to rich countries. The United States should be seeking to cooperate with as many of the countries with nuclear weapons, weapons-usable nuclear materials, or nuclear facilities whose sabotage could cause a major catastrophe as possible, in as many of the key areas of nuclear security as possible.

To support this expanded effort, the National Nuclear Security Administration’s International Nuclear Security program budget should be increased by \$80 million and its Nuclear Material

⁶ Matthew Bunn, Nickolas Roth, and William H. Tobey, “Revitalizing Nuclear Security in an Era of Uncertainty,” pp. 197-198.

Removal Program should be increased by \$100 million to support five key areas of nuclear security:⁷

- *Ensuring protection against the full spectrum of plausible threats.* This could include discussing countries’ approaches to evaluating threats, working with countries that have not established such a design basis threat to help them do so, exchanging unclassified threat information, holding workshops with experts from each country, and having teams review the adequacy of security against a range of threats. +\$20 million.
- *Putting in place comprehensive, multilayered protections against insider threats.* This could include in-depth exchanges on good practices in insider threat protection, workshops, help with appropriate vulnerability assessments, and peer review by expert teams. +\$20 million.
- *Establishing targeted programs to strengthen nuclear security culture.* This could include working with both regulators and operators to ensure that each operating organization has an effective program in place to strengthen its security culture, including regular security culture assessments to identify strengths and areas that still need improvement. +\$20 million.
- *Instituting effective, regular vulnerability assessments and performance testing.* Through workshops, peer observation of such activities in the United States, training, and description of approaches that have been effective, the United States can work with regulators and operators around the world to make these practices much more widespread. +\$20 million.
- *Consolidating weapons-usable nuclear material.* A larger expansion of funding—perhaps in the range of \$100 million initially—could be devoted to expanding efforts in the fifth key area of nuclear security, consolidating nuclear weapons and materials to the minimum practical number of locations. This could address additional stocks of material not yet covered by these programs, offering broader incentives for countries to convert research reactors or eliminate weapons-usable nuclear material, and ensuring that funding is available if opportunities arise to remove key stocks (such as the stocks of HEU in South Africa and Belarus, the only remaining locations in non-nuclear-weapon states where there is enough high-quality HEU at a single site for a simple “gun-type” nuclear bomb).

In addition, the United States and other countries should consider providing something in the range of \$10 million per year to expand IAEA nuclear security programs, particularly its peer review effort. The IAEA only conducts a handful of International Physical Protection Advisory Service reviews each year. Yet under the “Strengthening Nuclear Security Implementation

⁷ Matthew Bunn, Nickolas Roth, and William H. Tobey, “Revitalizing Nuclear Security in an Era of Uncertainty,” pp.199-201.

Initiative,” over 35 countries have committed to host such reviews “periodically”: if each of them hosted a review every five years, meeting that demand alone would require seven reviews a year—and of course, the United States is encouraging more countries to join the initiative, and encouraging countries outside the initiative to host such reviews as well. Ultimately, the goal should be to make such reviews a regular part of doing business in the nuclear world, which would require a substantially larger number of annual missions. Such an initiative could also help fund other peer review teams for sensitive stocks that countries were unwilling to have reviewed by an IAEA-led team.

RECOMMENDATION 3:

Congress should provide in-depth oversight of programs to strengthen nuclear security and reduce the risk of nuclear terrorism.

Though each successive administration has identified nuclear terrorism as one of the top threats to U.S. national security, it has been years since Congress has held a hearing on the subject. Committees with relevant jurisdiction should exert in-depth oversight over the steps the U.S. government is taking to reduce the danger, from improving nuclear security to intelligence efforts to proactively collect information on relevant terrorist plots and nuclear smuggling networks. If Congress directs the administration to develop an effective and comprehensive plan for improving nuclear security, and the result leaves out major portions of what needs to be done, Congress should push back. Congress should work to understand the obstacles to nuclear security progress and whether there are further actions it could take to address them.

In short, the U.S. government needs a plan for nuclear security, someone in charge of carrying it out, the funding and people needed to do so, and regular oversight and learning-by-doing to ensure that opportunities are seized and obstacles addressed. The funding proposals in this brief are not radical. In total, they would return NNSA’s nuclear security programs to something in the range of the FY 2016 level of \$513 million, compared to the FY20 request of \$347 million. That remains a small price to pay to reduce the danger of nuclear weapons or their essential ingredients falling into terrorist hands.

ABOUT THE PROJECT

The Project on Managing the Atom (MTA) has a dual mission: (1) leading the advancement of policy-relevant knowledge about the future of nuclear weapons, nuclear energy, and the connections between the two; and (2) preparing the next generation of leaders for work on these issues. MTA researchers not only engage in policy research and analysis, but also propose and promote policy innovations, and provide authoritative information for an interested public.

MTA’s research focuses primarily on four broad issues and on the interactions between them:

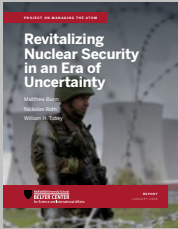
- Reducing the risk of nuclear and radiological terrorism: MTA has maintained a major focus on analyzing, proposing, and pushing for initiatives to keep nuclear weapons and materials out of the hands of terrorists and secure nuclear stockpiles throughout the world.
- Stopping the spread of nuclear weapons: MTA’s work focuses on strengthening nonproliferation efforts and addressing regional proliferation challenges in the Middle East, South Asia, and East Asia, with attention to both constraining the supply of nuclear technology and reducing demand for nuclear weapons.
- Reducing the dangers of existing nuclear stockpiles: MTA’s work suggests practical steps for reducing the risk of the use of nuclear weapons in war or crises, and for reducing the size of nuclear arsenals themselves.
- Lowering the barriers to the safe, secure, and peaceful use of nuclear energy: Nuclear energy would have to grow substantially to be a significant part of the answer to the climate change challenge. MTA examines how nuclear energy could be made as safe, secure, and proliferation-resistant as possible—and how the problem of radioactive waste can be successfully addressed.

The project is a joint venture of the Belfer Center’s Science, Technology, and Public Policy Program (STPP); International Security Program (ISP); and Environment and Natural Resources Program (ENRP)

READ THE FULL REPORT:

“Revitalizing Nuclear Security in an Era of Uncertainty”

[belfercenter.org/NuclearSecurity2019](https://www.belfercenter.org/NuclearSecurity2019)



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Nigeria's Miniature Neutron Source Reactor was the last operational research reactor in Africa to make the conversion from HEU to LEU. Here, the HEU once used in the reactor is loaded for shipment back to China, the supplier. (IAEA)

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