

Nuclear Terrorism: Assessment of U.S. Strategies to Prevent, Counter, and Respond to Weapons of Mass Destruction

For nearly eight decades, the world has been navigating the dangers of the nuclear age. Despite Cold War tensions and the rise of global terrorism, however, nuclear weapons have not been used in conflict since Hiroshima and Nagasaki in 1945. Efforts such as strategic deterrence, arms control and non-proliferation agreements, and U.S.-led global counter-terrorism have helped to keep nuclear incidents at bay. For example, the Cooperative Threat Reduction program (also known as the Nunn-Lugar program) established a bi-partisan, multi-decade effort with Russia to reduce the risk of nuclear and other forms of WMD terrorism.

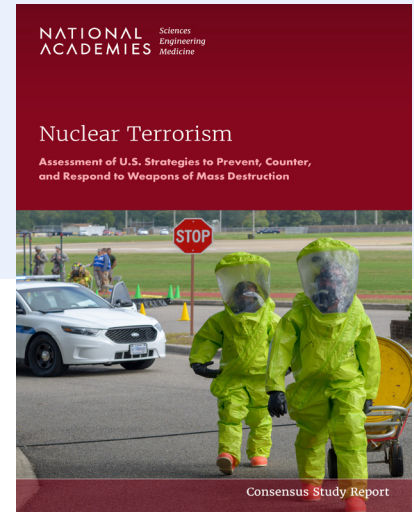
The attacks on New York and Washington by al Qaeda on September 11, 2001 heightened the concern that weapons of mass destruction could be used by terrorist organizations. The 9/11 Commission Report commissioned by Congress has helped guide efforts to shore up U.S. readiness for such attacks and has enabled a generation of Americans to grow up without experiencing another catastrophic terrorist attack on the U.S. homeland.

The nation's success to date in countering nuclear terrorism does not come with a guarantee, however. Success often carries the downside risk that other challenges will begin to siphon away attention and resources, and can lead to the perception that the threat no longer exists. In light of those concerns, Congress asked the National Academies to evaluate the readiness of the U.S. government to prevent, counter, and respond to and recover from the real and persistent threat of nuclear terrorism.

CALL TO STRENGTHEN U.S. COUNTERTERRORISM EFFORTS

The unanimous conclusion of this report's authoring committee is that, overall, U.S. efforts to counter nuclear or radiological terrorism¹ are not keeping pace with the evolving threat landscape. The efforts to manage this risk must be expanded and they must be enduring. A key challenge is ongoing coordination

¹ Nuclear terror threats include the intentional detonation of a state developed nuclear weapon, an improvised nuclear device (IND) assembled with stolen weapons usable fissile material, radiological dispersal devices (RDD), radiological exposure devices (RED), or the threat to use any of those weapons. These threats can also include attacks on nuclear facilities, including nuclear power plants.



and collaboration within and amongst all federal departments and agencies involved in the counterterrorism mission. Because no one agency is assigned a lead role, it falls to the White House to provide sustained oversight to minimize duplication of efforts and to ensure close interagency coordination and focus.

The report recommends that the U.S. government maintain as a strategic priority the post 9/11 focus and effort on combatting terrorism through ongoing deep collaboration and coordination across the national security community in addition to international partners, State, Local, Tribal and Territorial (SLTT) authorities, the National Laboratories, universities and colleges, and civil society, and ensure that senior leaders at key agencies stay engaged in the counter-terrorism mission.

NEW DYNAMICS IN NUCLEAR TERRORISM POSE NEW RISKS

The report's authoring committee does not foresee an imminent nuclear terrorist attack with a nuclear weapon or an IND. However, several factors point to an increasing risk of such an attack:

- The number and types of groups who may be motivated to use INDs, RDDs, or REDs is likely growing.
- Nuclear weapons, weapons-usable fissile materials, and nuclear weapons design expertise are almost entirely controlled by state actors, who—some motivated by the Great Power Competition²—could potentially collaborate with terrorist groups to conduct an attack. This risk is evident in the blurring of boundaries between state and non-state adversaries such as the Wagner Group, Hamas, Hezbollah, and ISIS.
- A number of U.S.-based accelerationist groups have been deliberately recruiting U.S. military personnel for terrorist activity, and there are disturbing and growing U.S. domestic links with mercenary and terrorist groups across international borders.
- Technical information can be obtained online, which could encourage groups to seek nuclear material, and extremists are using social media to fuel radicalization and extreme partisanship.

² GPC is a strategic posture that the United States has taken over the last decade to focus on challenges from inter-state competition, particularly focused on Russia and China.

The trends of the past years have demonstrated that domestic and international terrorist organizations are becoming more closely linked and difficult to differentiate. Countering these increasingly transnational organizations through close interagency and international cooperation will be challenged by the barriers associated with differing jurisdiction, authorities, and capacity along with the varying missions of the intelligence and law enforcement communities.

The report recommends evaluating whether the national security community has sufficient resources for essential capabilities managing and responding to the nuclear terrorism risk while there is a sea change in policy and funding towards the Great Power Competition. In addition, federal agencies should determine whether anti-government/terrorist groups operating in the United States should be included on the list of Foreign Terrorist Organizations, which would make it illegal to join or financially support these groups.

ERODING NUCLEAR SECURITY NORMS AND PRACTICES

A unifying theme in this report is the indispensable role the United States has played and must continue to play in mobilizing and sustaining global efforts to advance nuclear security. Since the collapse of the Soviet Union, the cornerstone of managing the nuclear terrorism threat has been the global partnerships in support of arms control, nonproliferation, and combating nuclear terrorism that limited the availability of nuclear weapons and weapons-usable nuclear materials to non-state actors. In recent years, however, those partnerships are no longer robust, and the final Nuclear Security Summit process was in 2016 with no follow-up summits scheduled. Meanwhile, Russia has shifted from being an important partner in enhancing nuclear security to a destabilizer of nuclear norms following its full-scale invasion of Ukraine in 2022.

Given this dynamic threat environment, the United States should work quickly to reinvigorate efforts to engage heads of states and governments to work together to close any existing and emerging gaps in the international nuclear security system. Additionally, U.S. proliferation prevention programs carried out in cooperation with

intergovernmental organizations like the International Atomic Energy Agency (IAEA) and Interpol, as well as with like-minded countries, require increased funding and coordination.

ADAPTING TO THE EVOLVING CIVIL NUCLEAR SECTOR

International interest in nuclear energy is growing due to its potential to provide clean power and support the goal of achieving net-zero carbon emissions—including in countries that lack experience with nuclear safety and safeguards. At the same time, new nuclear power technologies, including small modular reactors, are making nuclear power more accessible. Russian attacks on nuclear power plants and the civil energy sector in Ukraine are a startling reminder that state actors can target nuclear power plants, holding them hostage to use as a means of coercion.

An increase in civil nuclear material and nuclear facilities around the globe will require a strategy to ensure their security from terrorist attack and proliferation for the long-term. To fully safeguard nuclear material, it is important to permanently dispose of spent fuel, including in the United States. The report calls for a whole-of-government effort, in partnership with the civil nuclear sector, to strengthen the U.S. leadership in civil nuclear energy commerce and thereby enhance global standards for safety, security, and materials control.

RISKS ASSOCIATED WITH HIGHLY ENRICHED URANIUM AND PLUTONIUM

Since the end of the Nuclear Security Summit process in 2016, efforts to eliminate excess civilian stockpiles of weapons-usable highly enriched uranium (HEU) and separated plutonium have slowed. While global inventories of HEU have remained mostly static since 2020, inventories of plutonium have since increased, mostly as a result of commercial nuclear energy production. Five of the 31 countries with active nuclear programs—China, France, India, Japan, and Russia—use plutonium in reactor fuel. The fuel cycle reprocesses spent fuel to extract the plutonium—which is the same process used to separate plutonium for nuclear weapons.

Given the evolving interest of non-state actors in weapons of mass destruction, it should be a top national

security priority to eliminate weapons-usable materials wherever possible, and better secure those materials that are still needed. Nuclear newcomers should be discouraged from adopting a plutonium fuel cycle that requires reprocessing. As a non-state actor does not have the ability to create these materials, it is incumbent on those 22 countries that possess these materials to make every effort to prevent them from being used by terrorists.

MANAGING THE RISKS AND BENEFITS OF RADIOACTIVE SOURCES

Radioactive sources found in commonly used tools, equipment, and critical medical devices provide many beneficial services such as cancer treatment, blood irradiation, sterilization, oil prospecting, medical research, calibration of dosimeters, food safety, and radiography. In the wrong hands, these items can be used in a radiological dispersal device (RDD) or a radiation exposure device (RED), which are intended to cause widespread panic and environmental damage.

Over the past decade, DOE/NNSA has undertaken a major effort to reduce the opportunity for terrorist use of these sources by identifying alternative technologies. These efforts include phasing out the use of high-risk cesium-137, particularly in blood irradiators, and replacing it with x-ray technology. But more attention is needed to mobilize and sustain efforts to identify additional technological alternatives, raise awareness of the risk, and enact stronger security measures. In particular, the United States, with NNSA as the lead, should strengthen and accelerate current programs for end-of-life management of sources and work with industry to phase out high-risk cesium-137 and cobalt-60 sources by developing reliable alternative technologies.

DETECTION AND INTERDICTION IN THE GLOBAL SUPPLY SYSTEM

Non-state actors can move nuclear weapons, materials, and equipment by exploiting well-established criminal pathways for smuggling. This is true even in the face of the many detection and interdiction measures put in place since 9/11. Opportunities exist to enhance supply chain transparency and accountability by strengthening industry partnerships and taking advantage of artificial intelligence, machine learning, and other technologies

that can help identify anomalies and dangerous materials hidden within legitimate shipments. Concurrently, strengthening efforts to counter cross-border smuggling outside the legitimate trade and travel routes also remain critical for managing the nuclear terrorism risk.

The United States should lead an international effort to enhance security across all elements of the global supply system by building on the post-9/11 transportation and cargo security programs and deepening international and private industry cooperation. In addition, the Department of Justice, Federal Bureau of Investigation, Department of Energy, and Department of Homeland Security, with support from the U.S. Department of State, should continue to deepen ongoing international law enforcement cooperation and intelligence sharing to counter nuclear smuggling efforts along illicit transit routes and between legal ports of entry.

RESPONSE AND RECOVERY TO NUCLEAR INCIDENTS

Given that the consequences can be catastrophic, the nation must be well-prepared to respond and recover from a nuclear incident. The coronavirus pandemic exposed the disparate capabilities that exist across the nation's local and state jurisdictions as well as

significant shortcomings in coordination among federal, state, local, territorial, and tribal authorities in an extended public health emergency. In a nuclear incident, consequence management and recovery personnel have the added burden of managing it in the face of widespread fear. The complexity will increase if inaccurate information is widely disseminated, either intentionally or unintentionally.

Significant new investments in resources would likely be needed to develop and sustain adequate nuclear incident response and recovery capabilities at the local and state levels. The report recommends that the Federal Emergency Management Agency (FEMA) reinvigorate a dynamic, comprehensive, and inclusive exercise regimen, in coordination with the Federal Radiological Preparedness Coordinating Committee (FRPCC). FEMA, working with Centers for Disease Control and Prevention, Environmental Protection Agency, Department of Energy, and National Institutes of Health, should empower local response, by making available simple and accessible real-time information through application development that will facilitate standardized actions and guide an appropriate public response. Costs of those activities should be supported by Congress.

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