

## **NON-PAPER: STRENGTHENING THE SECURITY OF MILITARY NUCLEAR MATERIALS**

One of the greatest threats the world faces is the possibility that a terrorist group could acquire and detonate a nuclear weapon. A terrorist nuclear attack in any large city would likely kill hundreds of thousands of people, inflict billions of dollars in damage, and have profound effects on global security, the global economy, and our way of life. The effects of such an attack would transcend national boundaries, compelling a global response to a global threat. This means that all countries bear responsibilities to ensure that all weapons-usable nuclear materials are secured effectively and even those without nuclear materials should ensure that their territories are not used as safe havens or transit points for illicit nuclear smuggling.

Military materials—weapons-usable plutonium and highly enriched uranium outside civilian programs—are estimated to comprise **83% of all global weapons-usable nuclear materials**. Despite the fact that military materials represent the largest share of the world’s stockpiles of nuclear materials, there remain no internationally recognized standards for their protection and control, nor are there multilateral arrangements in place to build international confidence in their security. This represents a major barrier in the establishment of an effective global nuclear security system, because terrorists wishing to steal nuclear materials would not care whether those materials are designated as civilian or military. They will seek to obtain materials from the most vulnerable and least protected location.

At the 2014 Nuclear Security Summit in The Hague, leaders from more than 50 countries “reaffirm[ed] the fundamental responsibility of States, in accordance with their respective obligations, to **maintain at all times effective security of all nuclear and other radioactive materials, including nuclear materials used in nuclear weapons**, and nuclear facilities under their control. This responsibility includes taking **appropriate measures to prevent non-state actors from obtaining such materials**—or related sensitive information or technology—which could be used for malicious purposes, and to prevent acts of terrorism and sabotage.”

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<sup>1</sup> Through the Global Dialogue on Nuclear Security Priorities, leading government officials, international experts, and nuclear security practitioners engage in a collaborative process to build consensus about the need for a strengthened global nuclear security system, how it would look, and what actions would be needed at the Nuclear Security Summits and beyond. The Global Dialogue discussions are conducted on a not-for-attribution basis; where individuals and governments are free to use the information obtained during the meeting, but that information should not be attributed to a specific individual or government. For more information: <http://www.nti.org/about/projects/global-dialogue-nuclear-security-priorities>.

The 2016 Nuclear Security Summit offers an important opportunity for governments to deliver on commitments made at the 2014 Summit and each of the previous Summits on securing all nuclear materials, including military materials. Governments may also choose to establish a multilateral forum to exchange best practices, conduct joint exercises, and further develop standards related to military materials security.

This paper offers some options for countries to consider adopting at the 2016 Summit and beyond for (1) strengthening the security of their military materials; and (2) building international confidence in the security of those materials.<sup>2</sup> There is a broad spectrum of materials that fall within the category “military materials.” There is a range of sensitivity—from materials in research programs to materials in deployed warheads—and a range of personnel responsible for those materials—from civilian contractors to uniformed military personnel. Therefore, the options for building international confidence are designed to be a menu from which countries may choose the most appropriate actions depending on their circumstances and where the materials fall on the spectrum.

### **Understanding Military Materials**

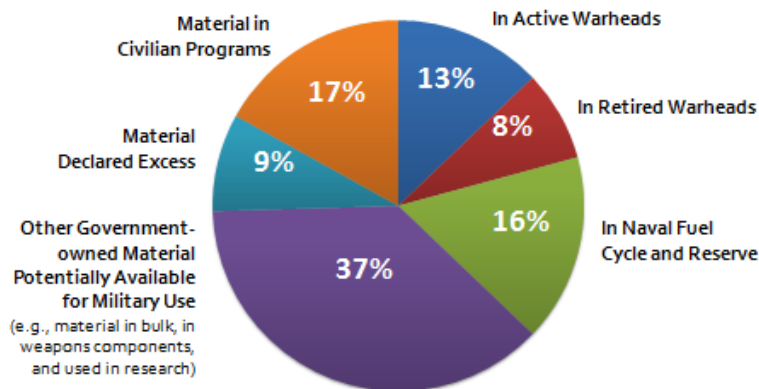
Military materials, as a category, are quite diverse and include materials in different forms, in different facilities, and in different uses. Military materials can be further divided into five sub-categories: nuclear materials found inside active nuclear warheads; nuclear materials inside retired nuclear warheads awaiting dismantlement; nuclear materials used for non-civilian naval purposes, including inside naval reactors and materials designated for naval reserves; nuclear materials declared excess awaiting downblending or disposition; and nuclear materials designated for other non-civilian purposes, including storage. The global distribution of these materials can be found in the chart below.<sup>3</sup>

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<sup>2</sup> These options were developed with input from the NTI Military Materials Security Study Group, a group of former high-level military officials from countries with military materials co-chaired by Senator Sam Nunn, Senator Richard Lugar, and NTI Vice-Chairman Des Browne, that was convened at the request of participants at the September 2014 meeting of the Global Dialogue on Nuclear Security Priorities.

<sup>3</sup> Material quantities are estimates based on analysis by Dr. Pavel Podvig. Sources include the *IPFM Global Fissile Material Report 2013*. The estimated range of uncertainty regarding the total quantity of materials is +/- 140 metric tons.

Categories of Weapons-Usable Nuclear Materials Globally  
(Estimated Percentages)



Not all of these types of materials fall under the custody of military forces. Depending on the country, some military materials are under civilian control and protection (particularly those materials in reserves or in storage), while others types, such as the materials inside deployed warheads, are under the custody of the military. Consequently, measures to build international confidence will vary depending on the sensitivity of the materials involved and the personnel responsible for securing them.

The majority of these materials are in Russia and the United States. However, all states with military materials have a responsibility to ensure that military materials are secured effectively and to build the confidence of others in their security.<sup>4</sup> Lapses in the security of military materials in one country would have profound consequences for all.

### Addressing Military Materials Security

An effective global nuclear security system requires that all weapons-usable nuclear materials be as secure as possible. Work must be done to strengthen the security of civilian materials, but several alarming security incidents at facilities containing military materials indicate that more can be done to also improve the security of military materials.

For example, in July 2012, three peace activists, including an 82-year-old nun, managed to break into the Y-12 National Security Complex in Oak Ridge, Tennessee. The activists spent over an hour and twenty minutes on the facility compound before a single guard noticed and arrested them for trespassing. The Y-12 facility is operated by the U.S. Department of Energy

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<sup>4</sup> The following countries have military nuclear materials: China, France, India, Israel, North Korea, Pakistan, Russia, the United Kingdom, and the United States.

and houses thousands of kilograms of highly enriched uranium.

More recently, in 2013, U.S. nuclear missile launch officers were found sleeping with a blast door open to their missile launch control capsule. Also, in 2013, as many as 50 U.K. Defense Ministry law enforcement personnel were under investigation for sleeping on the job and not completing patrols at the Atomic Weapons Establishment in Burghfield, Berkshire, a U.K. government-owned, contractor-operated site where nuclear warheads are constructed, maintained, and disassembled.

These incidents highlight that the security of military materials should not be taken for granted and that there remains considerable room for improvement in this regard. Despite this need for improvement, there are no internationally recognized standards for the security of military materials or multilateral arrangements designed to build confidence in the security of these materials.<sup>5</sup>

### **Strengthening the Security of Military Materials**

As a general rule, countries with military materials should commit to secure military materials to the same or higher standards as comparable civilian materials, including through the application of best practices and standards that are at least consistent with the International Atomic Energy Agency's (IAEA) nuclear security guidelines.<sup>6</sup>

In particular, the NTI Military Materials Security Study Group identified three foundational principles for military materials security: **accountability, risk management and minimization, and continuous improvement**. The following table explains each of these principles, as well as steps countries can take to put them into practice.

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<sup>5</sup> The Convention on the Physical Protection of Nuclear Materials (CPPNM) and its 2005 Amendment apply to nuclear materials use for peaceful purposes. Although UN Security Council Resolution 1540 requires countries to apply effective physical protection for all nuclear materials, including those in nuclear weapons, it does not provide specific guidelines for implementing this obligation. The nuclear security guidelines and recommendations issued by the International Atomic Energy Agency (IAEA)—the only mechanism that comes close to providing any international security standards for how to secure nuclear materials—apply to civilian materials.

<sup>6</sup> Comparability in this context refers to comparable fissionable properties of the material. That is, military materials should be provided with at least the same or higher standard of physical protection that civilian materials of similar fissionable characteristics are provided. The IAEA Nuclear Security Recommendations on Physical Protection of Nuclear Materials and Nuclear Facilities (INFCIRC/225/Rev.5) offers a useful approach to categorization of nuclear materials, which can serve as the basis for a graded approach to military materials security linked to the characteristics of the nuclear material. See [http://www-pub.iaea.org/MTCD/publications/PDF/Pub1481\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Pub1481_web.pdf).

**Accountability.** The elements below are important to ensure accountability at all levels, from political leaders to nuclear facility personnel.

**Strong Security Culture.** Even the most sophisticated security equipment can be undermined in a facility that lacks strong security culture, a concept defined by the IAEA as “the assembly of characteristics, attitudes and behavior of individuals, organizations and institutions which serves as a means to support and enhance nuclear security.”<sup>7</sup> Having a strong security culture means that all personnel are responsible for protecting nuclear materials and that no one is complacent about the threat.

**Independent Oversight.** Independent national oversight is essential to provide accountability for those with nuclear security responsibilities. The credibility of an oversight organization is largely linked to its degree of operational independence from the custodian of the materials on site (i.e., operator of the facility or base) and its ability to take corrective action against non-compliance with security regulations. Oversight for the security of weapons may not necessarily come from outside the military, but should still meet the criteria for independence.

**Clear Roles and Responsibilities.** Nuclear facilities should ensure that all personnel who work there understand their roles and responsibilities pertaining to security. Supervisors and facility leadership should reinforce this understanding through training, demonstrations, exercises, and regular reviews of rules and regulations. Personnel should be encouraged to report problems when they are identified and take ownership of their responsibilities pertaining to nuclear security.

**Risk Management and Minimization.** The elements below represent the measures necessary to manage and minimize the risks of theft of nuclear materials or sabotage of nuclear facilities.

**Comprehensive Threat Assessments.** Countries should establish a written Design Basis Threat (DBT) that specifies the “attributes and characteristics of potential insider and/or external adversaries who might attempt unauthorized removal of nuclear material or sabotage.”<sup>8</sup> Nuclear facilities should then regularly perform vulnerability assessments, effectiveness evaluations, and self-inspections to determine how well physical protection systems fare against threats specified in the DBT and update it as necessary.

**Material Control and Accounting.** To prevent theft of nuclear materials, facilities must be able

<sup>7</sup> IAEA Nuclear Security Series No. 7, “Nuclear Security Culture Implementing Guide,” at [http://www-pub.iaea.org/MTCD/publications/PDF/Pub1347\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Pub1347_web.pdf).

<sup>8</sup> IAEA INFCIRC/225/Rev.5.

to detect unauthorized diversions of small quantities of nuclear materials through robust accounting methods. Facilities should also effectively integrate these accounting systems with physical protection systems designed to interdict theft.

**Integration of Cyber Security.** To address the emerging threat of a cyber-mediated theft of weapons-usable nuclear materials or sabotage of a nuclear facility, nuclear facilities should ensure that their security plans incorporate measures to protect against cyber attacks and establish a set of procedures to protect digital networks and assets from cyber attacks that could lead to physical consequences.

**Effective Transportation Security.** Governments should ensure that well-armed, well-trained guards are protecting any movements of nuclear materials between buildings at one facility or between facilities. Governments should also ensure development and deployment of systems that track nuclear transports in real-time, monitor the state of physical protection systems of the materials during transport, and can identify the location of a response force in case of an emergency.

**Minimization of Materials and Sites.** One of the best ways to strengthen nuclear security is to minimize the quantity and use of weapons-usable materials where possible and to consolidate materials in as few locations as possible—reducing potential targets for terrorists to attack.

**Continuous Improvement.** Security must continuously evolve to counter evolving threats.

**Realistic Training.** Governments should ensure that protective forces for nuclear facilities are well and regularly trained, equipped, tested, and knowledgeable about the asset under protection. Realistic tests of security performance, including force-on-force exercises where groups attempt to defeat security at nuclear sites, should be incorporated into training. Information exchanges and sharing of lessons learned across the military/civilian divide can also strengthen the training of personnel.

**Trusted, Certified, and Well-Equipped Personnel.** Governments should implement a comprehensive insider threat mitigation program for nuclear facilities, which includes a robust personnel reliability program (PRP). Facility operators should ensure that all employees with access to nuclear materials are provided security training on a regular basis. National authorities should also establish or ensure participation in existing nuclear security certification programs.

**Security Reviews and Updates.** Nuclear facilities and regulators should conduct regular performance tests of security equipment to ensure effective protection against sophisticated adversaries; review and update DBTs and site-specific security plans to improve readiness and protection capabilities; and invest in nuclear security research and development to ensure that security systems designed to protect nuclear materials stay ahead of the capabilities of the adversaries who seek to steal them.

### **Building Confidence in the Security of Military Materials**

Given the potential global consequences of a nuclear security incident, all countries have a stake in effective nuclear security and should therefore take steps to build international confidence in the security of their nuclear materials. There are a number of benefits for countries taking these steps:

- **Improved Security.** Sharing information on the security of military materials through best practices, workshops, and information exchanges will lead to improved security.
- **Deterring Terrorists.** Improving security and establishing visible confidence-building measures sends a strong message to terrorists that military materials are secured to the highest standards.
- **Increased International Confidence.** Confidence-building measures will ensure that other countries are assured that their security will not be affected by lax security in another country.
- **Enhanced Credibility.** Given the potential global consequences of a nuclear security incident, a “trust me” approach to military materials security is not good enough. When countries take steps to *demonstrate* that they have effective security for all nuclear materials, this enhances their international and domestic credibility with respect to nuclear security.
- **Ensuring Sustainability of Nuclear Energy.** A single serious security incident involving nuclear materials—civilian or military—could undermine public support for nuclear power. Actions that build international confidence in the security of all materials, including military materials, will help to restore and maintain public trust in the safety and security of nuclear energy.

Toward this end, countries can consider **a range of options** to increase confidence in the security of military materials. Acknowledging the range of sensitivity of these materials and the range of personnel responsible for those materials, these options are designed to serve as a **menu from which countries may choose** the most appropriate actions depending on their circumstances and where the materials fall on the spectrum of materials described previously.

### Unilateral Activities

**Declare aggregate data.** Countries with military materials could publish periodic reports on each of the different categories of weapons-usable nuclear materials as part of a confidence-building initiative. For example, in June 2012, the United States published an unclassified report entitled “*The U.S. Plutonium Balance, 1944-2009.*” Other countries with military materials could make similar declarations, as appropriate to their national circumstances and security concerns.

**Publish results of accident and security incident investigations.** Following security incidents, national authorities should report the non-sensitive findings of investigations and the corrective measures taken to address those findings. As an example, the U.S. Department of Energy’s Inspector General recently published the findings of its investigation into the Y-12 security incident and identified security deficiencies and recommendations for addressing them.

**Report information about military materials security regulations.** Countries can use the Nuclear Security Summit process and other international forums to publish information on regulations pertaining to the security of military materials—demonstrating regulatory coverage of security topics such as material control and accounting, cyber security, and transportation security.

**Fulfill UNSCR 1540 Reporting Obligations.** In their reports to the UNSCR 1540 Committee, countries with military materials could report on the measures they are taking to secure military materials.

**Certification.** Countries could publish information about nuclear security certification programs used for nuclear security personnel in their countries, or indicate participation by personnel in existing international programs, such as by the World Institute of Nuclear Security (WINS) Academy.



## Bilateral and Multilateral Activities

**Peer reviews.** Countries should consider participating in nuclear security peer reviews. These could be conducted by selected bilateral or multilateral partners. Managed access principles should guide the conduct of such reviews to ensure sensitive information is protected.

**Best practice exchanges.** Best practice sharing is not only applicable to the security of materials in civilian programs, but also to military materials security. Because of the challenges around the sharing of sensitive information, best practice sharing on military materials security could be done in the context of small groups of countries with military materials or between states with existing relationships of trust.

**Joint training exercises.** Countries can conduct joint nuclear security training exercises related to military materials security, inviting participants from countries with military materials and countries without military materials as observers. Such exercises could involve tabletop exercises, demonstrations, and technical exchanges.

**Trusted agents.** When it is not possible to grant access to particular foreign nationals to sites containing nuclear materials, confidence in the security of these materials could be developed through the use of a “trusted agent,” a national of a host state, or trusted ally of a host state, who—by force of scientific reputation, standing, and training in security matters—could be relied on to provide an assurance of the adequacy of the host state’s security.

## Opportunities at the 2016 Nuclear Security Summit and Beyond

The 2016 Nuclear Security Summit offers an important opportunity for governments to deliver on commitments made at each of the previous Summits on security for all nuclear materials, including military materials. Specifically, countries could take the following steps at the upcoming Summit:

- **Ensure military materials are addressed in the Summit Communiqué.** Each of the last three Summit Communiqués has affirmed the responsibility of states to maintain effective security for *all* nuclear materials, including materials inside nuclear weapons. The upcoming Summit should reaffirm this commitment using a similar statement that emphasizes the importance of measures to build confidence in these materials’ security.
- **Deliver a “gift basket” on military materials security.** Countries with military materials and those without military materials can deliver a “gift basket” at the 2016 Summit reaffirming

the importance of effectively protecting military materials and building confidence in their security and pledging to work cooperatively on a number of specific steps to achieve these goals. Countries with military materials could also use the gift basket to commit to secure military materials to the same or higher standards as comparable civilian materials.

- **Reflect military materials security in National Statements and National Progress Reports.** Countries with military nuclear materials can reaffirm the importance of military materials security in their national statements and commit to secure military materials to the same or higher standards as those found in IAEA INFCIRC/225/Rev. 5—which currently only apply to civilian materials. These countries could also use their National Progress Reports to disclose steps that they are taking to build international confidence in the security of their military materials. Countries without military materials could use their National Statements to declare their support for enhanced international attention to the security of military materials.

Countries with military materials could also consider forming a new multilateral **technical-level working group** focused on military materials security that would provide a forum for communication between representatives of organizations responsible for the security of military materials in each of these countries. The working group would allow these organizations to exchange best practices, conduct technical exercises, develop security standards, and share lessons learned related to military materials security.<sup>9</sup> The group could also invite observers from countries without military materials to participate in exercises and workshops. The creation of such a group could be announced at the 2016 Nuclear Security Summit.

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<sup>9</sup> Participating organizations could, for example, include the Atomic Weapons Establishment (AWE) in the United Kingdom, the Defense Threat Reduction Agency (DTRA) and the Department of Energy (DOE) in the United States, the Commissariat à l'énergie atomique et aux énergies alternatives (CEA) and the Ministry of Defense in France, and the 12<sup>th</sup> Main Directorate of the Ministry of Defense in Russia, among others.