

**DISCUSSION PAPER: STRENGTHENING THE SECURITY OF RADIOLOGICAL SOURCES**

**INTRODUCTION**

Today, there are tens of thousands of radioactive sources used worldwide throughout medicine, industry, agriculture, academia, and government facilities for a variety of purposes, stored in thousands of facilities—many of which are poorly secured and vulnerable to theft. These sources pose a serious threat and could be readily employed for use in a dirty bomb. Radiological terrorism is an increasing threat and states as well as the private sector must do more to secure these dangerous materials and keep them out of the hands of terrorists. A dirty bomb detonated in a major metropolitan area could result in economic losses in the billions of dollars as a result of evacuations, relocations, cleanup, and lost wages. In addition, panic and psychological impacts may contribute to the impact of a dirty bomb.

Progress has been made in the past decade on securing radiological sources through efforts by the International Atomic Energy Agency (IAEA) and various national and international programs. In addition, leaders also have placed increased attention on radiological materials security through a series of four Nuclear Security Summits (NSS). However, despite these efforts, gaps still remain in the international radiological security regime and there is a lack of international political imperative to strengthen radiological security standards.

Implementation of existing international standards and adherence to the Code of Conduct for the Safety and Security of Radioactive Sources (CoC) and the supplementary Guidance on the Import and Export of Radioactive Sources (supplemental Guidance) remains far from universal, and no global legally-binding standards exist for holding countries accountable for security at radiological facilities or throughout their lifecycle. While a limited number of states have taken steps to secure their highest risk radiological sources by a specific date (in accordance with the 2014 NSS Joint Statement on Enhancing Radiological Security), a vast number of radiological

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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>.

sources exist around the world and are potentially vulnerable to terrorists seeking to acquire these materials.

## **CURRENT CHALLENGES**

There exists a number of unique challenges when it comes to securing radioactive sources, which are briefly summarized below:

- **Weak international regime for the security of radioactive materials** – There exists little in the way of international legal architecture when it comes to radiological materials. States have signed up to the IAEA’s CoC, which, while non-binding, outlines key principles of radiological security. This suffers, however, from a lack of universal coverage and implementation, with only 133 of 168 IAEA Member States having signed up to the CoC, many of which have yet to codify it into domestic law.
- **Gaps in national legislation and regulation** – In the absence of a formal international regime for radiological materials, countries have taken different legal and regulatory approaches to security. While there is no single solution to securing radioactive materials, clear gaps remain in many countries, especially when it comes to transporting materials, establishing national inventories, and the disposal of disused sources.
- **Poorly secured and open facilities** – Radioactive material is widely stored and used by the public and private sectors in hundreds of facilities around the world, such as hospitals and universities with open access and in some cases insufficient or no physical protection measures. These could be viewed as soft targets by potential adversaries looking to steal materials or carry out sabotage attacks. In these environments, increased security must be carefully balanced with safety and operational concerns.
- **Cradle-to-grave controls on radioactive materials remain weak** – Poor chain-of-custody procedures and insufficient or non-existent regulatory controls in many states have led to the loss of control over thousands of radiological sources. Even in states with regulatory controls in place, high disposal costs and a lack of depositories have led some end-users to abandon sources at the end of their lifecycle.
- **Complexity in tracking radioactive sources** – The use of radioactive sources is widespread and frequently involves trans-boundary movement of sources, making it difficult for states to keep track of radioactive sources, leaving them vulnerable to theft. Radioactive sources are particularly vulnerable during transport.
- **Lack of security awareness and security culture** – The diversity of radioactive source applications and affiliated organizations, as well as the primarily “safety” orientation of operators and regulators, presents significant challenges for users.
- **Absence of central venue for engaging a broad stakeholder base** – The private sector’s role in radiological security efforts is critical, but there is no dedicated existing forum for

such engagement and contributions.

- **Lack of urgency in accelerating radiological security efforts** – Given the increasing risk posed by terrorists seeking to acquire radiological materials, a global initiative, on par with President Obama’s four-year nuclear security effort, is urgently needed to galvanize international support for securing the most vulnerable radiological sources around the world within the next 3-4 years.

## RECOMMENDATIONS

The following highlights opportunities that have been recommended by various government and private sector stakeholders:

- **Strengthen the International Framework** – States should explore opportunities to launch a new high profile initiative that would further strengthen the global radiological security architecture and address major security challenges. Such an effort can build upon previous NSS and IAEA commitments, and acknowledge that more work needs to be done to improve radiological security standards, build confidence that states are fulfilling their radiological security obligations, and encourage information sharing. Given the prevalence of sources worldwide and the increasing threat posed by terrorist groups seeking to acquire such materials, an urgent global effort is needed to secure the most vulnerable radiological materials around the world within the next 3-4 years.<sup>2</sup>
- **Broaden Universal Coverage for the Code of Conduct** – More targeted efforts are needed to broaden the CoC’s coverage and implementation within the auspices of the IAEA as well as share information on the concrete actions states are taking to implement the CoC and related supplemental Guidance. In order to bring high-level attention to the undervalued risks posed by radiological materials, states need to acknowledge that their individual security regime contributes to the global architecture to prevent, detect, and respond to potential acts of radiological terrorism. This will require sustained political commitment and resources for the IAEA to continue to assist countries through guidance, training, and advisory services. More importantly, this will require countries that have not signed up to the CoC to do so, and for countries that have already signed up, to implement the provisions of the CoC.
- **Build and Strengthen the Regulatory Framework** – During the 2016 CoC Review

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<sup>2</sup> President Obama’s nuclear security agenda, laid out in his historic speech in Prague in 2009, included a vision of a world free of nuclear weapons, ending the production of fissile materials intended for use in state nuclear weapons, and ensuring that terrorists never acquire a nuclear weapon. This effort was supported by international partners who convened four Nuclear Security Summits, bringing countries together based on a shared recognition—at the highest levels of government—of the dangers of nuclear and radiological proliferation. A similar accelerated effort should be launched on radiological security.

Meeting, most states generally considered that progress has been made since the last review meeting in the lifecycle management of sources. To improve or sustain this progress, the IAEA should develop technical publications and training materials specifically for radiological security in the areas of human resource capacity, security awareness, threat assessment, insider threat mitigation, security inspections of facilities with radioactive materials, information protection, and safety and security interface. The IAEA could also establish an on-line collection of available national regulations on the security of radioactive sources, and make these available to Member States and other stakeholders.<sup>3</sup>

- **Strengthen the Role of the IAEA** – The 2016 NSS produced an IAEA Action Plan that recognized the central and unique role of the IAEA in nuclear and radiological security, putting forward several key recommendations for strengthening radiological security.<sup>4</sup> However, the transfer of priorities from the NSS IAEA Action Plan to the decision-making process of the IAEA will rely on the ability of states to attract support from members outside the NSS process. In order to align these priorities, including those made during the past four Summits, the IAEA’s essential role in coordinating global nuclear and radiological efforts should be strengthened, support from Member States for radiological security training, equipment, and continued development of technical guidance should be encouraged, and increased political support and predictable and programmatic funding should be provided to support the IAEA’s core nuclear and radiological functions. Consideration should be given to funding the IAEA’s Division of Nuclear Security through the IAEA’s regular budget, not extra-budgetary contributions. The 2016 International Conference on Nuclear Security should solidify the political message that nuclear and radiological security should be recognized globally as a priority.<sup>5</sup> The results of the conference can serve as important input for work scope and implementation actions in the forthcoming IAEA Nuclear Security Action Plan (2018-2021), as well as funding requirements needed to support expanded efforts.

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<sup>3</sup> Recommendations made at the September 2016 “International Workshop on the Security of Sealed Radioactive Sources – Are the Provisions of the Code of Conduct Effective?” Presentation by Fred Morris (PNNL) and Key Findings of the Working Group on Regulatory Control Concerning the Security of Radioactive Sources. See [www.nss2016-berlin.com](http://www.nss2016-berlin.com) for further information on this event.

<sup>4</sup> The 2016 NSS IAEA Action Plan recommended three key actions: 1) Implement the IAEA’s CoC and continue developing related existing and new guidance in support of the CoC; 2) Advocate for the IAEA to promote and facilitate technical exchanges of experience, knowledge, and good practices on the use and security of high activity radioactive sources and the exploration of alternative technologies; and 3) Advocate for the IAEA to facilitate further cooperation among suppliers and users of radioactive sources on management of radioactive sources no longer in use.

<sup>5</sup> The 2016 International Conference on Nuclear Security will include a high level session on the security of radioactive materials and associated facilities, as well as two technical sessions on the security of radioactive materials.

- **Increase Voluntary Actions and Reporting** – In order to strengthen the current information sharing mechanism within the CoC, Member States should fund the IAEA’s “Formalized Process for Information Sharing” through the IAEA’s regular budget, submit the recommendations and findings of the Report of the Chairman to the IAEA’s policy-making organs for adoption and action, and submit for approval the IAEA’s proposed Guidelines for National Reports. Member States should also make it a priority to attend the IAEA Code Review Meeting every three years and submit a national paper on the status of their progress.
- **Accelerate the Development and Use of Alternative Technologies** – For certain applications, alternative technologies (such as x-rays for the replacement of cesium irradiators and linear accelerators for the replacement of teletherapy devices) represent mature technology for radioactive sources that can also offer better operational, economic, and healthcare benefits. In order to support international engagement on alternative technologies, the IAEA should consider formally adopting alternative technologies as part of its program mandate and play a coordination role in defining standards, guidance and assistance, and support the establishment of a Coordinated Research Project. The IAEA should also develop a program plan on alternative technologies and establish a lead office to coordinate such an effort. In addition, individual hospitals and medical facilities should take the lead in using alternative technologies to replace existing cesium blood and research irradiators.
- **Strengthen the Role of the Private Sector and Key Stakeholders** – The private sector plays an important role in global radiological security efforts by advocating for best practices and ensuring corporate responsibility for radiological security, security culture, training for key personnel, and systems for testing security on a regular basis.<sup>6</sup> These stakeholders should have a forum for input and exchanges, and be encouraged to promote the international exchange of experiences on ways to develop, foster, and maintain a robust national radiological security culture compatible with the state’s radiological security regime. In order to ensure key stakeholder involvement, a dedicated forum should be established through an inaugural annual conference in October 2017 that will bring a diverse community together to share experiences, technology solutions, and support for securing radiological sources during their entire lifecycle. Such a forum will also recognize industry and the non-governmental community as integral supporters and contributors to global radiological security

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<sup>6</sup> During the 2016 Code Review Meeting, it was noted that the interface between safety and security still presents challenges to a fully integrated safety-security culture, threat awareness, and the sustainability of training and knowledge at all levels (national, regulatory, operator, and users/industry), and more qualification and refresher training programs are needed. See <http://www-ns.iaea.org/downloads/rw/code-conduct/info-exchange/charman-report-may2016.pdf>.

efforts.

- **Make and Sustain New Commitments at the 2016 Nuclear Security Summit and Beyond** – The 2016 NSS established a means of sustaining momentum and high-level political attention on nuclear and radiological security, providing a bridge beyond the Summits to track implementation of commitments and continue the work of strengthening the global system through a Nuclear Security Contact Group. Originally signed by 39 participating states and two international organizations, the Contact Group will meet annually and is open to any interested party. More states should join the Contact Group to maintain the network of senior officials and experts that supported the success of the Summits and synchronize national actions and commitments expressed in the NSS communiqués, action plans, and gift baskets. Long-term and sustained high-level attention on radiological security will require a regular structured mechanism within the IAEA or from a core group of states (e.g., Contact Group) that can drive future progress and accountability.

While all the actions mentioned above, if implemented, would contribute to strengthening the global radiological security framework, they fall short in galvanizing the high-level political support needed for timely action. States should explore opportunities to launch a new global initiative to secure the most vulnerable remaining radiological sources around the world within the next 3-4 years. States should also ensure key stakeholder involvement in global radiological security efforts through a dedicated radiological annual conference that will bring a diverse community together. The upcoming 2016 IAEA International Conference on Nuclear Security offers a near-term opportunity to implement numerous options to further discuss and improve global radiological security.