



Sweeping Up Dirty Bombs

A Shift From Normative to Pro-Active Measures

— BY BILL RICHARDSON, CHARLES STREEPER and MARGARITA SEVCIK

This summer the world witnessed acts of terrorism in Norway carried out by a self-proclaimed crusader. The 2011 massacre in Norway, executed in the form of two attacks: one on an Oslo executive government building and another at a summer youth camp on the island of Utøya, resulted in egregious casualties and death in a nation recognized for its neutrality, economic stability, peaceful-

ness, and civility. The perpetrator and meticulous mastermind of these attacks was not a member of a globally networked terrorist organization, but was a stereotypical Norwegian except with right-wing extremist ideologies.

The dramatic effect of these mass murders is heightened when one considers one of the other potential scenarios that

could have occurred based upon the content of a manifesto posted on the internet by the attacker just a few days prior to the tragedy. The manifesto titled *2083-A European Declaration of Independence*, called for “creating, deploying and detonating radiological bombs in Western European capitals.”¹

This attacker demonstrated exacting planning and capability. Had he chosen the alternate route of acquiring radiological material it is not hard to believe he would have been capable of inflicting potentially severe economic and psychological trauma to Western Europe during an already staggering economic crisis.

“Source contamination and over-exposure incidents have occurred in both countries with well and poorly developed national regulatory systems. This is a sign that the problem is endemic to the large amount of sources themselves and requires international not ad-hoc intervention.”

PROBLEM STATEMENT

Disused radioactive material, most active when found concentrated in radiological sealed sources (sources), poses significant threat potential when misused in a radiological dispersal or exposure device (RDD/RED).² In addition to inducing widespread public fear and panic, an RDD could cause severe economic impacts and denial of access to large urban areas (especially if lengthy decontamination is required). Sources are ubiquitous in numerous applications worldwide for which economically viable alternatives do not always exist. The global distribution of sealed sources is impossible to estimate although a couple attempts have assessed as wide a range as 8 million³ to 1 billion.⁴ There are likely more, many of which remain uncontrolled. These two factors, combined with the portability and low cost of most sources, greatly increase the likelihood of terrorist acquisition and misuse of radiological material.

In the last decade of the 20th century, the safety of sources, mostly in the form of radioactive waste, became an international norm strengthened by relevant international instruments and mechanisms (i.e., the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, the Convention on Nuclear Safety, the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter, Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, among others).

The security of sources has been addressed to a lesser extent and only recently. The International Atomic Energy Agency (IAEA) Code of Conduct on the Safety and Security of Sources (Code) suggests many vital measures that would help facilitate the security of sources, but few countries have the resources nor the necessity to implement all of the measures and the Code itself is voluntary. The lack of availability of safe transportation and

disposition of sources at the end of their useful lives is a complicating factor, making it impossible for most countries to provide a safe and secure final pathway to remove disused sources at the most vulnerable endpoint of their lifecycle.

Another concern is a lack of consensus among the expert community on the concept of what defines a radiological weapon or whether such a weapon even poses a threat. While there are several accounts of mal-intent of dispersing radiological materials by means of conventional explosive devices, fortunately, there are very few documented cases of a radiological device being used as a weapon.

There is no global institution or mechanism that supplies a comprehensive legal framework with binding implementation of the necessary measures to secure sources and curtail the possibility of a radiological attack.

Previous efforts at the UN, the IAEA and domestically in states have provided some of the key framework, but it is time for the negotiation of an internationally legally binding treaty or convention implementing essential recommendations of the Code with additional measures to prevent source diversion.

CALL TO ACTION

The threat of the use of sources by non-state actors in the aftermath of 9/11 sparked debates at the Conference on Disarmament (CD), which serves as a multilateral negotiating forum. The CD and its predecessors negotiated such prominent multilateral arms reduction and disarmament treaties such as the Treaty on the Non-Proliferation of Nuclear Weapons, Biological

Weapons Convention, Chemical Weapons Convention, the Comprehensive Test Ban Treaty and others. Given its role in curtailing threats posed by various types of weapons, the CD would be a proper organization to facilitate the creation of a legally binding treaty or convention reinforcing a current ban on radiological weapons and holding states accountable for proper management of their radioactive materials. By focusing at the state-level, the CD will assist efforts already underway at the IAEA in supporting state regulatory authorities with their sources. Preventive action at

the state-level is the only barrier thwarting terrorist acquisition of RDD materials. Russia and Germany have both recently demonstrated leadership in this area; Russia by successfully promoting an international convention⁵ in the United Nations General Assembly (UN-GA)

banning radiological weapons and their use; and Germany by issuing support for revisiting the radiological topic as a non-strategic threat in the CD. A heightened radiological threat environment and only very recent emphasis of international normative approaches to radioactive material management⁶ merit reflection by international bodies on strategies to improve the situation.

Deadlock in the CD on high-profile topics such as a fissile material cut-off treaty (FMCT), nuclear disarmament, prevention of an arms race in outer space, and effective international arrangements towards providing



Non-Nuclear Weapon States with negative security assurances⁷ might be lessened through elevating the topic of the non-strategic radiological threat. Higher prioritization to the already introduced radiological topic in the CD agenda will also provide a double-benefit of addressing an urgent topic relevant to immediate and long-term global security without the added burdens typically associated with discussions on nuclear topics. For example, states wouldn't have as strong an obligation to negotiate strictly from a national security perspective in parallel with each substantive matter. Since nearly all countries have and use sources, the "haves/have-nots" dilemma that has plagued progress in many key sensitive areas of the nuclear nonproliferation regime would be irrelevant in the radiological realm. More importantly, it would provide a foundation and mechanism for ensuring verifiable compliance and implementation of the International Convention for the Suppression of Acts of Nuclear Terrorism. Negotiations and passage of an international convention among CD member-states on a subject with wide-ranging and serious consequences tied to an achievable goal would help build the necessary confidence and trust between states to finally address the more contentious and sensitive nuclear security related issues and would reaffirm the relevance of the CD as a negotiating entity on sensitive matters.

Whether or not one believes radiological weapons are a threat, what cannot be denied is the fact that the nearly unchecked growth in radiological source distribution has provided every state and non-state actor with at least the capability to easily develop a wide range of radiological weapons. That such material is common in beneficial uses can be seen by a cursory review of the IAEA's Directory of Radiotherapy Centers (DIRAC) data, as well as published reports by many national regulators. Arguments over the desirability of such material for deliberate misuse are rendered irrelevant after just one debilitating attack.

In June 2011, Kim Bon-hyun, South Korea's deputy foreign minister for multilateral and global affairs, specifically suggested inclusion of "radioactive

sources" as a topic for the 2012 Nuclear Security Summit in South Korea. Sources were not included at the 2010 summit and thus would be an expansion of the summit's scope. Kim's reasoning for adding sources was the conclusion that an RDD is more likely to be used by a terrorist than a nuclear weapon.⁸

Sources were not included at the 2010 summit and thus are an ex-pansion of the summit's scope. A November 2011 Joint Statement of the Eminent Persons Group of the Seoul Summit makes the following suggestions: (1.) Universal application of the International Convention for the Suppression of Acts of Nuclear Terrorism; (2.) Calls for a world free of radiological terrorism; (3.) National/regional efforts to mitigate radiological accidents; (4.) Educate the public on radioactivity; and (5.) Detailed discussions and cooperative measures to reduce the radiological threat. The nuclear and radiological threats require unique approaches and so these topics should be addressed separately. There are many states participating at the summit and the addition of the radiological topic will ensure inclusiveness and broader participation.

One potent reason for inclusion of the topic of radio-logical material in the summit is that in many countries the diversion of highly enriched uranium or plutonium is of lesser concern or availability than the much more prevalent and unsecured sources.

Some expert observers want to exclude the topic in the CD and in other fora.⁹ Of course, dedicating time and energy in the CD to strategic radiological weapons would be nonsensical. However, terrorist threats have the potential for strategic impact, so

the CD must demonstrate it can adapt to this novel and burgeoning threat environment.

At the state level, attention being given towards radiological security resembles a patchwork of effective efforts (harmonization of legislation/regulation, source removal/secure storage/import/export) along with near negligence (minimal legal/regulatory framework/disused or orphan sources/serious

accidental exposures/impooverished source owners/general lack of accountability).¹⁰ With the adoption by the UN Security Council of Resolution 1540 aimed at curbing the proliferation of weapons of mass destruction, their means of delivery and related materials, many countries are reevaluating illicit trafficking and related regulatory penalties associated with radiological material diversion. However, the international community is precariously reliant upon national authorities prioritizing this on their own,

without verification and at their own pace. Unfortunately, in some cases this results in modification to legislation or other source management methods as post-incident reactions rather than the more effective preventive measures.¹¹ The IAEA has provided many essential tools, methodologies, and assistance in this area, including the Code, but is also limited in resources and has no mandated role to verify adherence to the principles that have been voluntarily agreed to by its member states.

CD's EARLY EFFORTS TO STEM "NEW TYPES OF WEAPONS OF MASS DESTRUCTION"

Early concerns in the CD about radiological weapons precipitated primarily

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from threats posed by strategic delivery vehicles or direct attacks upon nuclear facilities so-called denial of access attacks that would make large areas unsuitable for habitation or commerce. This emphasis on strategic radiological weapons actually stemmed from a supply concern of an increasing amount of radioactive waste spread by reactor proliferation worldwide.¹² It has been decades since this initial concern was raised and radioactive waste and materials continue to accumulate and spread with reactor growth and a burgeoning market for many of the by-products (i.e., radioactive sources).

Ironically, the rapid global growth of radioactive waste production and byproduct material usage along with a manifold increase of concerns about terrorism were followed by diminished attention and practical elimination of the entire topic of radiological weapons in the CD. The perceived decreased threat that nuclear weapons pose at the strategic level has had the opposite effect of equal or greater concerns of a new undeterrable nuclear terrorism. Shouldn't at least a similar emphasis be accorded to the more accessible and easily devised radiological weapon?

Much of the foundation for an international convention has already been accomplished in the CD. Attempts to ban radiological weapons on the strategic level date as far back as 1948, when it was proposed by the UN Commission on Conventional Armaments that "radioactive material weapons" be included in the definition of a weapon of mass destruction (WMD).¹³ Resultant attention to radiological weapons was brought up intermittently in an ad-hoc committee, mostly under the auspices of arms control as "new types of weapons of mass destruction." Of note, draft CD language from the ad-hoc committee included general verification provisions such as the creation of a ten member rotating "Fact-Finding Panel and separate Consultative Committee" to investigate and resolve disputes among members of the convention. These provisions could be refined upon and elaborated in specific detail in a new convention. Regarding the definition of a radiological weapon the ad-hoc committee did not limit itself to dissemination of radiological materials

associated solely with attacks on nuclear reactors or reprocessing facilities, that is, dispersal of highly radioactive fission products resident in irradiated or spent nuclear fuel and focused more on the general radiological effects.

There were several notable efforts by CD members to initiate discussion towards legally binding resolution of the early and current radiological problem. In 1969, Malta successfully helped pass a resolution in the UN General Assembly, which called on the predecessor to the CD, the Conference on the Committee on Disarmament (CCD) to investigate "effective methods of control against the use of radiological methods of warfare."¹⁴ This resolution addressed an issue that continues to make it imperative to re-raise the topic of radiological weapons as a non-strategic issue; *control* (regulatory, customs, detection, storage, disposal, etc.). Subsequent discussions in the CCD resulted in a 1979 joint proposal by the United States and Soviet Union for a Radiological Weapons Treaty.¹⁵ Decades of discussion resulted in a near final draft convention prohibiting radiological weapons.

Of note in 2002, through statements and discussion papers from the CD Secretariat and German delegation/new president (Ambassador Volker Heinsburg) to the CD; suggested the CD re-address the radiological topic. Germany's key reasons for "revisiting article 5 of the agenda (New types of weapons of mass destruction and new systems of such weapons: radiological weapons)" from a non-strategic perspective in the CD were the following:

1. The CD had the background work covered on much of the issue;
2. The post-9/11 threat posed by radiological terrorism had been recognized; and



3. Such a reassessment would demonstrate the ability of the CD to adapt and confront current political challenges and threats.

A suggestion was made by five former CD presidents to assign a special coordinator to this issue to help overcome deadlock in the CD. The informal discussions were broad and very active and according to Ambassador Heinsburg, exemplified the capabilities of a CD focused on "substantive" matters rather than deadlock. However, as was common in the past, the divergent views being expressed resulted in stagnation with some delegations attempting to further delegitimize the concept in general. The above approach by Germany must be commended in its adaptability to modern threats. All that it might have lacked was a slightly different tact focused strictly on implementable state measures towards the prevention of radiological terrorism rather than focusing solely on prohibiting just the weapon itself.

The history of the CD addressing radiological weapons from the strategic perspective demonstrates an early appreciation of the radiological damage that could be inflicted maliciously or accidentally. There is no reason that this same concept that merited discussion for decades at the highest levels of the CD as a strategic concern should not also be considered a topic relevant to the more likely non-strategic use of such a weapon in a globalized 21st century.



RECENT DEVELOPMENTS AT THE UN GA

Starting in 1996, the GA held multiple Ad Hoc Committee meetings, initially meant to suppress terrorist bombings, that later included focus upon the suppression of nuclear terrorism. As it was most relevant to its mandate, the IAEA was encouraged to attend and allowed access to the ad hoc sessions. The IAEA should be directly involved in the creation of a new convention.¹⁶ In 2005, after many years of committee meetings, an amended draft convention, proposed by Russia in 1998, was adopted without a vote as resolution A/RES/59/290; annexed by the International Convention for the Suppression of Acts of Nuclear Terrorism. One aspect of this landmark achievement that has not yet been seized upon by the international community is that this is the first and only legally binding international agreement banning the acquisition and use of a whole category of nuclear energy-related¹⁷ (radiological) weapons.

Through sufficient ratification, this convention entered into force in 2007. As

of this writing, 115 states had signed, 77 of which have ratified and become party. Significant hold-outs of ratification by states that have manufactured sources are the United States, France, Canada, and Argentina. The Obama administration supported the convention in both the Communiqué and Work Plan of the 2010 Washington Nuclear Security Summit, and more recently submitted legislation for its ratification.

The convention is very specific in addressing threats and outlining some preventive, but mostly post-event responsibilities of a state. Among many topics covered, the following are the key areas covered by this convention (many of which address unresolved issues that had been raised in the CD for decades): The convention (1) defines radioactive materials and devices; (2) prohibits a non-state actor, accomplice, or organization from threat, blackmail, possession, or use of radiological material with malicious intent; (3) obligates states to adopt national laws that criminalize and mete sufficiently serious punishment; (4) encourages cooperation by states to “detect, prevent, suppress, and investigate”

the above offenses within or outside of their territories; (5) through establishing accessible liaison points/competent authorities, encourages confidential and accurate information sharing among state parties and international organizations; (6) suggests the application of measures relevant to IAEA recommendations and standards of physical protection; (7) generally defines post-attack jurisdiction, detention, investigation, extradition, human rights, sovereignty and basic dispute concerns; (8) further obligates States must properly assess, handle, transport, store, radioactive materials; and (9) if assistance is requested, inform the IAEA of proposed method of disposition and storage.

Of particular importance are numbers 8 and 9. These are the areas that need to be focused upon and enforced more specifically and in detail in a new treaty/convention. Some states that have signed on to the UN-GA convention are already making significant legally binding commitments to these two key areas, but without a verification mechanism nor clearly outlined institutionalized requirements for implementation, it will be difficult if not impossible to demonstrate compliance with even the basic tenants of this convention. A new treaty/convention must fulfill both the purpose of providing the UN-GA convention a verification mechanism and establishing international norms for proper source management.

A SUGGESTED PATH

The CD inadvertently already provided much of the preliminary language, definitions, and associated work necessary to create a new convention. This near final draft convention language along with the Code and numerous other guidance, safety and technical documents relative to radioactive materials all create the necessary framework as a reference, but are not adequate in and of themselves without implementing or verification mechanisms. The international community need only take the extra step of heightened emphasis on and reformulation

of the topic with a non-strategic focus.

Should the CD be seen as an inappropriate venue for a convention there is another option with potential. Source regulators, manufacturers, and users, in addition to other government and non-governmental entities, now have a couple of decades of experience holding multiple international conferences on source management.¹⁸ These conferences and meetings of source suppliers/regulators can bring in most of the stakeholders in source usage and regulation and typically result in final documents that help inform the IAEA's suggested guidance and subsequently each state's source management methodologies. If higher-level state representatives were to participate in such international fora, they could negotiate and draft an international accord with the same legal weight as a treaty/convention. This would be desirable in that it likely wouldn't require such contentious negotiations as might be necessary in the 65 member-state CD and

would provide active contribution and buy-in to the text by those directly involved with sources. The Helsinki Accords are an example and provide precedent for achieving such an endeavor.

States must take a number of actions on their own. First, national regulators need to protect such material when it is in use, as recommended by the IAEA in the Code and other documents. Second and more problematic, an end-of-life disposition path must be created for disused or abandoned sources; whether it be recycling or permanent disposal. To create such a path, repatriation of these sources by manufacturing countries such as Russia, Canada, and the United States should be pursued and made legally-binding. One major barrier to this may be cost; due to the expense and difficulty of certifying a Type B container, international transport of a single high-activity source-containing device can cost upwards of US\$100,000; far beyond the financial ability of most source

owners or even some regulators. Additionally, some states would have to re-draft their regulatory language to enable the acceptance of imported radioactive waste in order to be able to accept some sources, transuranics or sources with long half-lives are the typical concern. One recent positive development was Russia enacting legislation (Federal Law 190F-3) that at least permits the import and recycle or disposal of spent sources; albeit selectively decided case by case by the government. Various entities within the United States and Canada have also taken some steps towards accepting disused sources that are either deemed still useful or a potential threat. Therefore, it should be incumbent upon manufacturing states that derive economic benefit from the export of such devices to agree to resolve pressing transportation issues and repatriate sources in such a way that will not negatively impact their beneficial use in applications such as cancer treatment, blood irradiation, and radiography.

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Source owners and importing states should also bear some of the burden of repatriation; in fact, some already pay up-front disposition/repatriation costs when purchasing sources. The re-export or transshipment of sources from the end-user also poses problems because ownership can change without the knowledge of the local regulatory authority or original distributor of the source.

At no other time in history has it been more apparent that states must take on the responsibility for protecting and preventing the diversion of their sources. As evidenced by the events in Fukushima, the public is acutely aware and sensitive to the radiological threat. Now is a vital moment in which responsible decisions, communication, and education must be established with the public. Through historic meetings of the CD and the

recent convention in the GA, the international community has unanimously voiced this concern and provided an outline for mitigation of a radiological contamination event. The urgency must not be lost from these efforts based on a lack of an attack and strained government resources. An international convention/treaty or accord must be negotiated and established as a foundation for responsible management of sources throughout their entire lifecycles. The threat is too accessible and consequences too high to continue to rely upon the status quo of applying mostly normative security to sources. ■

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¹ Berwick, Andrew, "A European Declaration of Independence," London, 2011. Accessed on September 23, 2011: <http://truthfrequencynews.com/?p=6944>

² An RDD is a device or mechanism that is intended to spread radioactive material from the detonation of conventional explosives or other means. RDDs are considered weapons of mass disruption; few deaths would occur nor would they be necessary because of the radioactive nature of the event. Significant negative social and economic impacts would result from public panic, decontamination costs, and denial of access to infrastructure and property for extended periods of time. A radiological exposure device (RED) is a device having the purpose of exposing people to radiation, rather than dispersing radioactive material into the air.

³ Lee Leonard et al., "Plutonium-239/Beryllium Neutron Sealed Sources: Origins, Inventory, and Suitability for Disposal at the Waste Isolation Pilot Plant," LA-UR-04-4289, Los Alamos National Laboratory, June 1, 2004.

⁴ Strub, Tiffany and Gregory J. Van Tuyle, "Large Radiological Source Production and Utilization and Implications Regarding RDDs," LA-UR-03-5432, Los Alamos National Laboratory, July 28, 2003.

⁵ International Convention for the Suppression of Acts of Nuclear Terrorism

⁶ Streeper, Charles (2010) "Preventing Dirty Bombs," *The Nonproliferation Review*, 17: 3, 531-550, James Martin Center for Nonproliferation Studies, 2010.

⁷ Negative security assurances are declarations that a country with nuclear weapons will not use them against a state without nuclear weapons. These are typically associated with being agreements between the official Nuclear Weapon States and Non-Nuclear Weapon States.

⁸ Golan-Vilella, "Nuclear Security Summit's Scope May Grow," *Arms Control Today*, June, 2007. Accessed on July 23, 2011: http://www.armscontrol.org/act/2011_06/NuclearSummit

⁹ New Types and Systems of WMD: Consideration by the CD," UNDIR Resources, United Nations Institute For Disarmament Research, May 2011. Accessed on August 31, 2011: <http://www.unidir.org/pdf/activities/pdf4-act611.pdf>



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¹⁰ A poignant example of such negligence is the fact that in some states a criminal caught trafficking radiological materials has a much less severe punishment than that meted for drug smuggling. One criminal smuggling highly enriched uranium in the Republic of Georgia actually accused the arresting officers of planting drugs on him and that his only intention was to traffic radiological materials, thus intentionally attempting to avoid the stiffer sentence for drug trafficking.

¹¹ Kukhianidze, Alexandre, "Smuggling in Nuclear and Radiological Materials," Video Presentation, James Martin Center for Nonproliferation Studies, 2010 accessed on July 23, 2011: <http://www.youtube.com/watch?v=xtT9t9SIlnM>

¹² Charles D. Ferguson, Tahseen Kazi, and Judith Perera, "Commercial Radioactive Sources: Surveying the Security Risks," Occasional Paper No. 11, Center for Nonproliferation Studies, 2003.

¹³ Issraelyan, Victor and Charles Flowerree, "Radiological Weapons Control: A Soviet and U.S. Perspective," Occasional Paper 29, Stanley Foundation, 1982.

¹³ With potential economic losses in the tens of billions of dollars or more, dependent upon contamination level and clean-up standards, a dirty bomb arguably has the potential to deny access to large urban areas, resulting in significant economic damage. The early consideration of radiological weapons as weapons of mass destruction and not just disruption arguably was a more accurate definition. Contamination of numerous city blocks could force the demolition of wide swaths of property.

¹⁴ General Assembly, Question of General and Complete Disarmament. UN document A/RES/2602(XXIV)C. 12/16/1969.

¹⁵ In 1980, a Convention on the Physical Protection of Nuclear Material (CPPNM) was signed and later ratified. However, it only addressed nuclear materials directly and mentioned radiological only in a side-bar "Developments" section.

¹⁶ The IAEA, through its Nuclear Waste section, multiple guides and technical documents, and as the only international organization addressing the source threat has the necessary experience and trust with its member states to provide suggestions on exactly what would be best to include or exclude in a convention.

¹⁷ Nuclear related because of the fact that most of the long-lived isotopes (i.e. ²³⁹Pu, ²⁴¹Am etc.) used for sources were and continue to be produced as by-products in the same defense reactors used to produce weapons grade fissile materials for nuclear weapons.

¹⁸ Some examples of these international conferences and source manufacturer meetings along with background can be found in the following publication starting on page 12: Streeper, Charles (2010) "Preventing Dirty Bombs," *The Nonproliferation Review*, 17: 3, 531-550, James Martin Center for Nonproliferation Studies, 2010.