Preventing a Dirty Bomb: Why Radiological Security Matters

Numerous world leaders and military experts recently signed a letter citing that nuclear terrorism poses a grave threat to human life. Though less devastating than a nuclear weapon, a terrorist incident featuring radiological material is far more likely due to the abundance of these materials and a widespread lack of adequate security. Consequently, physically protecting isotopes that could be used for a nuclear weapon or a Radiological Dispersion Device (RDD), most notably a dirty bomb – a conventional explosive with added radiological material – has become a key national security priority.

What Is A Dirty Bomb? A dirty bomb is a conventional weapon that has been augmented with a radiological substance. The method of delivery could be a missile, an airplane stocked with radioactive materials, or a strategically planted improvised explosive device.

A small-scale conventional explosive, such as backpack bomb, would not inflict widespread destruction. Much of the radioactive material will burn upon ignition, meaning that health effects may also be marginal. However, the psychological effects could be monumental if a dirty bomb were to go off in a heavily populated area, creating unsubstantiated mass panic about radioactive fallout. This would overwhelm hospitals and other public services, and it is likely the consequences would be felt for years. As a result, dirty bombs are often referred to as "weapons of mass *disruption*" (emphasis added).

What Are Radiological Materials? Radiological materials go through a process of radioactive decay, which makes exposure potentially harmful. Fissile – or nuclear – materials present the largest threat. These materials include Plutonium-239 (PU-239), Uranium-235 (U-235), and Uranium-233 (U-233) – all of which are sourced for fission and fusion nuclear weapons.

Some radiological materials are not suitable for use in nuclear weapons, but have an amplified risk because of their legitimate commercial uses. For instance, Americium-241, Cesium-137, and Cobalt-60 are all used in gauges for the gas and oil industries. Strontium-90 has medical applications in radiotherapy. Iridium-192, recently a source of concern in Mexico and Iraq following thefts and misplacements, is used in gauges for welding and in certain cancer treatments. Any of these isotopes could be a component in a dirty bomb.

What Is Being Done? Theft and loss of radiological material present substantial threats that are augmented by human negligence and poor physical security regimes. To overcome these challenges, the international community has prioritized tracking incidents of theft, establishing best practices for protecting the materials, and securing or removing materials from vulnerable locations.

Tracking/Reporting: The International Atomic Energy Agency's (IAEA) Incident and Trafficking Database was developed to keep track of any and all international cases of theft or loss of material around the word, of which there were over 160 cases between 2010-2014. The US Nuclear Regulatory Commission (NRC) also creates public incident reports on radiological mishaps.

Building Consensus: Four Nuclear Security Summits were held from 2010-2016 and have produced greater coordination and emphasis on the importance of securing nuclear and radiological material. The final summit in 2016 concluded with the announcement that an amendment to the decades-old Convention on the Physical Protection of Nuclear Material (CPPNM) will enter into force, setting standards for adequate fissile materials security and holding countries accountable for failing to meet those standards.

Securing and Removing Materials: As part of their commitments under the summits, countries pledged to secure their most dangerous radioactive sources. The United States is also partnering with businesses, hospitals, and government organizations in more than 85 countries to assist in securing these dangerous materials. However, in FY17, the National Nuclear Security Administration's Defense Nuclear Nonproliferation budget experienced a significant cut, including in programs tasked with securing radiological material both at home and abroad.

*__Sources__: IAEA, Nuclear Regulatory Commission, Nuclear Threat Initiative, White House