Bulletin of the Atomic Scientists

How do you solve a problem like plutonium?

By Fissile Materials Working Group | 6 May 2013

Four years ago in Prague, President Barack Obama focused the world's attention on a "strange turn of history:" Even as the danger of global nuclear war has lessened, the threat we face from nuclear materials is greater than ever, because of international terrorist networks, a global black market trade, and the spread of technology that could help build a bomb.

Through the Nuclear Security Summit process initiated in 2010, countries have started securing some of the most vulnerable materials. But they have largely left plutonium untouched. As Obama warned in a later speech, this time on the margins of the 2012 Seoul Nuclear Security Summit, "We know that just the smallest amount of plutonium -- about the size of an apple -- could kill hundreds of thousands and spark a global crisis."

Of the two materials that can be used to construct nuclear weapons, it's easy to see why so much effort has been focused on highly enriched uranium (HEU), widely considered to pose the most urgent threat from terrorist use. There are about 1,440 tons of HEU in more than 32 countries, spread across a difficult-to-determine number of military sites and more than 100 research reactors and other civilian facilities. Unlike plutonium, HEU can be used to make the simplest kind of nuclear weapon -- a device that shoots one piece of HEU into another, causing a nuclear explosion.

Policymakers shouldn't assume, though, that the approximately 490 tons of separated plutonium in the world don't also pose a significant threat. That amount is enough to make 100,000 nuclear warheads. Plutonium could also be used to make radiological dispersal devices, which do not involve nuclear fission, but spread radioactive material to increase the terror factor of regular explosives. Plutonium, in the hands of terrorists, would be extremely dangerous.

Plutonium is produced in nuclear power and research reactors every day, but unless it is chemically separated from other highly radioactive materials to create additional fuel for reactors -- which is called reprocessing -- it doesn't pose a significant security or proliferation risk. The difficulty of handling highly radioactive spent nuclear fuel that has not been reprocessed creates a formidable, long-lasting barrier to theft. When separated out, however, small amounts of plutonium can create enormous risks. As Obama cautioned last year in Seoul, "We simply can't go on accumulating huge amounts of the very material, like separated plutonium, that we're trying to keep away from terrorists."

Where is the plan to reduce the plutonium risk? Negotiations on an international treaty to ban plutonium (and HEU) production for weapons have been in a stalemate for more than two decades, while states outside the Nuclear Non-Proliferation Treaty -- India, Pakistan, and North Korea -- are increasing their capacity to separate plutonium for weapons. Although the United States and Russia agreed in 2000 to dispose of 34 tons of excess military stocks under the Plutonium Management and Disposition Agreement, this only constitutes about 15 percent of global military-owned separated plutonium. In the civilian sector, another 260 tons of plutonium has been separated to use as fuel in nuclear reactors.

Additional efforts are underway to control the spread of plutonium, including attempts to establish management guidelines; to build fuel banks that give states access to fuel without having their own reprocessing facilities; and to create frameworks for civil nuclear cooperation. Scientists are also developing technology that may help reduce proliferation risks. Still, these efforts aren't sufficient to reduce the risks posed by stockpiles.

Recognizing these challenges, the Fissile Materials Working Group, an international coalition of organizations that craft policy recommendations to keep the world safe from nuclear terrorism, recommends five steps that national governments, the nuclear industry, and the international community should take. The following is a brief overview of these critical reforms; more details are available here.

1. Limit the current scale of reprocessing operations and work to decrease it over time.

2. Stop the expansion of current stockpiles and work to reduce them over time.

3. Apply the most stringent standards of safety, security, accounting, and protection of public health to all processes that result in or use separated plutonium, including fuel fabrication.

4. Minimize the number of sites where separated plutonium is used and handled, and the number and length of transports of such material.

5. Pursue options for dry storage of spent fuel, particularly in multilateral cooperative repositories.

To truly reduce the danger, plutonium stocks should be disposed of and all facilities that can separate plutonium should be eliminated. Preventing expansion is the bare minimum of what responsible policymakers can do to protect global security.

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