

Backgrounder on Plutonium for Break-out Session
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The conundrum concerning plutonium is this: it can be used in nuclear weapons, improvised nuclear explosive devices or radiological dispersal devices; at the same time, it can be used as fuel for civilian nuclear power reactors. To use plutonium in fuel it must first be separated from spent nuclear fuel. And in its separated form (about 515 tons in both military and civilian sectors), this material constitutes a significant risk to global security and needs to be subject to the most stringent safety, security and accounting measures.

Since their inception in 2010, the Nuclear Security Summits have not excluded separated plutonium as a material of concern, but have focused instead on highly enriched uranium because quantities in the civil sector were more widespread and posed a lower technical barrier to terrorists interested in obtaining material for a nuclear weapon. Nonetheless, several states have committed to securing and sending separated plutonium overseas for storage, including Belgium, Italy, Switzerland and Japan.

There seems to be less political appetite to deal with separated plutonium stocks because unlike HEU, which is primarily used in research reactors, decisions about separated civilian plutonium may have a bigger impact on commercial nuclear power programs. A few countries still have civilian spent fuel reprocessing programs and actively use or intend to use Pu-based fuel in their reactors, including France, Japan, the UK, Russia, India, and China. Even some emerging nuclear energy countries have made statements to the effect that reprocessing and use of Pu-fuels is desirable. More countries have stocks of separated plutonium with no realistic plans to use this material in a timely fashion over the next few decades. Since 1998, nine countries have participated in the IAEA's International Plutonium Management Guidelines (INFCIRC/549) – the five nuclear weapon states, and Belgium, Germany, Japan and Switzerland. The guidelines are voluntary and designed primarily to provide transparency on states' separated plutonium holdings, although not necessarily material that has been declared excess to defense needs.

A more comprehensive program to reduce the security risks from separated plutonium should include steps that address existing stocks of material, capabilities to produce such material, and any future growth. For military stockpiles, the FMWG supports a moratorium on production leading to a fissile material cutoff treaty; in that context, all facilities that can separate plutonium for weapons should be shuttered. Five important steps that can be taken to address the remaining elements of this challenge are:

i. Limit the current scale of reprocessing operations globally and work to decrease that scale over time: The global scale of reprocessing of spent

nuclear fuel should be encouraged to decline, rather than grow. This should be achieved through a variety of mechanisms, including: reducing or eliminating current reprocessing capability; refraining from new reprocessing facility construction and transfers of sensitive reprocessing equipment and technologies; and using or disposing of current excess stockpiles before additional spent fuel is reprocessed. At a minimum, the global plutonium separation capacity should not increase, no matter where those operations are occurring.

ii. Stop expansion of current plutonium stockpiles globally and work to reduce over time: The existing stockpiles of separated plutonium in both civilian and military sectors need to shrink, not expand. Efforts already underway should be expanded. For example, all countries with commercial reprocessing should adopt policies that limit the growth of separated plutonium stockpiles by using or disposing of plutonium as rapidly as practicable after it has been separated. In the military sector, more fissile material needs to be declared as excess to weapons and defense needs, and China, Pakistan, India and North Korea should officially declare moratoria on fissile material production for weapons. These two steps are critical to make progress toward a world that reduces the role of nuclear weapons and eventually eliminates them.

iii. Apply the most stringent standards of safety, security, accounting, and protection of public health to all processes that result in or utilize separated plutonium (including mixed-oxide (MOX) fuel fabrication). This would include international safeguards on all operating civil reprocessing plants. These measures are essential to prevent potential catastrophes, whether caused by terrorism or accidents.

iv. Minimize the number of sites where such material is used and handled, and the number and length of transports of these materials. Every site and every transport handling separated plutonium represents another chance for a security weakness to arise that might be exploited by terrorists. Of course, some transportation will be required to remove material from sites where it is no longer needed.

v. Pursue alternatives to spent fuel reprocessing resulting in plutonium separation in the civilian sector, including safe and secure dry cask storage of spent fuel, and multilateral cooperative storage and repositories.