

FMWG

fissile materials
working group

Plutonium Policy **Updated March 2020**

Two years ago, the FMWG formed a subgroup to address the challenge of managing and minimizing and ultimately eliminating stockpiles of civil separated plutonium. The following draft guidelines are the result of that effort and are intended to spur public discussion on this important issue.

Plutonium can be used as a reactor fuel or for a nuclear weapon, improvised nuclear explosive or radiological dispersal device. A small amount, 6 kilograms, enough to fill a soda can, powered the Nagasaki bomb, which had a yield equivalent to 20 kilotons or 20 million kilograms of chemical explosive. Global stocks of separated plutonium (more than 500,000 kilograms in both military and civilian sectors) are potentially vulnerable to diversion or theft and therefore pose a significant risk to global security. This material needs to be subject to the most stringent safety, security and accounting measures.

A program to reduce these security risks should include steps that address both existing stocks of plutonium and capabilities to separate more. 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. For civilian uses, decades of experience show that there are no compelling arguments to engage in reprocessing for economic or waste-management reasons.

Five important steps can be taken to address the remaining elements of this challenge:

- 1. End reprocessing globally:** Given the security threat represented by separated plutonium and the lack of any economic or environmental benefit from separating more, reprocessing of irradiated nuclear fuel in all its forms (including pyroprocessing) should be phased out as quickly as possible. This can be achieved by shutting down current reprocessing plants; refraining from new reprocessing facility construction and transfers of sensitive reprocessing equipment and technologies; and using or disposing of current stocks of civilian and excess weapons plutonium.
- 2. Work to reduce existing stockpiles over time:** The existing stockpiles of separated plutonium in both civilian and military sectors need to shrink by using in fuel or disposing of plutonium as rapidly as practicable. In the military sector, more material needs to be declared excess to defense needs and China, Pakistan, India and North Korea should officially join the moratorium on fissile material production for weapons. In all such cases, reducing stockpiles of

plutonium through peaceful use in fuel or disposition should take place under international monitoring, such as the U.S. pledge to carry out its disposition of excess weapons plutonium via the dilution and permanent geologic disposal under IAEA verification. These steps are critical to making progress toward a world that reduces the role of nuclear weapons and eventually may eliminate them.

- 3. Apply the most stringent standards of safety, security, accounting, and protection of public health** to all processes that utilize or dispose of separated plutonium. This would include international safeguards on all operating reprocessing and plutonium fuel fabrication and disposal plants. These measures are essential to international transparency and security of plutonium management. Countries should revisit the international guidelines on the management of plutonium (known as INFCIRC/549) with an eye to updating the guidelines, increasing the number of adherents, and improving the international accountability of plutonium in all countries that possess separated plutonium.
- 4. Reduce the number of sites where plutonium is used and handled, and the number and distance of its transport.** Every site handling and every transport of separated plutonium creates vulnerabilities to theft that could be exploited by terrorists. Of course, some transportation will be required to remove plutonium from sites during the processes of consolidation of storage and disposal.
- 5. Pursue safer and more economical alternatives to spent fuel reprocessing in the civilian sector,** including safe, secure and low-cost dry cask storage of spent fuel and multilateral cooperative storage and repositories. Plutonium in spent fuel is diluted by one hundred times the mass of uranium and radioactive fission products. As the radioactivity of the fission products dies away over a period of a century or so, deep, monitored disposal would provide an additional barrier to access.