

14. Ending Production

A first step in limiting the size of these stockpiles follows “the law of holes”: when you are in one, stop digging. If the United States and Russia already have far larger stockpiles of nuclear warheads, plutonium, and highly enriched uranium (HEU) than they could possibly need, they should stop making more.

In the case of nuclear warheads, both the United States and Russia have been dismantling far more warheads than they have been assembling since the end of the Cold War. But neither can stop assembling warheads entirely, because when components wear out, warheads have to be disassembled, the faulty parts replaced, and the warheads reassembled again. The most that could be hoped for at present would be a political commitment that each year the number dismantled would be larger than the number assembled, so that the trend was always down.

In the case of HEU, both the United States and Russia have formally pledged never again to produce HEU for nuclear weapons, as have Britain and France. China has indicated that it is not currently producing HEU – though this policy may change if China decides on a substantial nuclear buildup in response to U.S. missile defenses.¹ Currently, however, no verification of these commitments is in place. The United States should work with Russia to develop and implement reciprocal transparency measures at U.S. and Russian enrichment facilities to confirm that neither country is producing HEU.² These measures could provide a test-bed for approaches to verifying a future treaty cutting off production of fissile materials for nuclear weapons, at a cost likely to be in the range of \$10 million or less per year. To give Russia an incentive to agree to such measures, this could be presented as part of a larger deal

that included, for example, a U.S. or international purchase of additional HEU.

While the United States has stopped production of plutonium for weapons and does not separate plutonium for civilian fuel, Russia is still doing both. Three military plutonium production reactors are still operating (two at Seversk and one at Zheleznogorsk), not because there is any need for the plutonium they produce, but because they provide essential heat, and some power, for tens of thousands of people who live in Siberia.³ These produce something in the range of a ton of additional weapon-grade plutonium every year, adding to a Russian stockpile of weapon-grade plutonium that is likely in the range of 130–140 tons. Russia’s Mayak reprocessing complex also continues to separate civilian plutonium from spent fuel, adding something like a ton of reactor-grade plutonium a year to Russia’s 35-ton stockpile.

To stop digging this hole, the United States should:

- Provide the resources required (in both funds and high-level attention needed to overcome problems) to accelerate the program to provide alternative power sources, and shut these reactors in 2006–2007 (rather than the currently scheduled 2008–2011);
- Pursue, at the same time, extensive energy efficiency upgrades in both Seversk and Zheleznogorsk, which could cost-effectively reduce the fossil energy requirements and the cost of providing them;
- Reach agreement with Russia on how Russia will finance operation of the fossil replacement plants once they have been built;

¹ See discussion in Hui Zhang, “A Chinese View on a Fissile Material Cut-off Treaty,” *Journal of Nuclear Materials Management* 30, no. 4 (2002).

² For a useful recent discussion, see Oleg Bukharin, “U.S.-Russian Bilateral Transparency Regime to Verify Nonproduction of HEU,” *Science & Global Security* 10, no. 3 (2002).

- Work with Russia to focus an intensive job creation effort (from programs funded by Russia's Ministry of Atomic Energy (MINATOM) and U.S.-funded programs) on providing jobs for the more than 10,000 personnel who will no longer be needed once the plutonium production reactors and their associated reprocessing plants shut down;
- Renew the negotiations, which were very near agreement at the end of the Clinton administration, aimed at reaching agreement on a 20-year U.S.-Russian moratorium on separation of plutonium from civilian spent fuel, in return for assistance in providing dry storage for the fuel that would not be reprocessed, and joint research and development focused on future nuclear energy concepts posing lower proliferation risks. If employment for the reprocessing plant workers should become a key issue in sealing such a deal, the United States and other partners in the G-8 Global Partnership could offer a program to finance jobs on cleanup and other projects for these workers, as part of a broader program to close unnecessary facilities in Russia's nuclear complex and reemploy their personnel.

Finally, there is the issue of a verifiable international treaty to ban production of plutonium and HEU for weapons – known as the fissile material cutoff treaty (FMCT). Talks on this matter have been languishing with no progress for many years.⁴ While it is unlikely that the political issues

blocking progress will be resolved soon, as an initial step the United States and Russia should work together to carry out cooperative experiments to demonstrate approaches to verification that could be used at older plutonium reprocessing plants never designed for safeguards.

Recommendation: Complete the program to provide alternative heat and power and shut down Russia's plutonium production reactors as quickly as possible.

Recommendation: Complete negotiations of a long-term U.S.-Russian moratorium on separation of plutonium from civilian spent fuel.

Recommendation: Put in place agreed monitoring measures to confirm U.S. and Russian statements that they are no longer producing HEU.

Recommendation: Carry out joint U.S.-Russian demonstrations of approaches to verifying that older reprocessing plants are not separating plutonium for weapons – a key element of a proposed international fissile cutoff treaty.

Recommendation: Continue seeking to put in place an international moratorium on production of plutonium or HEU for weapons, and continue negotiations toward a verifiable international treaty banning further production of nuclear materials for weapons.

³ For a description of these reactors and efforts to shut them down, see Frank von Hippel and Matthew Bunn, "Saga of the Siberian Plutonium Production Reactors," *FAS Public Interest Report* 53, no. 6 (November/December 2000; available at <http://www.fas.org/faspir/v53n6.htm> as of January 14, 2003); for an update, see Matthew Bunn, "Plutonium Production Reactor Shutdown," *Controlling Nuclear Warheads and Materials* (available at http://www.nti.org/e_research/cnwm/ending/plutonium.asp as of March 12, 2003).

⁴ For a brief discussion with links to other sources, see Matthew Bunn, "Fissile Material Cutoff Treaty," *Controlling Nuclear Warheads and Materials* (available at http://www.nti.org/e_research/cnwm/ending/fmct.asp as of March 12, 2003).