Military Fissile Material Stockpile (Metric Tons)

Updated September 2013

Country	Plutonium	HEU
Belarus[1]	0	0.1
China[2]	1.8 ± 0.5*	16 ± 4*
France[3]	6* ± 1	30.6 ± 6*
India[4]	0.54 ± 0.18	2.4 ± 0.9
Israel[5]	0.82 ± 0.15*	0.3*
Kazakhstan[6]	0	0
North Korea[7]	0.024 ± 0.048*	?
Pakistan[8]	0.15 ± 0.05	3.0 ± 1.2
Russia[9] [10]	128 ± 8*	695 ± 120
South Africa[11]	0	0
Ukraine[12]	0	0
UK[13]	3.2 available for weapons 4.4 declared excess	21.2
USA[14]	94.8 total: 80.7 weapons grade, 49.3 surplus to defense needs	260

Sources:

[1] As a non-nuclear weapon state, Belarus does not produce either HEU or plutonium for military purposes. The nuclear weapons stationed on its territory during the Soviet period have all been transferred to the Russian Federation. Belarus agreed to return all of its stock of HEU, around 170 kg, to Russia before the 2012 Nuclear Security Summit. However, Belarus suspended its participation with the U.S. for HEU removal in 2011. 100kg of HEU remain while negotiations continue. "Belarus Nuclear Overview," Nuclear Threat Initiative, www.nti.org; William Potter, "Belarus Agrees to Remove all HEU," CNS Feature Story, 1 December 2010, http://cns.miis.edu; Fissile Materials Working Group, "NuclearSecurity's Top Priority," Bulletin of the Atomic Scientists (web edition), 12 June 2012, www.thebulletin.org.

[2] Definitive information about China's stockpile of fissile material does not exist in the open-source literature. China is believed to have discontinued production of fissile material for military purposes. International Panel on Fissile Materials, "Increasing Transparency of Nuclear-warhead and Fissile-material Stocks as a Step toward Disarmament," April 2013, www.fissilematerial.org. International Panel on Fissile Materials, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org.

[3] France announced in 1996 that it would stop production of fissile materials for weapons purposes. However, France has been reluctant to provide any definitive information on its existing stocks of plutonium and HEU. In contrast to the United States, the Russian Federation and the United Kingdom, France has not declared any

of its fissile material to be excess to military use. Estimates of the French stockpile come from an evaluation of the production capacities of known historical facilities. International Panel on Fissile Materials, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org. International Panel on Fissile Materials, "Increasing Transparency of Nuclear-warhead and Fissile-material Stocks as a Step toward Disarmament," April 2013, www.fissilematerial.org

[4] India produces both HEU and weapons-grade plutonium. Open-source quantitative assessments of India's stockpile of fissile material have to be understood as highly speculative. India's stockpile of HEU is only enriched between 30% and 45% U-235 and therefore not weapons-useable. The HEU is believed to be used for nuclear submarine propulsion. International Panel on Fissile Materials, Global Fissile Material Report 2012, January 2012, www.fissilematerials.org.

M.V Ramana, "India," in the publication Assuring Destruction Forever by Reaching Critical Will, March 2012, www.reachingcriticalwill.org; International Panel on Fissile Materials, Global Fissile Material Report 2013, February 2013, www.fissilematerials.org.

[5] Israel's policy of nuclear opacity prevents the release of any definitive information about its presumed nuclear weapons program. Therefore, estimates of its fissile material stocks have a high degree of uncertainty. The most detailed account of Israel's nuclear weapons program to date was provided by former Dimona technician Mordechai Vanunu. His testimony and books by Avner Cohen and Pierre Péan guide much of the open source analysis on Israel's probable plutonium production to date. Less can be surmised about Israel's stock of HEU. Vanunu stated that uranium enrichment via gas centrifuges at the Dimona nuclear facility took place during his tenure. Publications by Israeli scientists on centrifuge theory, and their participation in related conferences provide supporting evidence to his testimony. In addition to alleged indigenous production, there is speculation of a secret transfer of HEU from a U.S. nuclear fuel facility to Israel during the 1960s. International Panel on Fissile Materials, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org; Victor Gilinsky and Roger J. Mattson, "Revisiting the NUMEC Affair," Bulletin of the Atomic Scientists, Vol. 66(2), March 2010, pp.61-75, www.thebulletin.org. International Panel on Fissile Materials, Global Fissile Material Report 2013, February 2013, www.fissilematerials.org

[6] Kazakhstan inherited a large stockpile of HEU (~10,750 kg) and plutonium (3,000 kg) from the Soviet Union's BN-350 breeder reactor. Kazakhstan also operates two research reactors powered by HEU. However, Kazakhstan is a party to the NPT, the CTBT and has an IAEA Additional Protocol in force. Additionally, Kazakhstan is an active member of the Global Initiative to Combat Nuclear Terrorism. "Kazakhstan Nuclear Overview," Nuclear Threat Initiative, www.nti.org; International Panel on Fissile Materials, "The Non-Weapon States," in Global Fissile Material Report 2010, Balancing the Books: Production and Stocks (2010), www.fissilematerials.org, pp. 134-143.

[7] Estimates of North Korea's plutonium stockpile are based on its claim to have completed reprocessing of 8,000 spent fuel rods from its 5 MW(e) reactor at Yongbyon. The DPRK unveiled a uranium enrichment plant in 2010 that it claims will be used for LEU production, but it could produce up to 40kg HEU per year if the DPRK chose to do so. It remains uncertain if the DPRK has produced any highly enriched uranium. Shannon N. Kile, Vitaly Fedechenko, Bharath Gopalaswamy, and Hans M. Kristensen, "Chapter 7: World Nuclear Forces" in SIPRI

Yearbook 2011, SIPRI, n.d., pp. 351- 352; Seigfried S. Hecker and Robert Carlin, "North Korea in 2011: Countdown to Kim il-Sung's Centenary," Bulletin of the Atomic Scientists, Vol. 68 (1), January/February 2012, pp. 50-60, www.thebulletin.org.

[8] Pakistan has not published any information on its production of fissile materials. However, it is generally understood that Pakistan has been producing HEU for weapons since the 1980s. Moreover, Pakistan operates two plutonium production reactors, with two more plutonium production reactors and one new reprocessing facility under construction. Pakistan's efforts to expand its fissile material production capacity seem limited only by its supply of uranium. International Panel on Fissile Material, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org; Hans M. Kristensen and Robert S. Norris, "Pakistan's Nuclear Forces, 2011," Bulletin of the Atomic Scientists, Vol. 67(4), pp. 91-99, July/August 2011, www.thebulletin.org; "Countries: Pakistan," International Panel on Fissile Materials, 3 February 2013, http://fissilematerials.org.

[9] Russia has not published any account of its plutonium production for military purposes. Estimates therefore rely on "assumptions about the power history of the production reactors." These assessments have improved over time with the release of historical documents and memoirs into the public domain. The IPFM estimates Russia's total stock of plutonium at 128 ± 8 metric tons. International Panel on Fissile Material, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org.

[10] Calculating Russia's stockpile of HEU with a high degree of certainty is not possible. Best guess estimates of Russia's total SWU production, based on the history of the Soviet enrichment program, have a degree of uncertainty of ± 5%. The IPFM estimates that Russia currently holds approximately 737 ± 120 metric tons of HEU, which includes material in weapons and available for weapons, as well as material for naval and research reactor fuel. International Panel on Fissile Materials, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org. "Increasing Transparency of Nuclear-warhead and Fissile-material Stocks as a Step toward Disarmament," International Panel on Fissile Materials, 24 April 2013, www.fissilematerials.org

[11] South Africa dismantled its nuclear weapons program in the early 1990s and halted the production of weapons grade HEU. Remaining HEU was subsequently converted to civilian use. South Africa has approximately 400 to 450 kg weapons grade HEU under IAEA safeguards. International Panel on Fissile Materials, "Nuclear Weapon and Fissile Material Stockpiles and Production," in Global Fissile Material Report 2009: A Path to Nuclear Disarmament (2009), www.fissilematerials.org, pp. 8-23.

[12] Ukraine does not produce any HEU or plutonium for weapons purposes. The massive stockpile of nuclear weapons Ukraine inherited from the Soviet Union was returned to Russia by 1996 for dismantlement. Ukraine has committed to remove all HEU from its territory by the beginning of the 2012 Nuclear Security Summit. The Ministry of Foreign Affairs confirmed in March 2012 that all HEU had been transferred to Russia. "Ukraine Nuclear Overview," Nuclear Threat Initiative, www.nti.org; Martin Matishak, "Ukraine Agrees to Eliminate Highly Enriched Uranium Stock by 2012," Global Security Newswire, 13 April 2010, www.nti.org; Pavel Podvig, "Ukraine removed all HEU from its territory," International Panel on Fissile Materials, 22 March 2012, www.fissilematerials.org.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.

[13] The United Kingdom has provided partial accounts of its stockpile of fissile material on a number of occasions. Current estimates of its holdings of HEU and plutonium are largely based on the Strategic Defence and Security Review from 1998. While the U.K. has provided what are believed to be accurate declarations of its production and use of fissile material, there remains much to be learned about its holdings. The IPFM estimates the total stock of separated plutonium in the U.K. at 7.6 metric tons, with 4.4 declared excess and 3.2 available for weapons. International Panel on Fissile Materials, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org; International Panel on Fissile Materials, "Increasing Transparency of Nuclear-warhead and Fissile-material Stocks as a Step toward Disarmament," April 2013, www.fissilematerial.org.

[14] In 2006, the Department of Energy released a previously classified report on its HEU production through 1996 called Highly Enriched Uranium: Striking a Balance. Undertaken in the interests of transparency, the report provides what is likely the most accurate assessment of the U.S. HEU stockpile. In 2012, the U.S. Department of Energy released a report titled "The United States Plutonium Balance, 1994-2009" which served as an update to its 1996 report "Plutonium: The First 50 Years." The IPFM largely bases it assessments on these reports and other information provided by the U.S. government. The total stock of separated plutonium in the United States is reported to be 95.4 metric tons, of which 81.3 metric tons is weapons grade. The United States also declared 43.4 metric tons as plutonium surplus to defense needs. International Panel on Fissile Materials, Global Fissile Material Report 2011, January 2012, www.fissilematerials.org; "The United States Plutonium Balance, 1944-2009: An Update of 'Plutonium: The First 50 Years,'" National Nuclear Security Administration and the U.S. Department of Energy, June 2012, www.nnsa.energy.gov; International Panel on Fissile Materials, "Increasing Transparency of Nuclear-warhead and Fissile-material Stocks as a Step toward Disarmament," April 2013, www.fissilematerial.org; "Countries: United States," International Panel on Fissile Materials, 31 July 2013, http://fissilematerials.org.