

Appendix 8B. Global stocks of fissile materials, 2007

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Table 8B.1. Global stocks of highly enriched uranium (HEU), 2007^a

Country	National stockpiles (93% enriched equivalent, tonnes)	Production status	Comments
China	20 ± 4	Stopped 1987–89	
France ^b	36.4 ± 6	Stopped early 1996	Includes 6.4 tonnes declared civilian
India ^c	0.2 ± 0.1	Continuing	
Pakistan ^d	1.4 ± 0.3	Continuing	
Russia ^e	770 ± 300	Stopped 1987 or 1988	Includes 100 tonnes assumed to be reserved for naval and other reactor fuel; does not include 200 tonnes to be blended down
UK ^f	23.4 (declared)	Stopped 1963	
USA ^g	508 (declared)	Stopped 1992	Includes 128 tonnes reserved for naval fuel and 20 tonnes for other HEU reactor fuel; Does not include 146 tonnes to be blended down or for disposition as waste.
Non-nuclear weapon states ^h	~10		
Total	~1370		Not including 346 tonnes to be blended down

^a Totals are rounded to nearest 5 tonnes. Blending down of excess Russian and US weapon HEU up to early and mid-2007, respectively, has been taken into account. A 20% uncertainty is assumed in the figures for China, France and Pakistan, and 50% for India.

^b France declared 6.4 tonnes of civilian HEU to the International Atomic Energy Agency (IAEA) as of the end of 2006; it is assumed here to be weapon grade, 93% enriched HEU.

^c It is believed that India is producing HEU (93% enriched equivalent) at a rate of less than 0.1 tonnes each year for use as naval reactor fuel.

^d This figure assumes production at a rate of 0.1 tonnes per year between 2003 and 2007.

^e As of 16 Apr. 2007, 300 tonnes of Russia’s weapon-grade HEU had been blended down. The estimate shown for the Russian reserve for naval reactors is not based on any public information.

^f This figure includes 22.9 tonnes of HEU as of 31 Mar. 2002, the average enrichments of which were not given. The UK declared 1.4 tonnes of civilian HEU to the IAEA as of the end of 2006.

^g The amount of US HEU is given in actual tonnes, not 93% enriched equivalent. As of 30 Sep. 1996 the USA had an inventory of 740.7 tonnes of HEU containing 620.3 tonnes of uranium-235 and had declared 177.8 tonnes containing 122 tonnes of uranium-235 to be excess. An additional 20 tonnes were declared excess in 2005, an amount that was increased to 60 tonnes in 2006. The same average enrichment as the material previously declared excess is assumed. This would leave a residual stockpile equivalent (in terms of uranium-235 content) of 491 tonnes of 93% enriched HEU. It is assumed that, during the subsequent decade, *c.* 20 tonnes were consumed for naval reactor fuel and *c.* 5 tonnes for research reactor fuel. As of mid-2007 the USA had blended down 87 tonnes of HEU.

^h This figure does not include HEU originally enriched to 20–26% in spent fast-reactor fuel in Kazakhstan.

Table 8B.2. Global stocks of separated plutonium, 2007

Country	Military stocks as of December 2006 (tonnes)	Military production status	Civilian stocks as of December 2006, unless indicated (tonnes)
Belgium ^a	0		3.7 (includes 0.4 abroad)
China	4 ± 0.8	Stopped in 1991	0
France	5 ± 1.0	Stopped in 1994	52.4 (does not include 29.7 foreign owned)
Germany	0		15 in France, Germany and the UK
India ^b	0.65 ± 0.13	Continuing	5.4
Israel ^c	0.45 ± 0.11	Continuing	0
Japan	0		6.7 in Japan + a total of 38 in France and the UK
North Korea	0.035 ± 0.018	Stopped in 2007	0
Pakistan ^d	0.08 ± 0.016	Continuing	0
Russia ^e	145 ± 25 (34–50 declared excess)	Effectively stopped in 1997	42.4
Switzerland	0		0 (does not include 0.7 foreign owned)
UK	7.9 (4.4 declared excess)	Stopped in 1989	81.3 (includes 0.9 abroad, but not 26.5 foreign owned)
USA ^f	92 (53.9 declared excess)	Stopped in 1988	0
Totals	~255 ± 27 (up to 100 declared excess)		244.9

^a This figure is as of the end of 2004.

^b As part of the Indian–US Civil Nuclear Cooperation Initiative, India has proposed to include in the military sector much of the plutonium separated from India's spent power-reactor fuel that is labelled civilian here. India is estimated to be producing *c.* 30 kg a year of weapons plutonium from the CIRUS and Dhruva reactors. The estimate is based on an assumption that 50% of India's accumulated heavy-water reactor spent fuel has been reprocessed. An uncertainty of 20% for military plutonium production is assumed.

^c Israel is believed to still be operating the Dimona plutonium production reactor, but may be using it primarily for tritium production.

^d Pakistan is estimated to be producing *c.* 10 kg a year of weapon plutonium from its Khushab-1 reactor. Two additional plutonium production reactors are under construction at the same site. An uncertainty of 20% for military plutonium production is assumed.

^e Russia is producing c. 1.2 tonnes of weapon-grade plutonium annually in 3 production reactors that continue to operate because they also produce heat and electricity for nearby communities. Russia has committed itself not to use this material for weapons. The military plutonium holdings of the other Non-Proliferation Treaty-signatory nuclear weapon states were unchanged between 2003 and 2007.

^f In its IAEA INFCIRC/549 statement of 30 Nov. 2007, the USA declared as civilian stocks (as of Dec. 2006) a total of 44.9 tonnes of material described as plutonium contained in unirradiated MOX fuel or other forms, and unirradiated separated plutonium held elsewhere. On 17 Sep. 2007, the Secretary of Energy, Samuel W. Bodman, announced the removal of a further 9 tonnes of plutonium from the US weapon stockpile.

Sources for table 8B.1: Institute for Science and International Security (ISIS), *Global Stocks of Nuclear Explosive Materials* (ISIS: Washington, DC, Dec. 2003), <http://www.isisonline.org/global_stocks/end2003/tableofcontents.html>; Albright, D., Berkhout, F. and Walker, W., SIPRI, *Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies* (Oxford University Press: Oxford, 1997), p. 80, table 4.1; *Russia:* United States Enrichment Corporation, 'Megaton to megawatts', <<http://www.usec.com>>; *UK:* British Ministry of Defence, 'Historical accounting for UK defence highly enriched uranium', London, Mar. 2006, <<http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/HealthandSafetyPublications/Uranium/>>; International Atomic Energy Agency (IAEA), Communication received from the United Kingdom of Great Britain and Northern Ireland concerning its policies regarding the management of plutonium, INFCIRC/549/Add.8/9, 15 Sep. 2006; *USA:* US Department of Energy (DOE), *Highly Enriched Uranium, Striking a Balance: A Historical Report on the United States Highly Enriched Uranium Production, Acquisition, and Utilization Activities from 1945 through September 30, 1996* (DOE: Washington, DC, 2001); George, R. and Tousley, D., DOE, 'US highly enriched uranium disposition', Presentation to the Nuclear Energy Institute Fuel Supply Forum, 24 Jan. 2006; Tobey, W., Deputy Administrator for Defence Nuclear Nonproliferation, National Nuclear Security Administration, DOE, Statement before the House Government Reform Committee Subcommittee on National Security, Emerging Threats, and International Relations, 26 Sep. 2006; Vogler, K., 'The U.S. highly enriched uranium (HEU) disposition program', 48th Annual INMM Meeting, Tucson, Ariz., 8–12 July 2007; *Non-nuclear weapon states:* IAEA, *Annual Report 2005* (IAEA: Vienna, 2006), table A20.

Sources for table 8B.2: Institute for Science and International Security (ISIS), *Global Stocks of Nuclear Explosive Materials* (ISIS: Washington, DC, Dec. 2003), <http://www.isisonline.org/global_stocks/end2003/tableofcontents.html>; *Military production status:* Albright, D., Berkhout, F. and Walker, W., SIPRI, *Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies* (Oxford University Press: Oxford, 1997); US Department of Energy (DOE), 'U.S. removes nine metric tons of plutonium from nuclear weapons stockpile', Press release, 17 Sep. 2007, <<http://www.energy.gov/nationalsecurity/5500.htm>>; *Civilian stocks (except for India):* declarations by country to the International Atomic Energy Agency (IAEA) under INFCIRC/549, <<http://www.iaea.org/Publications/Documents/>>; *India:* Mian, Z. et al., *Fissile Materials in South Asia and the Implications of the U.S.–India Nuclear Deal*, International Panel on Fissile Materials (IPFM) Research Report no. 1 (IPFM: Princeton, N.J., Sep. 2006), <<http://www.ipfmlibrary.org/rr01.pdf>>; *North Korea:* Albright, D. and Brannan P., 'The North Korean plutonium stock mid-2006', Institute for Science and International Security (ISIS), Washington, DC, 26 June 2006; *Russia:* Agreement between the Government of the United States of America and the Government of the Russian Federation concerning the Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes and Related Cooperation (Russian–US Plutonium Management and Disposition Agreement), signed on 1 Sep. 2000.