

Preventing Nuclear Terrorism

A Project of the Union of Concerned Scientists

If a terrorist group exploded just one nuclear weapon, hundreds of thousands of people could die. Because there is no effective protection against nuclear terrorism, the only solution is to prevent terrorists from obtaining nuclear weapons, and the fissile materials needed to make them, in the first place.

Problem: Enormous Military Stockpiles of Highly Enriched Uranium (HEU) in Russia and the United States

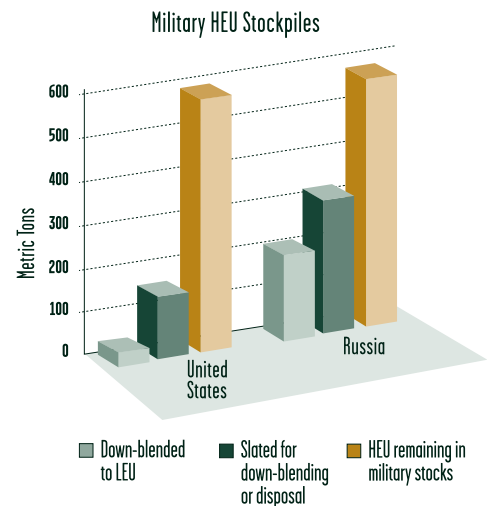
HEU is attractive to terrorist groups because it can be used directly to make a simple nuclear weapon. During the cold war, the United States and Russia each produced enormous quantities of HEU for weapons. It is estimated that Russia has more than 1,050 metric tons of HEU—enough for some 20,000 simple nuclear weapons or more than 80,000 sophisticated weapons. Fortunately, HEU can be readily “down-blended” to low-enriched uranium (LEU), which cannot be used directly to make nuclear weapons but is generally suitable for use as nuclear power plant fuel.

Under a 1993 U.S.-Russian agreement, Russia will convert 500 metric tons of HEU from dismantled warheads to LEU by 2013. However, Russia will still be left with more than 550 metric tons of HEU. The United States, which possesses more than 740 metric tons of HEU, plans to convert or dispose of 174 metric tons that it has designated as “excess to its future military needs.” But this process will not be completed until 2016 or later, after which the U.S. military will still retain some 570 metric tons of HEU. Recent concerns about the security of U.S. HEU at the Oak Ridge National Laboratory underscore the fact that the only way to eliminate the threat of HEU theft is to eliminate the material—at home and abroad.

Solution: Accelerated and Expanded HEU Blend-Down Programs

To reduce the long-term risk of nuclear terrorism and the costs of protecting HEU from theft, the United States and Russia should each maximize the amounts of HEU excess to their military needs and down-blend these stocks to LEU as quickly as feasible. For FY05, Congress should:

- Appropriate \$40 million for the first year of a multiyear program to purchase down-blended HEU for future sale to the nuclear power industry, as market conditions allow. Stabilizing the market price for LEU would allow Russia to accelerate the rate at which it down-blends its first 500 metric tons of HEU.
- Make an advance appropriation of \$200 million to implement a second agreement for Russia to down-blend and store some of its additional 550 tons of HEU. Funding would be conditional upon negotiation of the agreement.
- Request a General Accounting Office report on the U.S. HEU disposition program to assess its effectiveness.
- Require the National Academy of Sciences to conduct a study of how much of the United States’ remaining 570 metric tons of HEU could be declared excess, considering the performance and financial tradeoffs of designing future U.S. naval reactors to use LEU fuel and the implications of Russia agreeing to down-blend an additional amount of its HEU.



More details:

Accelerated blend-down of Russian HEU

The United States Enrichment Corporation (USEC), a private U.S. company that makes LEU for reactor fuel and then sells it on the open market, is implementing the U.S.-Russian HEU blend-down agreement. This commercial agreement saves the U.S. government money, with the only cost being for Department of Energy verification that the HEU comes from dismantled Russian weapons (for which it is requesting \$21 million in FY05). However, it also constrains the rate at which Russia down-blends its HEU because the USEC arrangement was carefully designed to prevent a glut of LEU reactor fuel and corresponding drop in its market price. One way to increase Russia's down-blend rate without upsetting the LEU fuel market is for the United States to purchase some of the Russian LEU, which it would keep in reserve for 5 to 10 years and then begin to sell on the market for production of nuclear reactor fuel. Thus, the United States would recoup its investment in the future, while achieving immediate security benefits.

Accelerated blend-down of U.S. HEU

Under the U.S. blend-down program, HEU in different forms—some of it contaminated—will be dealt with in different ways and at different facilities. However, there is currently no plan for how to dispose of 56 of the 174 metric tons designated as excess. Funding is needed to both develop this plan and to accelerate the blend-down efforts already under way.

Expanded Blend-down Programs for U.S. and Russian HEU

As noted above, after the United States and Russia blend down or dispose of the HEU they have declared excess, each country will still retain more than 550 metric tons of HEU. To minimize the risk that terrorists will gain access to this material and to reduce the costs of providing security, both countries should reduce these stockpiles. However, neither country is likely to declare more of its HEU to be excess unless the other makes a comparable commitment.

One factor that will affect U.S. and Russian decisions about their excess HEU is the number of nuclear weapons that each country plans to deploy or maintain as part of a "reserve" stockpile. For example, assuming a generous 20 to 25 kg of HEU per thermonuclear weapon, maintaining 2,000 warheads would require 40 to 50 metric tons of HEU—leaving more than 500 metric tons in each country that could readily be declared excess and eliminated. The United States currently deploys or stores some 10,000 warheads—an arsenal with no credible security rationale. To maintain that arsenal would require less than 300 metric tons of HEU, allowing the United States to declare an additional 200 metric tons of HEU.

There is a second issue that arises when considering how much HEU to declare as excess. U.S. nuclear submarines and some aircraft carriers are fueled with HEU, as are Russian submarines and icebreakers. The U.S. Navy maintains that a significant fraction of the remaining 570 metric tons of U.S. military HEU will be needed to fuel these and future naval reactors. However, existing submarines and other nuclear-powered ships have lifetime fuel supplies and it may be possible to design new naval propulsion systems to run on LEU fuel.

The Union of Concerned Scientists' Preventing Nuclear Terrorism Project seeks to prevent terrorists from acquiring nuclear weapons and the fissile materials—plutonium or highly enriched uranium (HEU)—needed to make them. This fact sheet series covers specific problems relating to nuclear terrorism and the steps the United States and other countries should take to address them.

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