

Editors' Note

The five articles in this issue all deal with fissile material production and stockpiles. They cover the history of highly enriched uranium and plutonium production in the United States, Russia, and China. They are drawn from, revise, and in some cases provide additional details to the respective chapters in the International Panel on Fissile Material's *Global Fissile Material Report 2010*. The articles show that independent technical analysts using publicly available information are able to make consistent and increasingly detailed estimates of fissile material production even where nuclear weapon states have chosen not to release official data on historical production activities and current stockpiles.

The United States, alone among the nuclear weapon states, has made declarations by site and year of its production of highly enriched uranium (released in 1993 and with an update released in 2006) and for plutonium (published in 1996). While not subject to independent domestic or international verification, it is still possible to assess whether these declarations are reasonable given what else is known of the U.S. production program. Frank N. von Hippel shows that the fissile material declarations are in good agreement with government data separately released much earlier, in the 1970s and 1980s, on uranium acquisition, separative work at uranium enrichment plants, and the energy produced by plutonium production reactors. Weapon states that have not so far declared their fissile material production might consider as a first step releasing the kind of data on uranium acquisition, enrichment capacity and production reactor operation that can allow similar consistency checks on possible future declarations.

In *Plutonium Wastes from the U.S. Nuclear Weapons Complex*, Robert Alvarez uses recent, more accurate measurements of plutonium in waste streams carried out for environmental remediation purposes to show that almost 3 tons of plutonium were not properly accounted for in the 1996 U.S. plutonium declaration. These waste data have not been part of the official record set used by the United States to account for its plutonium production activities. This analysis of how plutonium losses were underestimated was featured in *The New York Times* and has led to a government effort to update the official declaration of U.S. plutonium production history. This work suggests other nuclear weapon states would benefit from collecting and integrating accurate measurements on fissile material bearing wastes at production and disposal sites into their national fissile material accounting and management systems.

The two articles on Russia provide the first detailed new estimates for Russia's plutonium and HEU production histories since the work published by David Albright, Frans Berkhout, and William Walker in 1997. Anatoli Diakov and Pavel Podvig use newly available technical data, including government documents on the development of the Soviet nuclear program in its first decade, along with recent official and semi-official histories of the Soviet weapons program and nuclear industry to look at plutonium and HEU production respectively. Their analyses significantly reduce the uncertainties about Russia's production history and current stockpiles of fissile materials.

China maintains great secrecy about its fissile material production history. It is the only one of the five weapon-states party to the Nuclear Nonproliferation Treaty to not have formally declared an end to fissile material production for weapons—it has informally indicated an end to such production. These policies often have been attributed to China having perhaps the smallest stockpile of fissile material among these five weapon states. There is, however, increasing openness even about the Chinese program. In *China's HEU and Plutonium Production and Stocks*, Hui Zhang uses newly published official information about the early history China's nuclear weapons program, memoirs of scientists involved in this program, and recent media reports (especially about a previously secret uncompleted plutonium production complex now turned into a tourist site). This new analysis suggests that China's stockpile may be significantly smaller even than previous non-governmental estimates and shows that researchers may have more potential resources for further refining this estimate than may have been anticipated.