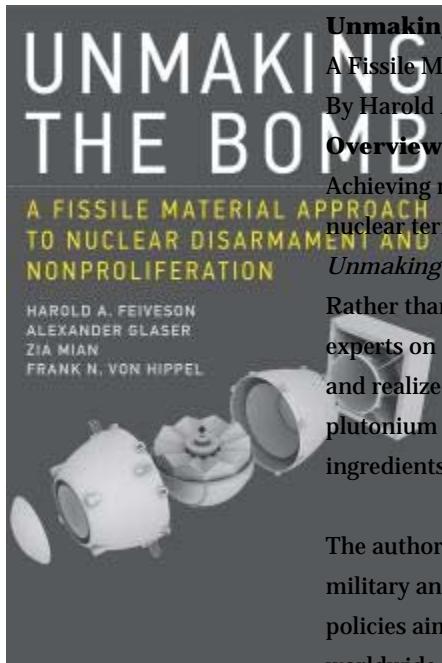




The MIT Press



Unmaking the Bomb

A Fissile Material Approach to Nuclear Disarmament and Nonproliferation

By Harold A. Feiveson, Alexander Glaser, Zia Mian and Frank N. von Hippel

Overview

Achieving nuclear disarmament, stopping nuclear proliferation, and preventing nuclear terrorism are among the most critical challenges facing the world today.

Unmaking the Bomb proposes a new approach to reaching these long-held goals. Rather than considering them as separate issues, the authors—physicists and experts on nuclear security—argue that all three of these goals can be understood and realized together if we focus on the production, stockpiling, and disposal of plutonium and highly enriched uranium—the fissile materials that are the key ingredients used to make nuclear weapons.

The authors describe the history, production, national stockpiles, and current military and civilian uses of plutonium and highly enriched uranium, and propose policies aimed at reducing and eventually eliminating these fissile materials worldwide. These include an end to the production of highly enriched uranium and plutonium for weapons, an end to their use as reactor fuels, and the verified elimination of all national stockpiles.

About the Authors

Harold A. Feiveson is Senior Research Policy Scientist at the Woodrow Wilson School of Public and International Affairs at Princeton University.

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Reviews

“Feiveson, Glaser, Mian and von Hippel convincingly argue that this problem [of fissile materials] demands a real and immediate solution. Along with the history of nuclear weapons, they cover attempts to control the weapons’ spread, including the 1970 Treaty on the Non-Proliferation of Nuclear Weapons; the physics and technology of producing, downblending and storing fuel; and the complexities of convincing nations to agree to be supervised and controlled by an international agency.”—**Ann Finkbeiner**, *Nature*

“A succinct, authoritative account of all the fissile material produced in military and civilian nuclear programmes since 1945...To ensure nuclear disarmament, the authors argue, all these materials have to be eliminated.”—**Rob Edwards**, *New Scientist*

“The book masterfully breaks down a very technical and politically charged subject so that its most salient facts are accessible and understandable to technical and

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Look Inside

Sample Chapter

nontechnical readers alike. It marshals clear, accurate, and broadly supported data, graphs, charts, and photographs that describe and explain the evolution of the fissile material age and the current global status of these materials in military and civilian programs... *Unmaking the Bomb* is an invaluable tool for historians, educators, military strategists, students of nuclear disarmament and nonproliferation, and those who advocate the elimination of nuclear weapons."

—**James Doyle**, *Arms Control Today*

"All nuclear weapons require fissile materials—plutonium and/or highly-enriched uranium (HEU)—to function. As many of the world's nuclear powers reduce their stockpiles of weapons, an issue that will come to the fore is that of securing and eventually disposing of the global supply of excess fissile materials. This book describes the history, production, current stockpiles, and uses of fissile materials, and sets out possible policies for reducing and eventually eliminating them... This book should be read and carefully considered by every serious student of the world nuclear situation." —*Physics & Society*

Endorsements

"Nearly seventy years after the world's first atomic explosion, stocks of weapon-usable material sufficient for more than 100,000 nuclear warheads continue to pose one of the gravest threats to our very survival. This book by some of the world's leading experts provides sober technical and policy assessments that should be required reading for all of us yearning for a world free from nuclear weapons. Elimination of these nuclear materials is not only key but also possible. This valuable and timely book shows us how."

—**Mohamed ElBaradei**, Director-General of the International Atomic Energy Agency, 1997-2009

"This is a comprehensive text on fissile material, with a much-needed historical perspective and a detailed analysis of the present situation. It is invaluable for all those who teach a university course in nuclear weapons, nuclear disarmament, and nonproliferation and for those who are thinking of ways to eliminate nuclear weapons altogether."

—**Paolo Cotta-Ramusino**, Secretary General of the Pugwash Conferences on Science and World Affairs

"*Unmaking the Bomb* is the most up-to-date encyclopedia of the history and present state of nuclear weapons and peaceful nuclear energy—their overlap and contradictions. The book is also valuable since it is designed not only for professional nuclear physicists, military strategists, and arms controllers, but also for the interested public and journalists."

—**Alexey Arbatov**, Director of the Center on International Security, Russian Academy of Sciences

"Achieving a nuclear-free world is a common ideal of the international community. The authors of this book have been long involved in the study of nuclear materials. Based on their abundant research achievements, they have made four specific suggestions for the gradual reduction and eventual elimination of worldwide fissile materials, providing an opportunity for the international community to have a more extensive and in-depth discussion in this regard."

—**Hu Side**, former President of the China Academy of Engineering Physics

"To address the challenges of nuclear disarmament and nonproliferation, the Princeton team persuasively details why and how it is necessary to go beyond

nuclear weapons as the units of account. They show that accounting for, verifying, and ultimately eliminating stockpiles of fissile materials will be vital to international security and can be done."

—**George Perkovich**, Director of the Nuclear Policy Program, Carnegie Endowment for International Peace, Washington, DC

"Fissile materials pose a 'perpetual menace to human security,' Niels Bohr famously argued in 1944. This book both highlights the continuing truth of that observation and importantly outlines policies that can reduce the risks. It will be an invaluable guide to the subject for students of international relations, security studies, and nuclear engineering."

—**Scott Sagan**, Center for International Security and Cooperation, Stanford University

"Among the toxic and threatening legacies of the nuclear arms race are thousands of warheads, and stockpiles of plutonium and enriched uranium. How can these best be safeguarded and disposed of? The distinguished authors have had a sustained involvement in the science and the politics of these issues. This cogent and authoritative book deserves to have wide influence among policymakers worldwide."

—**Martin Rees**, Cambridge University, former President of the U.K. Royal Society (2005-2010)