CHAPTER 1

INTRODUCTION

MATERIALS UNACCOUNTED FOR: NUCLEAR WEAPONS MATERIALS GONE MISSING

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Ever since President Barack Obama made securing nuclear weapons assets a top priority for his global arms control agenda, guarding and disposing of these holdings have become an international priority. Every 2 years, high-profile nuclear summits on how to prevent nuclear theft and sabotage have been held—the first in Washington, DC; the second in Seoul, South Korea; and the third in The Hague, the Netherlands. With each summit, more and more states have agreed to dispose of what weapons-grade nuclear fuels they have. In between these meetings, scores of studies have been commissioned and nearly as many workshops (official and unofficial) have been held. Yet, in all of this, almost no attention has been focused on what to do about the nuclear weapons-usable plutonium and highly enriched uranium that we have lost track of. This is odd.

Although the exact quantities of materials unaccounted for (MUF) are unknown, there is no doubt they are significant. U.S. nuclear weapons MUF alone is pegged at nearly six tons—i.e., enough to fashion at least 800 low-tech, multi-kiloton bombs. Russian MUF figures are assumed easily to be as large. As for Chinese, Indian, Pakistani, Israeli, and North Korean MUF figures, though, we have only a general idea of

what they might be. The civilian production of nuclear weapons-usable plutonium in the United States, United Kingdom (UK), Japan, France, and India also is a worry. We know that specific accounting losses in the case of civilian plutonium reprocessing and fuel making in the UK and Japan have been significant—measured in scores of bombs worth. What they might be elsewhere, again, is unknown.

As for the possibility of military diversions, we now know that some of what was categorized as MUF has been spirited away to make bombs. In specific, at least 100 kilograms (kg) (and possibly much more) of U.S. weapons-grade uranium was stolen from a defense contractor in the 1960s to help fuel Israel's nuclear weapons program. Fortunately, the two largest fissile material producers, the United States and Russia, stopped making nuclear weapons-usable plutonium and uranium. Also, a small portion of the U.S. and Russian surpluses of these materials have been disposed of.

This helps at least cap the growth in MUF uncertainties. Also, so far, besides the Israeli case, there are no known cases of large nuclear thefts. Presumably, they would have become known by now. Finally, there is some solace in knowing that U.S. nuclear material accounting practices are now improved over those used during the Cold War.

Unfortunately, none of this helps answer precisely how much MUF has been produced or the extent to which we can prevent the generation of more MUF. Without these answers, reducing or capping existing nuclear weapons arsenals and blocking future nuclear proliferation must remain iffy propositions.

How likely is it that the International Atomic Energy Agency (IAEA) could detect a large amount of

MUF in a timely fashion even at declared civilian nuclear sites? What of its ability to detect smaller, incremental diversions? What of national means of detection? What can we learn from the history of civilian MUF discoveries in Japan and the UK and of military MUF in the United States and South Africa? How well can the IAEA or any existing nuclear material accountancy system track the production of special nuclear material or account for past production? What do the answers to these questions suggest with regard to the prospects of eliminating nuclear weapons and nuclear weapons material stockpiles?

As this volume makes clear, the answers are mixed at best. In the case of U.S. MUF, the discoveries of tons of material missing came well after the United States originally lost track of the material. Most of it has yet to be accounted for. The South African case remains a debate between analysts that trust what South African officials have claimed and those that still worry about persisting accounting discrepancies. In the few known IAEA MUF cases, there still are material balances outstanding that are quite large. More important, the IAEA privately admits that its ability to track production of nuclear fuels and to find covert nuclear enrichment and reprocessing plants is limited. None of this augurs well for the future. As for accounting for past production, there are clear limits.

A much larger question, of course, concerns enforcement: What, if anything, has been done when nuclear security understandings have been violated or there have been discoveries of significant amounts of MUF? In important cases, has the United States or other major states chosen to act or avert their gaze? Again, what history we have offers answers that are hardly encouraging. Too often and more often than not, the United States and its allies have averted

their gaze from intelligence that lends credence to military diversions.

This volume focuses on all of these issues. Much of the analysis is technical. Most of it, technical or not, is downbeat. The good news is that this is the first dedicated volume on this specialized topic. What questions we cannot answer now may have answers with further analysis. The key message of this volume, however, is one of limits. We may never know where considerable amounts of nuclear weapons-usable material "went." More important, the amount of MUF will only grow unless we do more to limit continued, unnecessary civilian and military material production. Whether or not that recommended limit will be recognized and honored remains to be seen.