

Securing Nuclear Materials: Remaining Challenges



In April 2009 in Prague, President Barack Obama recommitted the United States to achieve a nuclear-weapon-free world. Although he cautioned that reaching this goal might not occur in his lifetime, he did pledge his administration to cooperate with other governments and international institutions such as the International Atomic Energy Agency to accomplish securing all vulnerable nuclear materials in four years. The motivation behind that goal was to prevent terrorists from acquiring the essential fissile materials such as highly enriched uranium (HEU) and plutonium needed to make nuclear explosives. No matter how much terrorist groups might covet nuclear weapons, they cannot obtain them without buying, stealing, or being given fissile material or intact nuclear warheads.

The Prague speech led to the first ever Nuclear Security Summit in April 2010 in Washington, D.C. Remarkably, the 2010 summit brought together more than 40 heads of state. Even more importantly, they agreed that preventing nuclear terrorism is a top priority. Many of these leaders pledged to take further steps to lock up nuclear material, phase out the use of HEU (which is the highest risk fissile material because of its relative ease of use in a crude nuclear explosive), and form centers of excellence to promote nuclear security across the globe. While the majority of national leaders were not at the Summit, the ones that were represented most of the countries with large quantities of weapons-usable fissile material.

When the world is facing numerous challenges such as ensuring access to clean water, providing for adequate amounts of nutritional food, and improving public health, it is fair to ask why nuclear security deserves such emphasis. These are not either/or choices. Leaders need to work together to solve all these problems. Nonetheless, the motivation behind President Obama's Nuclear Security Summit was to attract high-level political attention to a threat that could have catastrophic consequences worldwide. Nuclear terrorism is not just a threat to the United States or other Western countries. While a nuclear detonation by a terrorist group in any city would immediately kill upwards of a hundred thousand people, this attack could cause panic in numerous cities around the globe and could result in trillions of dollars worth of damage to the global economy.

Encouragingly, 80 percent of the pledged commitments made by the Washington Nuclear Security Summit have been accomplished. But much more work is needed. For example, dozens of research reactors still use HEU. One of the remaining technical hurdles is to develop high-density low enriched uranium fuel and targets for isotope production in order to substitute for HEU. This effort could take several years meanwhile governments should ensure that they are providing the necessary funds for the R&D.

But I would argue that the biggest hurdle is the political will for leaders to link preventing nuclear terrorism with achieving nuclear disarmament. As George Shultz, Sam Nunn, William Perry, and Henry Kissinger assessed in their first *Wall Street Journal* op-ed in January 2007, nuclear weapons have become liabilities rather than assets. Although they believed that during the Cold War nuclear weapons served a purpose to prevent major war between the United States and the Soviet Union by threatening mutual assured destruction, today the most likely route of nuclear weapons use is by a terrorist group. Nuclear-armed terrorists would most likely not be deterred. If the nuclear-armed nations could dismantle their warheads and immediately turn the fissile material into physical states that are not readily usable for weapons, they will have made major strides toward reducing the risk of nuclear terrorism.

But the risk would not be zero as long as HEU or plutonium would continue to be used in research reactors, naval reactors, and commercial reactors. Although the Nuclear Security Summit on March 26 and 27 in Seoul, Republic of Korea, will focus on HEU in research reactors, the agenda fails to call attention to naval reactors. The United States still uses HEU to fuel its submarines and aircraft carriers and is opposed to converting the reactors on these warships to low enriched uranium. Opposition arises from the fact that the HEU-fueled reactors have long-lived cores thus saving on refueling costs. Moreover, the United States has a huge stockpile of HEU dedicated to naval use. No security system, however, is perfect, and it is possible that some HEU from this stockpile may become unsecured. Even if this stockpile remains highly secure, it can make the United States look hypocritical when Washington requests other nations to reduce and eventually eliminate their weapons-usable fissile material.

The other major left-out agenda item is to address the security challenge of the massive plutonium stockpile slated for commercial reactors. About 250 metric tons of civilian plutonium—enough to make more than ten thousand nuclear weapons—has been separated from the protective barrier of highly radioactive fission products in spent nuclear fuel. (This is comparable to the stockpile of military plutonium.) France, Japan, India, and Russia, in particular, have had plutonium-recycling programs. China may soon follow suit. But the Fukushima Daiichi accident and pending changes in Japan's nuclear policy might result in further delays in Japan's reuse of plutonium. This has called into question what Japan will do with the almost 10 metric tons stored in Japan and the 35 metric tons stored in France and the United Kingdom. There are no easy solutions. One option could be to dispose of the plutonium in deep boreholes; another is to surround it with highly radioactive materials; and another is to consume it in burner reactors, but this technology has confronted technical problems and could be used in a breeder mode to make more plutonium.

Making concrete steps toward nuclear disarmament, phasing out use of HEU in naval reactors, and disposing of the huge stockpile of civilian plutonium are serious political and technical challenges that deserve to be on the agenda at the Seoul Summit and at future summits.

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