

Preventing a Nuclear 9/11

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The danger that terrorists could get and use a nuclear weapon or the essential ingredients to make one remains all too real. To reduce the risk of a nuclear 9/11, a fast-paced campaign to lock down all stockpiles of nuclear warheads and potential nuclear bomb materials worldwide is urgently needed to keep these items from being stolen and transferred to terrorists. Sustained presidential leadership will be needed to overcome the myriad obstacles to the intensive international cooperation focused on improving secret security measures for sometimes secret nuclear stockpiles that is required.

THE ESSENTIAL FACTS

The facts that frame the danger of nuclear terrorism are stark:

Terrorists want the bomb. Osama bin Laden has called the acquisition of nuclear weapons a “religious duty,” and has repeatedly attempted to purchase nuclear material for a bomb and to recruit nuclear expertise—including meeting with two senior Pakistani nuclear scientists to discuss nuclear weapons.

No Manhattan project required. Repeated government studies have concluded that with enough highly enriched uranium (HEU) or separated plutonium in hand, making a crude bomb might well be within the capabilities of a sophisticated terrorist group. Only a relatively small group, with modest machine-shop facilities and no access to classified information, might be sufficient. U.S. intelligence concluded before 9/11 that making a crude nuclear bomb was within al Qaeda’s capabilities, if they got the needed material.

Huge global nuclear stockpiles, some poorly secured. More than 20,000 nuclear weapons and over 2,300 tons of HEU and separated plutonium (enough nuclear material for over 200,000 bombs) now exist in the world. The essential ingredients of nuclear weapons exist in hundreds of buildings in some 40 countries, with security measures ranging from excellent to appalling. Civilian facilities such as HEU-fueled research reactors (including those in the United States) often have no more security than a night watchman and a chain-link fence. The most egregious nuclear security weaknesses in the former Soviet Union—from gaping holes in security fences to the lack of any detector to set off an alarm if nuclear material was being removed—have largely been fixed, but the threat of nuclear theft there remains very real, as terrorists and criminals there have demonstrated the ability to carry out large attacks without warning, and to orchestrate substantial insider theft conspiracies. In Pakistan, a much smaller nuclear stockpile is heavily guarded but faces huge threats both from armed remnants of al Qaeda and other jihadi groups operating in the country and from nuclear insiders with a proven willingness to sell almost anything to almost anyone. Nuclear theft is not a hypothetical worry but an ongoing reality: the International Atomic Energy Agency has confirmed 18 cases of theft of plutonium or HEU to date. Indeed, because the rudimentary nuclear accounting system used in the Soviet Union was designed to monitor Cold War production, not to detect theft, no one will ever know how much material may already have gone missing; even in the United States, some two tons of plutonium is officially unaccounted for (though it is unlikely any of that material was stolen, no one will ever be able to prove that it was not).

Needed nuclear material small and easy to hide and smuggle. A crude terrorist bomb might require 6–8 kilograms of plutonium—just over what would fit in a single soda can. The simplest and most inefficient bomb design, a “gun-type” bomb, requires roughly a six-pack of HEU. (The Hiroshima bomb, was a cannon that fired a shell of HEU into rings of HEU; it used 60 kilograms of HEU enriched to roughly 80% uranium-235.) The nuclear material for a bomb could easily be carried in a suitcase or two. The radiation it emits is weak and easy to shield—particularly in the case of HEU. As a result, many of the radiation detectors now being put in place at U.S. borders and around the world would not be able to detect shielded HEU—and searching for a hidden bomb over a large area is extraordinarily difficult. The long and

porous U.S. borders, the myriad people and vehicles crossing them, the many pathways to cross them, and the small size and low radiation of the material needed for a bomb conspire to make the smugglers' job easy and the detectors' job difficult. Moreover, if the United States got warning tomorrow that a terrorist nuclear bomb was located in a particular U.S. city—but no other information was available—there would be little chance of finding it within, say, 48 hours.

Consequences devastating. A terrorist nuclear bomb could turn the heart of any modern city into a smoking ruin. One study estimated that a terrorist bomb with an explosive power equivalent to 10,000 tons of TNT (smaller than the Hiroshima bomb), detonated at Grand Central Station on a typical workday, would kill 500,000 people and cause \$1 trillion in direct economic damage (with total damage, including economic effects, going far beyond that). America and the world would never be the same.

Bomb materials too difficult for terrorists to make themselves. Producing HEU requires technically challenging and expensive enrichment processes, to separate uranium-235 (U-235) from the U-238 that makes up more than 99% of natural uranium. Producing plutonium typically requires irradiating U-238 in a nuclear reactor, and then chemically separating the plutonium from the irradiated fuel (a step known as reprocessing). It is extremely unlikely that terrorist groups will be able to produce either material in the foreseeable future—which means that if the stockpiles produced by states can be protected from theft and transfer to terrorists, nuclear terrorism can be prevented.

There is no convincing evidence that any terrorist group has yet acquired a nuclear bomb, or the materials and expertise to make one. But such a proliferation disaster could occur at any time.

AN IMPORTANT BUT INADEQUATE RESPONSE

Blocking the terrorist pathway to the bomb requires a multi-layered defense, from the counterterrorist struggle to improved nuclear detection at key border crossings and within the United States. But the most crucial element of that defense is to ensure that nuclear weapons or materials are not stolen in the first place: once these items are carried out the door of the facility where they are supposed to be, the problems of finding them and stopping terrorists from using them multiply a thousand-fold.

Theft of nuclear weapons or materials is the most likely route by which these items might fall into terrorist hands. Conscious state decisions to transfer such items to terrorists are highly unlikely—particularly because the devastating retaliation that would result if a terrorist nuclear attack were traced back to its source would threaten the survival of the regime that provided the means for the attack. Nevertheless, gaining international agreement on packages of carrots and sticks large and credible enough to convince Iran and North Korea to verifiably give up their quest for nuclear weapons is one important part of preventing nuclear terrorism.

Many elements of the response to this threat are making progress. With its Afghanistan sanctuary removed, and its former leadership dead, captured, or in hiding, al Qaeda has less chance of making a nuclear bomb today than it once did—though there remains a real chance that one group in the global movement that is today’s al Qaeda could put

Other Types of Nuclear and Radiological Attack

This paper focuses only on the most devastating type of nuclear terrorism—the use of an actual nuclear explosive. Sabotage of a major nuclear facility could also result in a major catastrophe, potentially requiring the evacuation of hundreds of thousands or even millions of people and causing tens or hundreds of billions of dollars in economic damage. In most cases the number of immediate deaths would be modest, but there might be thousands of long-term cancer deaths. Key policies to reduce this danger are improved security and safety measures at nuclear sites, and more effective evacuation plans.

The most likely type of nuclear-related terrorism is dispersal of radioactive material in a so-called “dirty bomb.” A dirty bomb could create an expensive and annoying mess, requiring the evacuation of many blocks, and potentially causing tens of billions of dollars in disruption and cleanup costs. Few if any deaths would be likely to result, however. Key policies to reduce this danger focus on improved public education about the dangers of radiation, strengthened response and cleanup capabilities, beefed-up detection capabilities, and stronger security at least for the most dangerous of the hundreds of thousands of radiological sources in use in virtually every country of the world.

Nuclear threats and hoaxes—which happen more often than many people realize—can also pose a serious threat if they are judged to be credible. A group that only had an ounce of HEU, for example, might send a vial of that material, with a plausible blueprint of a bomb, as “proof” that it had a nuclear bomb. Improved approaches to assessing the credibility of such threats, and policy exercises to explore how the system would respond to a credible threat, can reduce the risk.

together the needed capabilities and build a bomb without being detected before it is too late. Cooperative threat reduction programs like Nunn-Lugar, sponsored by the United States and other countries, have demonstrably improved security at scores of buildings in the former Soviet Union and elsewhere, permanently destroyed thousands of bombs' worth of nuclear material, put radiation detection equipment at scores of key border crossings around the world, and offered at least temporary civilian re-employment for thousands of nuclear experts who were no longer needed. (It is a little-known fact, for example, that nearly half of the nuclear electricity generated in the United States is fueled by material from dismantled Russian nuclear warheads.) These efforts have represented an excellent investment in U.S. and world security.

But in virtually every category of effort, far more remains to be done. By the end of fiscal year (FY) 2005, U.S.-funded comprehensive security and accounting upgrades had been completed for only 54% of buildings in the former Soviet Union containing potential nuclear bomb material. The summit accord on nuclear security that President Bush and Russian President Putin agreed on at Bratislava in early 2005 has accelerated progress, and demonstrates what presidential leadership can do. But meeting the 2008 deadline for completing an agreed set of security upgrades that U.S. and Russian experts agreed to after Bratislava remains

Terrorist Suitcase Nukes? Probably Not

One of Boris Yeltsin's national security advisors, Alexander Lebed, once claimed that a large number of small, portable nuclear weapons—so-called “suitcase nukes”—were missing. The Russian Ministry of Defense hotly denied this charge.

Both the United States and the Soviet Union did produce small nuclear weapons intended to be carried by one or two people—“atomic demolition munitions,” as the U.S. versions were called—as well as small weapons such as nuclear artillery shells. All of the U.S. versions of these weapons, and most or all of the Russian versions, have since been dismantled. Responsible Russian generals, even in private with Americans they know and trust, swear that Lebed was mistaken, and that all such weapons are accounted for. Lebed, who was known for a wide range of extreme statements, later claimed he had never said that any of the suitcase nukes were actually missing, only that they were not properly accounted for. There is no reason to believe that any of the occasional media reports that al Qaeda or other terrorists have such a weapon is correct. A crude nuclear bomb that terrorists made themselves might fit in a van, but not in a suitcase. This episode highlights the importance of joint accounting and ultimately secure, monitored dismantlement of tactical nuclear weapons, particularly those not equipped with modern, difficult-to-bypass electronic locks.

an immense challenge, and some key nuclear material and nuclear war-head sites are not on the agreed list. Moreover, serious questions remain as to whether the security measures being put in place—which are less than those the Department of Energy is now requiring at its own facilities—will be enough to protect Russia’s stockpiles against the huge insider and outsider threats in Russia, and whether Russia will sustain effective nuclear security after U.S. assistances phases out (as is scheduled to occur by 2013).

Elsewhere in the world, there has been much less progress. In most countries, U.S.-sponsored security upgrades have barely begun, or are not yet even on the agenda. The Global Threat Reduction Initiative (GTRI), launched in early 2004, has accelerated the pace of removing HEU from vulnerable sites around the world, but some of its timelines for removing HEU stretch to 2014–2019, and serious gaps remain. Two-thirds of the U.S.-origin HEU abroad is not yet eligible for the U.S. offer to take it back; nearly half the research reactors using HEU around the world are not yet targeted for conversion to low-enriched fuel that cannot be used in a nuclear bomb; few incentives are being offered to most facilities to convince them to allow their potential bomb material to be removed; and no effort is being made to convince aging and unneeded research reactors to shut down (an approach likely to be quicker and cheaper than conversion to low-enriched fuel, in many cases).

The Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, launched at the G8 summit in 2002, has been neither global nor targeted on the most urgent measures to prevent the spread of weapons and materials of mass destruction: it has been allowed to drift focused entirely within a few countries of the former Soviet Union, and has focused on submarine dismantlement and chemical weapons destruction, with only a dribble of non-U.S. money going to securing nuclear stockpiles. The International Atomic Energy Agency’s Office of Nuclear Security has been allowed to limp along with funding and authority clearly far short of what it needs to make the maximum contribution to preventing nuclear terrorism. No global coalition to prevent nuclear terrorism, no binding global nuclear security standards, and no truly comprehensive plan for securing *all* the stockpiles of nuclear weapons and materials around the world yet exists.

Total U.S. spending on cooperative programs to control nuclear war-heads, materials, and expertise, at just over \$1 billion per year, represents

one quarter of one percent of U.S. defense spending. Nevertheless, only a few of these programs could be greatly accelerated by simply writing a larger check. Rather, the most fundamental missing ingredient of faster progress is sustained high-level leadership. While President Bush has repeatedly emphasized the danger of nuclear terrorism, he, like President Clinton before him, has not provided the sustained, day-in and day-out focus needed to overcome the myriad obstacles to ensuring that nuclear stockpiles around the world are secure and accounted for. In many cases, problems have been allowed to fester unresolved for years at a time. The huge Fissile Material Storage Facility at Mayak in Russia, for example, built with hundreds of millions of dollars in U.S. assistance, remains empty almost three years after it was completed.

WHAT NEEDS TO BE DONE NOW

The danger of nuclear theft and terrorism is a global problem, requiring a global response. The key to a stronger and faster response is sustained presidential leadership.

President Bush could dramatically accelerate the effort by, in effect, telling everyone in his government: “I want every warhead and every kilogram of nuclear material worldwide secured, as fast as it can possibly be done, but certainly in no more than six years. I’m appointing some one with the sole job of leading these efforts, and finding and fixing every obstacle that is slowing them down—and they will be able to walk into my office whenever there is a decision I need to make. I will make the tough choices to resolve any problem slowing these efforts. We will make this a top priority of U.S. foreign policy, to be addressed at every opportunity, at every level, until the job is done. I want U.S. intelligence focused on identifying the highest risks of nuclear theft and key issues for policies to fix them. I am prepared to put several billion additional dollars, beyond current budgets, into the effort over the next few years. And I will fire anyone who I find slowing this down.” President Bush should immediately issue a decision directive along these lines, making the priority of this agenda clear. Several particular initiatives are needed now.

A global coalition to prevent nuclear terrorism. President Bush should immediately begin working with Russia and other leading nuclear-weapon and nuclear-energy states to forge a global coalition to prevent

nuclear terrorism, whose participants would agree to protect all of their nuclear stockpiles to an agreed standard sufficient to defeat the threats terrorists and criminals have shown they can pose; encourage, assist, and pressure other states to do likewise; sustain effective nuclear security for the long haul using their own resources; reduce the number of locations where nuclear weapons and weapons-usable nuclear materials are located (thereby achieving higher security at lower cost); and take other steps to cooperate to reduce the dangers of nuclear terrorism, from expanding intelligence and law enforcement cooperation targeted on nuclear theft and smuggling to putting in place criminal laws making actual or attempted nuclear theft or terrorism a crime comparable with murder or treason.

Bilateral cooperation with Russia and other countries should continue, framed as a genuine partnership within this global coalition, and focused particularly on ensuring that security measures are put in place that are sufficient to meet the threats that exist in each country; forging strong security cultures, so that guards do not patrol without ammunition or turn off intrusion detectors (both of which have occurred, both in Russia and the United States); and ensuring that high levels of security for nuclear stockpiles will be sustained after international assistance phases out.

Effective global nuclear security standards. Facing terrorists with global reach, nuclear security is only as good as its weakest link—so global standards adequate to ensure that all stockpiles are protected from plausible theft attempts are urgently needed. Past attempts to negotiate such standards in binding treaties have largely failed—blocked by a least-common-denominator dynamic among mid-level officials unable to agree on anything that their nation’s nuclear industry might see as unduly costly or intrusive. The best hope for creating an effective global standard is likely to be a quick top-level political agreement—perhaps initiated at a G8 summit—on a standard specific enough to be effective, but flexible enough to allow each country to pursue its own approach to nuclear security. For example, the agreed standard might be that all nuclear weapons and significant caches of weapons-usable nuclear materials must be protected at least against two small groups of well-armed and well-trained outsiders, one to two well-placed insiders, or both outsiders and insiders working together. Participants in the global coalition

would agree to secure their stockpiles at least to this standard, and help encourage and pressure others to do likewise. Such a standard could become legally binding if enough states agreed that this was what was needed for nuclear security measures to be “appropriate” and effective” as legally required by UN Security Council Resolution 1540.

An accelerated and expanded “global cleanout.” The only way to guarantee that nuclear material will not be stolen from a particular site is to remove it, so there is nothing left to steal. The United States should immediately begin working with other countries to take steps to accelerate and expand the removal of weapons-usable nuclear material from vulnerable sites around the world—and take steps to ensure that high levels of security will be put in place and maintained where material cannot immediately be removed. The goal should be to remove the nuclear material entirely from the world’s most vulnerable sites within four years—substantially upgrading security wherever that cannot be accomplished—and to eliminate all HEU from civil sites worldwide within roughly a decade. The United States should expand its take-back offer to cover *all* U.S.-supplied HEU, and, on a case-by-case basis, other weapons-usable nuclear material that poses a proliferation threat—and should convince states such as Russia, Britain, and France to make similar offers. A major effort should be launched to convince countries and operators to shut down unneeded HEU-fueled research reactors. The United States and other coalition partners should offer substantial packages of incentives, targeted to the needs of each country and facility, to convince facilities to convert or shut-down, and to give up their nuclear material.

Building the needed sense of urgency. The United States should immediately begin taking action to convince political leaders and facility managers around the world that nuclear theft and terrorism is a real and urgent threat to their own countries, worthy of their time and money. Steps in this direction should include: threat briefings for key foreign leaders, given jointly by experts from the United States and their own countries; encouraging key states to carry out fast-paced reviews of security at their nuclear sites by trusted teams of experts; working with key states to put in place regular systems of realistic security testing, in which “red teams” test facilities’ protection against outsider and insider thieves; carrying out war games and similar exercises with policymakers

of key states, to get them to think through how nuclear material might be stolen and the situation they would face if it was; creating shared databases of unclassified information on security incidents and lessons learned from them; and putting in place strong incentives for states and facilities to provide effective nuclear security, from strong nuclear security regulation to preferences in U.S. contracts for facilities that have demonstrated superior nuclear security performance.

A full-time senior official to take the lead. Remarkably, today there is no senior official of the U.S. government with responsibility for leading all the myriad efforts related to preventing nuclear terrorism. President Bush should appoint a senior full-time White House official, with the access needed to walk in and ask for presidential action when needed, to lead these efforts, and keep them on the front burner at the White House every day. That official would be responsible for finding and fixing the obstacles to progress, setting priorities, eliminating overlaps, and seizing opportunities for synergy. As part of the global coalition described above, President Bush should lean on Russian President Putin and the leaders of other coalition participants to do the same.

Partnership-based approaches. To get the “buy-in” essential to ensuring that nuclear security equipment will be used effectively and sustained for the long haul, security managers and staff have to be convinced that the new security measures were in large part their idea, not something imposed by Americans. Hence, the United States should base its international nuclear security approaches on genuine partnership, with experts from each country where these stockpiles reside playing key roles in the design, implementation, and evaluation of the entire effort in their countries, moving away from donor-recipient relationships. Strategic plans, timetables, and milestones should be developed jointly by the country where the nuclear stockpiles in question exist and its foreign partners, using both the country’s own funds and foreign funds—not set and controlled from Washington. Because genuine nuclear security partnerships cannot be built in a political vacuum, other steps to increase or decrease cooperation with particular countries—particularly with respect to nuclear technologies—should be considered in the light of their potential effect on cooperation to ensure effective nuclear security.

Flexible approaches to secrecy and access to sites. Many of the stockpiles that need improved security, and the security measures now in place for them, are closely held secrets, and are likely to remain that way. The United States should take flexible approaches to ensuring that taxpayer funds are spent appropriately without insisting that recipients give up their nuclear secrets—for example relying on photographs, videotapes, and operational reports on equipment in use at a secret site rather than insisting on direct access by U.S. personnel in every case.

A LONG ROAD YET TO TRAVEL

As President Bush has said, the nations of the world must do “everything in our power” to ensure that terrorists never gain control of the fearsome power of a nuclear bomb. The steps recommended above could lead the way toward a faster, more effective, and more comprehensive effort to lock down the world’s nuclear stockpiles before terrorists and criminals can get to them. There is still time to win the race to prevent a nuclear 9/11.

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