

# CRS Report for Congress

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## Terrorist Nuclear Attacks on Seaports: Threat and Response

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### Summary

A terrorist nuclear attack on a U.S. seaport could cause local devastation and affect the global economy. Terrorists might obtain a bomb in several ways, though each poses difficulties. Ability to detect a bomb appears limited. The United States is using technology, intelligence, international cooperation, etc., to try to thwart an attack. Issues for Congress include safeguarding foreign nuclear material, mitigating economic effects of an attack, and allocating funds between ports and other potential targets. This report will be updated as needed.

### Background

Terrorists have tried to obtain weapons of mass destruction (WMD) — chemical, biological, radiological, and nuclear weapons. While it would probably be more difficult for terrorists to obtain or fabricate a nuclear weapon than other WMD, an attack using a nuclear weapon merits consideration because it would have much higher consequence. U.S. seaports could be targets for terrorist attack. A terrorist Hiroshima-sized nuclear bomb (15 kilotons, the equivalent of 15,000 tons of TNT) detonated in a port would destroy buildings out to a mile or two; start fires, especially in a port that handled petroleum and chemicals; spread fallout over many square miles; disrupt commerce; and kill many people. Many ports are in major cities. By one estimate, a 10- to 20-kiloton weapon detonated in a major seaport would kill 50,000 to 1 million people and would result in direct property damage of \$50 to \$500 billion, losses due to trade disruption of \$100 billion to \$200 billion, and indirect costs of \$300 billion to \$1.2 trillion.<sup>1</sup>

Terrorists might try to smuggle a bomb into a U.S. port in many ways, but containers may offer an attractive route. A container is a metal box, typically 8 ft wide by 8½ ft high by 20 ft or 40 ft long, that can be used on and moved between a tractor-trailer, a rail car, or a ship. Much global cargo moves by container. Nearly 9 million containers a year enter

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<sup>1</sup> ABT Associates, “The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability,” executive summary, April 30, 2003, p. 7, [[http://www.abtassociates.com/reports/ES-Economic\\_Impact\\_of\\_Nuclear\\_Terrorist\\_Attacks.pdf](http://www.abtassociates.com/reports/ES-Economic_Impact_of_Nuclear_Terrorist_Attacks.pdf)].

the United States by ship.<sup>2</sup> Customs and Border Protection (CBP) screens data for all containers, and reportedly inspects about 6 percent of them.<sup>3</sup> Containers could easily hold a nuclear weapon. Many believe that ports and containers are vulnerable. An FBI official stated, “The intelligence that we have certainly points to the ports as a key vulnerability of the United States and of a key interest to certain terrorist groups....”<sup>4</sup> CBP Commissioner Robert Bonner believes an attack using a nuclear bomb in a container would halt container shipments, leading to “devastating” consequences for the global economy. ...”<sup>5</sup> People can, however, find ways to minimize economic problems.

**Terrorist Nuclear Weapons: Routes to a Bomb.** A terrorist group might obtain a bomb, perhaps with the yield of the Hiroshima bomb, by several plausible routes.

**Russia.** Strategic (long-range) nuclear weapons are reportedly well guarded on missiles or, thanks in part to U.S. assistance, in storage. In contrast, thousands of shorter-range lower-yield weapons intended for use in combat are less well secured, and numbers and locations are uncertain. (See CRS Report RL32202, *Nuclear Weapons in Russia: Safety, Security, and Control Issues*.) A fear is that terrorists might buy or steal one of these weapons along with information on how to bypass any use-control devices.

**Pakistan.** U.S., British, Chinese, French, and Israeli nuclear weapons are thought to be well guarded. Control is less certain for India and Pakistan. Reports indicate that Pakistanis aided nuclear programs in Iran, Libya, and North Korea, and there are concerns about the security of Pakistani nuclear weapons if President Musharraf were assassinated.<sup>6</sup>

**Build a Bomb.** The Hiroshima bomb was a “gun assembly” weapon. Its nuclear explosive was a gun barrel about 6 inches in diameter by 6 feet long. It was capped at each end, with standard explosive at one end, a mass of uranium highly enriched in the isotope 235 (highly enriched uranium, or HEU) next to the explosive, and a second HEU mass at the other end. Detonating the explosive shot one mass of HEU into the other, rapidly assembling a mass large enough to support a fission chain reaction. (Plutonium cannot be used.) This is the simplest type of nuclear weapon. U.S. scientists had such high confidence in the design that they did not test the Hiroshima bomb. Experts agree

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<sup>2</sup> U.S. Department of Homeland Security, Bureau of Customs and Border Protection, “Remarks by Commissioner Robert C. Bonner, Council on Foreign Relations, New York, New York,” January 11, 2005.

<sup>3</sup> Caitlin Harrington, “Post-Election Analysis: Millions of Dollars Ride on a Simple Definition of ‘Inspection,’” *CQ Homeland Security*, January 7, 2005.

<sup>4</sup> U.S. Senate Committee on the Judiciary, Subcommittee on Technology, Terrorism, and Government Information, Hearing: “Covering the Waterfront — A Review of Seaport Security since September 11, 2001,” January 27, 2004; Statement of Gary M. Bald, Acting Assistant Director Counterterrorism Division, FBI. Transcript by Federal Document Clearing House, Inc.

<sup>5</sup> U.S. Dept. of the Treasury, U.S. Customs Commissioner Robert Bonner, Speech Before the Center for Strategic and International Studies, Washington, D.C., January 17, 2002, [[http://www.cbp.gov/xp/cgov/newsroom/commissioner/speeches\\_statements/archives/jan172002.xml](http://www.cbp.gov/xp/cgov/newsroom/commissioner/speeches_statements/archives/jan172002.xml)].

<sup>6</sup> David Sanger and William Broad, “From Rogue Nuclear Programs, Web of Trails Leads to Pakistan,” *New York Times*, Jan. 4, 2004, p. 1 and “One Man’s Fortune,” *Washington Post*, Dec. 27, 2003, p. 24.

that terrorist groups could not make special nuclear material (SNM, i.e., fissile plutonium or HEU). Many believe that a terrorist group with access to HEU and key skills could build a crude nuclear weapon. Five former Los Alamos nuclear weapons experts held that such a weapon “could be constructed by a group not previously engaged in designing or building nuclear weapons, providing a number of requirements were adequately met.”<sup>7</sup> A National Research Council study stated: “The basic technical information needed to construct a workable nuclear device is readily available in the open literature. The primary impediment that prevents countries or technically competent terrorist groups from developing nuclear weapons is the availability of SNM, especially HEU.”<sup>8</sup> Many believe it would be hard for a terrorist group to obtain enough HEU for a weapon; others fear that terrorists could do so. The National Research Council study rated the threat level from SNM from Russia as “High — large inventories of SNM are stored at many sites that apparently lack inventory controls and indigenous threats have increased.”<sup>9</sup>

## Responses

The main approach to reducing vulnerability to a terrorist nuclear attack is defense in depth — using multiple methods to detect and interdict a weapon. It would be harder to evade several methods than one: attempts to evade one may make a bomb more visible to another or reduce the odds that the bomb would work. Defense in depth also seeks to push detection and interdiction far from U.S. shores. This section illustrates the scope of effort. (See CRS Report RL31733, *Port and Maritime Security: Background and Issues for Congress*, and CRS Report RS21283, *Homeland Security: Intelligence Support*.)

**Programs to Secure Nuclear Weapons and Materials.** One report saw securing “existing stockpiles of nuclear weapons and materials” as “the most critical and cost-effective step to prevent nuclear terrorism.”<sup>10</sup> To this end, the Department of Energy (DOE) operates the Materials Protection, Control, and Accounting Program (MCP&A) to secure fissile materials in former Soviet republics, and the Department of Defense operates the Cooperative Threat Reduction Program to secure nuclear weapons there. In May 2004, DOE announced the Global Threat Reduction Initiative to secure fissile and other radioactive material worldwide. (See CRS Report RL31957, *Nonproliferation and Threat Reduction Assistance: U.S. Programs in the Former Soviet Union*.)

**Other International Programs.** (1) The International Atomic Energy Agency has safeguards to protect, among other things, HEU in nuclear reactors. (2) A joint effort

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<sup>7</sup> J. Carson Mark, Theodore Taylor, Eugene Eyster, William Maraman, and Jacob Wechsler, “Can Terrorists Build Nuclear Weapons?” Nuclear Control Institute, Washington, [<http://www.nci.org/k-m/makeab.htm>]. Requirements include detailed design drawings; individuals with a wide range of weapons skills; equipment; and preparations to create a bomb quickly after obtaining HEU to reduce the risk of detection.

<sup>8</sup> National Research Council, Committee on Science and Technology for Countering Terrorism, *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism*, Washington, National Academy Press, 2002, p. 40. [<http://www.nap.edu/catalog/10415.html>].

<sup>9</sup> *Ibid.*, p. 44.

<sup>10</sup> Matthew Bunn, “Preventing Nuclear Terrorism: A Progress Update,” Project on Managing the Atom, Harvard University, and Nuclear Threat Initiative, October 22, 2003, p. 4.

by that agency, the United States, and Russia moved HEU from a shut-down nuclear reactor in Bulgaria to Russia for conversion to a safer form of uranium.<sup>11</sup> (3) On May 31, 2003, President Bush announced the Proliferation Security Initiative, under which the United States and allies “have begun working on new agreements to search planes and ships carrying suspect cargo and to seize illegal weapons or missile technologies.” Reports claim one such interdiction may have influenced Libya's decision to end its WMD programs.<sup>12</sup> (4) CBP's Container Security Initiative started in January 2002. CSI involves bilateral agreements with foreign ports that export to this nation. CBP teams work with host governments to identify high-risk containers for screening for WMD before they are loaded onto ships. CSI operated in 34 ports in January 2005.<sup>13</sup> (5) Under the Megaports Initiative, MCP&A provides radiation detection equipment and expertise to CBP for screening containers in foreign ports. (6) The U.N.'s International Maritime Organization promulgated the International Ship and Port Facility Security Code, effective July 1, 2004, which requires port operators, ship owners, and others to improve maritime security, such as by creating plans to respond to terrorist attack.

**U.S. Domestic Programs.** Various programs seek to strengthen the security of U.S. ports. As of late 2004, DHS had reportedly distributed about \$560 million in port security grants in the past few years.<sup>14</sup> The Maritime Transportation Security Act (MTSA) of 2002 (P.L. 107-295) requires (Sec.102) assessments of the vulnerability of vessels and U.S. maritime facilities “that may be involved in a transportation security incident,” a plan for deterring and responding to such an incident, assessment of the effectiveness of antiterrorism measures at certain foreign ports, etc. CBP is implementing the Automated Commercial Environment, an electronic system to gather and analyze data on goods entering the United States to help select containers for inspection. On December 21, 2004, President Bush reportedly issued “Maritime Security Policy,” National Security Presidential Directive 41/Homeland Security Presidential Directive 13. While the text has apparently not been released as of mid-January 2005, a report indicates that it requires DHS to set standards for maritime recovery operations in the event of a terrorist attack. It also requires creation of a Maritime Security Policy Coordinating Committee, development of a National Strategy for Maritime Security, integration of global maritime intelligence, coordination of domestic and international outreach, and creation of a comprehensive plan for maritime supply chain security.<sup>15</sup>

**Enhanced Technology.** The last line of defense against a terrorist nuclear attack is the ability to detect nuclear weapons or material entering the United States. A large effort is underway by government agencies, industry, and universities to develop key technologies. By one estimate, the FY2005 appropriation provides \$4.1 billion for

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<sup>11</sup> “IAEA, USA, Russia Assist Bulgaria in Removal of HEU Fuel,” staff report, International Atomic Energy Agency, December 24, 2003, at [<http://www.iaea.org/NewsCenter/News/2003/bulgaria20031224.html>].

<sup>12</sup> Robin Wright, “Ship Incident May Have Swayed Libya,” *Washington Post*, Jan.1, 2004: 19.

<sup>13</sup> “Remarks by Commissioner Robert C. Bonner,” January 11, 2005.

<sup>14</sup> Sam Hananel, “Report Criticizes Use of Port Security Grants,” *Washington Post*, December 29, 2004: 17.

<sup>15</sup> Martin Edwin Andersen, “New Bush National Security Directive on Maritime Issues Charts Administration Course During His Second Term,” *Port Security News*, January 18, 2005.

homeland security R&D.<sup>16</sup> Operation Safe Commerce, a Department of Transportation-CBP “program to fund business initiatives designed to enhance security for container cargo ... will provide a test-bed for new security techniques.”<sup>17</sup> The Trade Act of 2002, P.L. 107-210, sec. 343a, mandates the establishment of a task force to “establish a program to evaluate and certify secure systems of international intermodal transport.”<sup>18</sup>

Terrorists can counter new technologies. If the United States deploys sensors at some ports, terrorists might detonate a weapon before it is inspected, or ship it to another port. If foreign ports screened containers before being loaded onto U.S.-bound ships, terrorists could infiltrate the ports. Securing the largest ports might lead terrorists to use smaller ones. Securing every U.S.-bound container might lead terrorists to smuggle a weapon in a small boat or airplane. Detecting an HEU bomb is difficult because HEU emits very little radiation. R&D is underway to address this key issue.

In 2002 and 2003, ABC News shipped shielded 15-pound cylinders of depleted uranium (DU, natural uranium minus most uranium-235) into U.S. ports in containers. CBP did not detect these shipments. ABC claimed that DU is a good surrogate for HEU; CBP claimed the opposite. In September 2004, DHS issued a report on the topic. It concluded “[i]mprovements are needed in the inspection process to ensure that weapons of mass destruction ... do not gain access to the U.S. through oceangoing cargo containers” and recommended improving detection equipment and search methods.<sup>19</sup>

**Pending Legislation.** Bills related to terrorist nuclear attacks on ports include H.R. 163, Secure Domestic Container Partnership Act of 2005, and H.R. 173, Anti-Terrorism and Port Security Act of 2005.

## Policy Issues

**Securing Nuclear Materials.** The possibility that a terrorist group could make a nuclear weapon given enough HEU, and the difficulty of preventing terrorists from smuggling a weapon into a U.S. port, show the value of securing nuclear weapons and materials in Russia and elsewhere. Are current efforts sufficient?

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<sup>16</sup> American Association for the Advancement of Science, “Defense and Homeland Security R&D Hit New Highs in 2005; Growth Slows for Other Agencies,” November 29, 2004.

<sup>17</sup> U.S. Department of Homeland Security, Bureau of Customs and Border Protection. “Customs and DOT Launch ‘Operation Safe Commerce’ Program,” November 20, 2002, p. 1.

<sup>18</sup> The MTSA Senior Policy Group was established in early 2004 to address mandates in MTSA and the Trade Act that DHS take steps to secure international intermodal cargo shipments. The group is led by the DHS Directorate of Border and Transportation Security and has representatives from the Department of Transportation, the Transportation Security Administration, the Coast Guard, and the Bureau of Customs and Border Protection. Information provided by Department of Homeland Security, August 17, 2004.

<sup>19</sup> U.S. Department of Homeland Security. Office of Inspector General. *Effectiveness of Customs and Border Protection’s Procedures to Detect Uranium in Two Smuggling Incidents*. OIG-04-40, September 2004, 4 p.

**Forensics.** Technology may enable identification of the origin of nuclear material used in a bomb. This forensic capability strengthens the value of controlling Russian nuclear weapons and materials: finding that material for a bomb detonated in the United States came from Russia, a likely source, would in all probability lead to the conclusion that the material was stolen rather than that Russia conducted the attack. At the same time, augmenting already-excellent forensic capability through technology and intelligence could help deter other nations from giving nuclear materials to terrorists.

**Ports in Major Cities.** The terrorist weapons discussed earlier, while lower in yield than strategic weapons, might produce blast damage over a radius of 1 to 2 miles, and fire and fallout beyond that range. Accordingly, it might be argued that ports with the greatest number of people living or working within a mile or two of cargo docks, such as Philadelphia and New York, should have highest priority in receiving security resources.

**Ameliorating Economic Consequences.** Cold War civil defense studies examined how to ameliorate the destructive effects of a large nuclear attack. This effort, and more recent emergency preparedness efforts, provide a template for response and recovery following a terrorist attack using one 15-kiloton weapon. This work does not, however, address possible global economic consequences and how to predict and mitigate them. These issues could benefit from further study and analyses.

**What Priority Should Port Security Have?** The 9/11 Commission wrote, “Opportunities to do harm are as great, or greater, in maritime or surface transportation [compared to commercial aviation]. Initiatives to secure shipping containers have just begun.” Terrorists “may be deterred by a significant chance of failure.”<sup>20</sup> Improving the ability to detect terrorist nuclear weapons in the maritime transportation system may make a terrorist attack on a port less likely to succeed, and thus less probable. The American Association of Port Authorities, a trade association, welcomed federal grants for port security upgrades to comply with the MTSA, but called for “substantially greater resources.”<sup>21</sup> Others agree that more resources are needed to secure U.S. ports, such as to reduce overcrowding of cargo-handling facilities and to hire more workers.<sup>22</sup> A similar case could be made for gas pipelines, electric power plants, rail yards, or bridges. At issue for Congress is how to allocate security funds among ports and other potential targets.

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<sup>20</sup> U.S. National Commission on Terrorist Attacks upon the United States. *The 9/11 Commission Report*. (New York: Norton, 2004), p. 391.

<sup>21</sup> American Association of Port Authorities, “U.S. Ports Laud Additional Federal Security Grants; Caution More Assistance Is Needed,” news release, December 10, 2003, p. 1.

<sup>22</sup> John Broder, “At Nation’s Ports, Cargo Backlog Raises Question of Security,” *New York Times*, July 27, 2004: 12.