

# CRS Report for Congress

## Pakistan's Nuclear Weapons: Proliferation and Security Issues

Updated June 20, 2008

Paul Kerr and Mary Beth Nikitin  
Analysts in Nonproliferation  
Foreign Affairs, Defense, and Trade Division



Prepared for Members and  
Committees of Congress

# Pakistan's Nuclear Weapons: Proliferation and Security Issues

## Summary

Pakistan's nuclear arsenal consists of approximately 60 nuclear warheads. Pakistan continues fissile material production for weapons, and is adding to its weapons production facilities and delivery vehicles. Pakistan reportedly stores its warheads unassembled with the fissile core separate from non-nuclear explosives, and these are stored separately from their delivery vehicles. Pakistan does not have a stated nuclear policy, but its "minimum credible deterrent" is thought to be primarily a deterrent to Indian military action. Command and control structures have been dramatically overhauled since September 11, 2001 and export controls and personnel security programs have been put in place since the 2004 revelations about Pakistan's top nuclear scientists, A.Q. Khan's international proliferation network.

Pakistani and some U.S. officials argue that Islamabad has taken a number of steps to prevent further proliferation of nuclear-related technologies and materials and improve its nuclear security. A number of important initiatives such as strengthened export control laws, improved personnel security, and international nuclear security cooperation programs have improved the security situation in recent years.

Current instability in Pakistan has called the extent and durability of these reforms into question. Some observers fear radical takeover of a government that possesses a nuclear bomb, or proliferation by radical sympathizers within Pakistan's nuclear complex in case of a breakdown of controls. While U.S. and Pakistani officials express confidence in controls over Pakistan's nuclear weapons, it is uncertain what impact continued instability in the country will have on these safeguards. For a broader discussion, see CRS Report RL33498, *Pakistan - U.S. Relations*, by K. Alan Kronstadt. This report will be updated.

## Contents

Background .....	1
Nuclear Weapons .....	1
Delivery Vehicles .....	3
Nuclear Doctrine .....	4
Command and Control .....	5
Security Concerns .....	6
Proliferation Threat .....	10
Pakistan's Response .....	11

# Pakistan's Nuclear Weapons: Proliferation and Security Issues

## Background

The political instability and imposition of emergency rule in Pakistan on November 3, 2007, and the assassination of former Prime Minister Benazir Bhutto on December 27, 2007, has called attention to the issue of the security of Pakistan's nuclear weapons, and how the world can be assured they remain in safe hands during potential transitions of power. Some observers fear scenarios in which Pakistan's strategic nuclear assets are given to or stolen by Al Qaeda sympathizers or other terrorists, or a future government in nuclear Pakistan that might be hostile to the United States.

Measures to improve the security of Pakistan's nuclear weapons have been ongoing and include some cooperation with the United States. Since Pakistan and India's nuclear tests in 1998, increased attention has been given to reducing the risk of nuclear war in South Asia. The two countries have most recently come to the brink of full-scale war in 1999 and 2002 over Kashmir, and realizing the dangers, have developed some nuclear risk reduction measures to prevent accidental war.<sup>1</sup> Pakistan has also developed its command and control systems and improved security of military and civilian nuclear facilities. After the 2004 revelations of an extensive international nuclear proliferation network run by Pakistan's Abdul Qadeer Khan, as well as possible connections between Pakistani nuclear scientists and Al Qaeda, the Pakistani government has made additional efforts to improve export controls and monitor nuclear personnel. The main security challenges for Pakistan's nuclear arsenal are keeping the integrity of the command structure, ensuring physical security, and preventing illicit proliferation from insiders.

## Nuclear Weapons

Pakistan's nuclear energy program dates back to the 1950s, but it was the loss of East Pakistan (now Bangladesh) in a bloody war with India that reportedly triggered a political decision in January 1972 (just one month later) to begin a secret nuclear weapons program. Defense against India is said to be the primary motivation for Pakistan's nuclear deterrent. Observers point to the peaceful nuclear explosion by India in 1974 as the pivotal moment which gave urgency to the program. Pakistan's path to the bomb was through uranium enrichment technology, mastered by the mid-1980s. Pakistan gained technology from many sources. This extensive assistance is reported to have included, among other things, uranium enrichment

---

<sup>1</sup> See CRS Report RL31589, *Nuclear Threat Reduction Measures for India and Pakistan*, by Sharon Squassoni.

technology from Europe, blueprints for a small nuclear weapon from China, and missile technology from China. In 1989, the United States learned that Pakistan had assembled a nuclear warhead,<sup>2</sup> which then led to a cut-off in military and financial aid under the Pressler Amendment.<sup>3</sup> When India conducted nuclear weapon tests on May 12, 1998, Pakistan's government responded two weeks later on May 28 and May 30 with six tests at the Chagai Hills test site in western Pakistan. Test yields were about 10 kilotons and 5 kilotons, according to seismic analysis.<sup>4</sup> The United States imposed additional sanctions after the tests (these were lifted after the September 11<sup>th</sup>, 2001 attacks).

Most observers estimate that Pakistan has enough nuclear material (highly enriched uranium and a small amount of plutonium) for about 60 nuclear weapons.<sup>5</sup> Pakistan's nuclear warheads use an implosion design with a solid core of highly enriched uranium (HEU), approximately 15-20 kg per warhead.<sup>6</sup> Pakistan reportedly continues to produce highly-enriched uranium for weapons at a rate of at least 100 kg per year.<sup>7</sup>

Pakistan has also pursued plutonium-based warheads since the 1990s and continues to produce plutonium for weapons. Pakistan has received Chinese assistance for its plutonium program. The 40-50 megawatt heavy water Khushab plutonium production reactor has been operating since 1998. A second heavy water reactor is being built at Khushab, which will at least double Pakistan's plutonium production capacity.<sup>8</sup> Pakistan's nuclear weapons complex also includes the 300-megawatt reactor at Chasma, a reprocessing plant at Chasma, fuel fabrication plant,

---

<sup>2</sup> A 1985 National Intelligence Council report stated that Pakistan "probably has a workable design for a nuclear explosive device" and was "probably ... a year or two away from a capacity to produce enough" highly enriched uranium for such a device.

<sup>3</sup> The Pressler Amendment (August 1985) linked aid and military sales to two certification conditions: (1) that Pakistan not possess a nuclear explosive device; and (2) that new aid 'will reduce significantly the risk' that Pakistan will possess such a device. For background summary of sanctions legislation, see CRS Report 98-486, *Nuclear Sanctions: Section 102(b) of the Arms Export Control Act and Its Application to India and Pakistan*, by Jeanne Grimmett, and CRS Report RS22757, *U.S. Arms Sales to Pakistan*, by Richard Grimmett.

<sup>4</sup> Seismic data showed yields less than what was officially announced by Pakistan and India. See Gregory van der Vink, Jeffrey Park, Richard Allen, Terry Wallace and Christel Hennet, "False Accusations, Undetected Tests and Implications for the CTB Treaty," *Arms Control Today*, May 1998 [[http://www.armscontrol.org/act/1998\\_05/vimy98.asp](http://www.armscontrol.org/act/1998_05/vimy98.asp)].

<sup>5</sup> "Nuclear Notebook: Pakistan's nuclear forces, 2007," *Bulletin of the Atomic Scientists*, vol. 63, no.3, May/June 2007; Arms Control Association Fact Sheet, [<http://www.armscontrol.org/factsheets/Nuclearweaponswhohaswhat.asp>]; "Global Fissile Material Report 2007," *ibid.*; SIPRI Yearbook 2007.

<sup>6</sup> "Nuclear Notebook," *ibid.*

<sup>7</sup> "Global Fissile Material Report 2007," International Panel on Fissile Materials [[http://www.fissilematerials.org/ipfm/site\\_down/gfmr07.pdf](http://www.fissilematerials.org/ipfm/site_down/gfmr07.pdf)].

<sup>8</sup> David Albright and Paul Brannan, "Commercial Satellite Imagery Suggests Pakistan is Building a Second, Much Larger Plutonium Production Reactor: Is South Asia Headed for a Dramatic Buildup in Nuclear Arsenal?," *ISIS*, July 24, 2006.

tritium production facility, etc.<sup>9</sup> The continued expansion of the complex and production of weapons materials indicates plans to increase its nuclear weapons arsenal in the near future. Pakistan may be partially responding to India's ambitious plans to build a nuclear triad.<sup>10</sup>

## Delivery Vehicles

Pakistan has two types of delivery vehicles for nuclear weapons: aircraft under the Pakistan Air Force and surface-to-surface missiles under the Pakistan Army. Pakistan could deliver its nuclear weapons using F-16s purchased from the United States, provided modifications are made. It is widely believed that Pakistan has made modifications to the F-16s previously sold to them.<sup>11</sup> Concerns have been raised about the impact of these sales on the strategic balance in South Asia.<sup>12</sup> The U.S. government maintains that the sale of additional F-16s to Pakistan will not alter the regional balance of power.<sup>13</sup> The contract for provision of an additional 36 aircraft was signed on September 30, 2006, as was the contract for the weapons for those aircraft, and a contract to perform the mid-life upgrade on Pakistan's F-16A/B model aircraft. Pakistan's F-16 fleet will therefore be expanded, but it is unclear what portion of the fleet will be capable of a nuclear mission. Mirage III and V aircraft could also be used, although would have limited range. A-5's may have been modified to carry a nuclear payload.<sup>14</sup>

After India's first test of its *Prithvi* ballistic missile in 1988, Pakistan jump-started its own missile program. Three types of ballistic missiles are thought to be nuclear-capable: the solid fuel *Hatf-III (Ghaznavi)* and *Hatf-IV (Shaheen)* with a range of 100-290 and 200-650 km respectively; and the medium-range *Hatf-V*

---

<sup>9</sup> See chart of facilities in Pakistan chapter of Joseph Cirincione, Jon B. Wolfsthal, and Miriam Rajkumar, *Deadly Arsenals*, Carnegie Endowment for International Peace, 2005.

<sup>10</sup> "India Working on Sea-based Nuclear Missiles," *Defense News*, October 15, 2007. [<http://www.defensenews.com/story.php?F=3079617&C=landwar>].

<sup>11</sup> A 1993 National Security Council report to Congress indicated that Pakistan would use these aircraft to deliver nuclear weapons. See National Security Council, *Report to Congress on Status of China, India and Pakistan Nuclear and Ballistic Missile Programs*, 1993. [<http://www.fas.org/irp/threat/930728-wmd.htm>].

<sup>12</sup> CRS Report RL33515, *Combat Aircraft Sales to South Asia: Potential Implications*, by Christopher Bolkcom, Richard F. Grimmett, and K. Alan Kronstadt; Zachary Ginsburg, "US Renews Fighter Exports to Pakistan," *Arms Control Today*, September 2007. [[http://www.armscontrol.org/act/2007\\_09/USPakistan.asp](http://www.armscontrol.org/act/2007_09/USPakistan.asp)].

<sup>13</sup> "Release of these systems would not significantly reduce India's quantitative or qualitative military advantage. Release of these modifications to Pakistan will neither affect the regional balance of power nor introduce a new technology as this level of capability or higher already exists in other countries in the region." Defense Security and Cooperation Agency news release, June 28, 2006. [[http://www.dsca.mil/PressReleases/36-b/2006/Pakistan\\_06-11.pdf](http://www.dsca.mil/PressReleases/36-b/2006/Pakistan_06-11.pdf)].

<sup>14</sup> CRS Report RL30623, *Nuclear Weapons and Ballistic Missile Proliferation in India and Pakistan: Issues for Congress*, by K. Alan Kronstadt.

(*Ghauri*) with a 1200 km range. The *Hatf-VI (Shaheen-2)* is under development.<sup>15</sup> Reports also indicate that Pakistan may be developing a nuclear-capable cruise missile, the *Hatf-7 (Babur)*, with ground, sea and air-launched versions.

A.Q. Khan, former head of Khan Research Laboratories, maintained that only the medium-range *Ghauri* missiles would be usable in a nuclear exchange (given fall-out effects for Pakistan of shorter-range missiles). Other observers view the 30 to 50 *Hatf-II* short-range (300km) missiles (modified Chinese M-11s) as potential delivery vehicles for nuclear weapons. *Ghauri* missiles (1350 and 2300km), which reportedly are based on the North Korean *No-Dong* and *Taepo-Dong-1*, are capable of reaching New Delhi with large payloads.<sup>16</sup> Pakistan continues to carry out ballistic missile tests, but notifies India in advance in accordance with the bilateral missile pre-notification pact of October 2005.<sup>17</sup>

## Nuclear Doctrine

Pakistan's strategic doctrine is undeclared, and will probably remain so, but prominent officials and analysts have offered insights concerning its basic tenets.<sup>18</sup> They have indicated that Pakistan's posture is designed to preserve territorial integrity against Indian attack, prevent military escalation, and counter its main rival's conventional superiority. "Minimum credible nuclear deterrence" is the guiding principle.<sup>19</sup> Statements of high level officials point to four policy objectives for Pakistan's nuclear weapons: deter all forms of external aggression; deter through a combination of conventional and strategic forces; deter counterforce strategies by securing strategic assets and threatening nuclear retaliation; and stabilize strategic deterrence in South Asia.<sup>20</sup>

---

<sup>15</sup> Nuclear Notebook, *ibid.*; "Worldwide Ballistic Missile Inventories," *Arms Control Today Fact Sheet*, [<http://www.armscontrol.org/factsheets/missiles.asp>]; and Mahmud Ali Durrani, "Pakistan's Strategic Thinking and the Role of Nuclear Weapons," *Cooperative Monitoring Center Occasional Paper 37*, July 2004. [<http://www.cmc.sandia.gov/cmc-papers/sand2004-3375p.pdf>].

<sup>16</sup> *Bulletin of the Atomic Scientists*, January/February 2002.

<sup>17</sup> "Agreement Between the Republic of India and the Islamic Republic of Pakistan on Pre-Notification of Flight Testing of Ballistic Missiles." Full text on the Henry L. Stimson Center website: [<http://www.stimson.org/?SN=SA20060207949>].

<sup>18</sup> Peter Lavoy, "Pakistan's Nuclear Posture: Security and Survivability," Paper presented to the Conference on Pakistan's Nuclear Future, Nonproliferation Education Center, Washington, DC, April 28, 2006: [<http://www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=20070121-Lavoy-PakistanNuclearPosture&PDFFolder=Essays>].

<sup>19</sup> For an in-depth discussion of minimum deterrence, see Naeem Salik, "Minimum Deterrence and India Pakistan Nuclear Dialogue: Case Study on Pakistan," Landau Network Centro Volta South Asia Security Project Case Study, January 2006. [[http://www.centrovolta.it/landau/South%20Asia%20Security%20Program\\_file%5CDocumenti%5CCase%20Studies%5CSalik%20-%20S.A.%20Case%20Study%202006.pdf](http://www.centrovolta.it/landau/South%20Asia%20Security%20Program_file%5CDocumenti%5CCase%20Studies%5CSalik%20-%20S.A.%20Case%20Study%202006.pdf)].

<sup>20</sup> Mahmud Ali Durrani, "Pakistan's Strategic Thinking and the Role of Nuclear Weapons," *Cooperative Monitoring Center Occasional Paper 37*, July 2004. (continued...)

Pakistani officials state that they have already determined the arsenal size needed for a minimum nuclear deterrent and they will not engage in an arms race with India. Pakistan has also pledged no-first-use against non-nuclear-weapon states, but has not ruled out first-use against a nuclear-armed aggressor that attacks Pakistan — for example, India. Analysts say this ambiguity serves to maintain deterrence against India’s conventional superiority. Others argue that keeping the first-use option against India allows Pakistan to conduct sub-conventional operations while effectively deterring India at the strategic level.<sup>21</sup> Pakistan has reportedly addressed issues of survivability through second strike capability, possible hard and deeply buried storage and launch facilities, road-mobile missiles, air defenses around strategic sites, and concealment measures.<sup>22</sup>

## Command and Control

Pakistan’s command and control over its nuclear weapons is compartmentalized and includes strict operational security. Pakistan’s command and control system is based on “C4I2SR” (command, control, communication, computers, intelligence, information, surveillance and reconnaissance). The system has three components — the National Command Authority (NCA), the Strategic Plans Division (SPD), and the Strategic Forces Commands.<sup>23</sup> The NCA was created in 2000 and for the first time the nuclear program was under military control with oversight. The SPD acts as the secretariat for the NCA and coordinates with the strategic forces commands. The Army, Air Force, and Navy each have their respective strategic force command, but operational control remains with the NCA. The authority to launch a nuclear strike requires consensus within the NCA. The NCA is a 10-member body, which consists of the President, Prime Minister, the chairman of the joint chiefs of staff, the Ministers of Defense, Interior and Finance, the Director-General of the Strategic Plans Division, and the Commanders of the Army, Air Force and Navy.<sup>24</sup> The NCA Chairman, who is the President of Pakistan, casts the final vote.<sup>25</sup>

On December 13, 2007, President Musharraf formalized these authorities and structure in the “National Command Authority Ordinance, 2007.”<sup>26</sup> The NCA was

---

<sup>20</sup> (...continued)

[<http://www.cmc.sandia.gov/cmc-papers/sand2004-3375p.pdf>].

<sup>21</sup> Kanti Bajpai, “No First Use in the India-Pakistan Context,” *Pugwash Workshop No. 279*, November 2002. [<http://www.pugwash.org/reports/nw/bajpai.htm>].

<sup>22</sup> Lavoy, *ibid.*

<sup>23</sup> Durrani, *ibid.*

<sup>24</sup> Salik, *ibid.*

<sup>25</sup> See Lavoy, Slide 19, *ibid.*; and Naeem Salik, “Changes within Pakistan’s Nuclear Security Structure since 1998,” Presentation to the Partnership for Global Security Conference, “Building Confidence in Pakistan’s Nuclear Security,” June 20, 2007. [<http://www.partnershipforglobalsecurity.org/Projects/Globalizing%20Threat%20Reduction%20Project/index.asp>].

<sup>26</sup> “President Promulgated National Command Authority Ordinance,” *Associated Press of* (continued...)

established by administrative order, but now has a legal basis. Analysts point out that the timing of this ordinance was meant to help the command and control system weather political transitions and potentially preserve the military's strong control over the system. The Ordinance also addresses the problems of the proliferation of nuclear expertise and personnel reliability. It outlines punishable offenses related to breach of confidentiality or leakage of "secured information," gives the SPD authority to investigate suspicious conduct, states that punishment can be up to 25 years imprisonment, and applies to both serving and retired personnel, including military personnel, notwithstanding any other laws. As a result, Pakistani authorities say that the Ordinance should strengthen their control over strategic organizations and their personnel.

## Security Concerns

Pakistan's nuclear weapons are reportedly stored unassembled, with the fissile core separated from the non-nuclear explosives. These components are stored separately from delivery vehicles. A Department of Defense report says that Pakistan can probably assemble the weapons fairly quickly.<sup>27</sup> Nevertheless, separate storage may provide a layer of protection against accidental launch or prevent theft of an assembled weapon.<sup>28</sup>

As the United States prepared to launch an attack on the Afghan Taliban after 9/11, President Musharraf reportedly ordered Pakistan's nuclear arsenal be redeployed to "at least six secret new locations."<sup>29</sup> This action came at a time of uncertainty about the future of the region, including the direction of U.S.-Pakistan relations. In President Musharraf's speech justifying his decision to assist the United States against the Taliban, he cited protection of Pakistan's nuclear and missile assets as one of the reasons for the dramatic policy shift.<sup>30</sup> Pakistan's leadership was uncertain whether the U.S. would decide to conduct military strikes against Pakistan's nuclear assets if it did not do so. These events, in combination with the 1999 Kargil crisis, the 2002 conflict with India at the Line of Control and revelations about the A.Q. Khan proliferation network, inspired a variety of reforms to secure the nuclear complex. Risk of nuclear war in South Asia ran high in the 1999 Kargil crisis, when the Pakistani military is believed to have begun preparing nuclear-tipped

---

<sup>26</sup> (...continued)

*Pakistan*, December 13, 2007. [[http://www.app.com.pk/en/index.php?option=com\\_content&task=view&id=23443&Itemid=2](http://www.app.com.pk/en/index.php?option=com_content&task=view&id=23443&Itemid=2)]

<sup>27</sup> U.S. Department of Defense, *Proliferation: Threat and Response*, January 2001, p. 28.

<sup>28</sup> Some experts take the opposite view — that disbursing assets increases the risk of diversion. See Graham Allison, "What About the Nukes?" *Newsweek Web*, December 28, 2007. [<http://www.newsweek.com/id/82259>]

<sup>29</sup> Molly Moore and Kamran Khan, "Pakistan Moves Nuclear Weapons - Musharraf Says Arsenal Is Now Secure," *Washington Post*, November 11, 2001.

<sup>30</sup> "Partial transcript of Pakistan President Musharraf's televised speech asking the people of Pakistan to support his course of action," September 19, 2001. [[http://www.washingtonpost.com/wp-srv/nation/specials/attacked/transcripts/pakistantext\\_091901.html](http://www.washingtonpost.com/wp-srv/nation/specials/attacked/transcripts/pakistantext_091901.html)].

missiles.<sup>31</sup> It should be noted that even at high alert levels of 2001 and 2002, there were no reports of Pakistan mating the warheads with delivery systems.<sup>32</sup>

In the fall of 2007 and early 2008, Pakistan faced another crucial moment in its history and some observers have recently expressed concern about the security of Pakistan's arsenal if political instability persists.<sup>33</sup> Former Prime Minister Benazir Bhutto said in an interview on November 5, 2007, that while President Musharraf says he is firm control of the nuclear arsenal, she is afraid this control could weaken due to instability in the country.<sup>34</sup> Similarly, Michael Krepon of the Henry L. Stimson Center has argued that "a prolonged period of turbulence and infighting among the country's President, Prime Minister, and Army Chief" could jeopardize the army's unity of command, which "is essential for nuclear security."<sup>35</sup> U.S. military officials have also expressed concern about the security of Pakistan's nuclear weapons.<sup>36</sup> Director General of the International Atomic Energy Agency, Mohamed El Baradei, has expressed fears that a radical regime could take power in Pakistan, and thereby acquire nuclear weapons.<sup>37</sup> Experts also worry that while nuclear weapons are currently under firm control, with warheads disassembled, technology could be sold off by insiders during a worsened crisis.<sup>38</sup>

Deputy Secretary of State John D. Negroponte in testimony to Congress on November 7, 2007 expressed confidence that Pakistan's nuclear weapons were not at risk. He said he believes there is "plenty of succession planning that's going on in the Pakistani military" and that Pakistan's nuclear weapons are under "effective technical control."<sup>39</sup> Similarly, Donald Kerr, Principal Deputy Director of National

<sup>31</sup> Bruce Riedel, "American Diplomacy and the 1999 Kargil Summit at Blair House," Center for the Advanced Study of India, Policy Paper Series, 2002. [<http://www.ccc.nps.navy.mil/research/kargil/reidel.pdf>].

<sup>32</sup> Lavoy, *ibid*.

<sup>33</sup> "Opinions Mixed on Pakistani Nuclear Security," *Global Security Newswire*, November 6, 2007. [[http://www.nti.org/d\\_newswire/issues/recent\\_stories.asp?category=nuclear#6783E660](http://www.nti.org/d_newswire/issues/recent_stories.asp?category=nuclear#6783E660)].

<sup>34</sup> Also see comments by David Albright in the same interview. "Pakistan in Crisis: Interview with Benazir Bhutto," *CNN*, November 5, 2007.

<sup>35</sup> "U.S.-Pakistan Strategic Relations," Statement before the Committee on Senate Homeland Security and Governmental Affairs Subcommittee on Federal Financial Management, Government Information, Federal Services, and International Security June 12, 2008.

<sup>36</sup> "Lieutenant General Carter Ham Holds a Defense Department Briefing," *CQ Transcripts*, November 7, 2007.

<sup>37</sup> "Al Baradei to Al Hayat," *Dar Al Hayat*, English Edition on-line, January 10, 2008, [<http://english.daralhayat.com/Spec/01-2008/Article-20080110-639032eb-c0a8-10ed-01ae-81ab2ea588db/story.html>].

<sup>38</sup> Also see comments by David Albright in "Pakistan in Crisis: Interview with Benazir Bhutto," *CNN*, November 5, 2007.

<sup>39</sup> House Foreign Affairs Committee Hearing on Democracy, Authoritarianism and (continued...)

Intelligence, told a Washington audience May 29, 2008, that the Pakistani military's control of the country's nuclear weapons is "a good thing because that's an institution in Pakistan that has, in fact, withstood many of the political changes over the years." President Musharraf has said that Pakistan's nuclear weapons are under "total custodial controls."<sup>40</sup>

The security of Pakistan's nuclear weapons could also be jeopardized by another conflict between India and Pakistan, Krepon argued, explaining that an "escalating war with nuclear forces in the field would increase the probability of accidents, miscalculations, and the use of nuclear weapons." This is because

when tensions rise precipitously with India, the readiness level of Pakistan's nuclear deterrent also rises. Because the geographical coordinates of Pakistan's main nuclear weapon storage sites, missile, and air bases can be readily identified from satellites — and therefore targeted by opposing forces — the dictates of deterrence mandate some movement of launchers and weapons from fixed locations during crises. Nuclear weapons on the move are inherently less secure than nuclear weapons at heavily guarded storage sites. Weapons and launchers in motion are also more susceptible to "insider" threats and accidents.<sup>41</sup>

Such a war would also place stress on the army's unity of command, Krepon added.

The issue of U.S. plans to secure Pakistani nuclear weapons in case of a loss of control by the Pakistani government were famously addressed in Secretary of State Condoleezza Rice's confirmation hearing in January 2005. In response to a question by Senator John Kerry asking what would happen to Pakistan's nuclear weapons if there was a radical Islamic coup in Islamabad, Secretary Rice answered, "We have noted this problem, and we are prepared to try to deal with it."<sup>42</sup> On November 12, 2007, responding to press reports about this contingency, the Pakistan Foreign Office said, "Suffice it to say that Pakistan possesses adequate retaliatory capacity to defend its strategic assets and sovereignty."<sup>43</sup> The Foreign Office spokesman also emphasized that Pakistan's nuclear weapons have been under "strong multi-layered, institutionalized decision-making, organizational, administrative and command and control structures since 1998." The issue of U.S. contingency plans to take over

---

<sup>39</sup> (...continued)

Terrorism in Contemporary Pakistan, November 7, 2007.

<sup>40</sup> "Pakistan Nukes Under Control: Musharraf," *Agence France Presse*, November 13, 2007.

<sup>41</sup> Krepon, June, 12, 2008.

<sup>42</sup> "The Nomination of Dr. Condoleezza Rice to be Secretary of State," Hearings before the Senate Foreign Relations Committee, January 18 and 19, 2005. The concept of a contingency plan to take over Pakistan's nuclear assets was first somewhat sensationally written about by Seymour Hersh, "Watching the Warheads," *The New Yorker*, November 5, 2001.

<sup>43</sup> "Strategic Assets Are Safe, Says FO," *Dawn*, November 12, 2007.

Pakistani strategic assets was raised again in the press following Benazir Bhutto's assassination, and was met with similar assurances by Pakistan's government.<sup>44</sup>

The United States reportedly offered Pakistan nuclear security assistance soon after September 11<sup>th</sup>, 2001.<sup>45</sup> U.S. assistance to Pakistan, which must comply with nonproliferation guidelines, has included the sharing of best practices and technical measures that could help prevent unauthorized or accidental use of nuclear weapons as well as contribute to physical security of storage facilities and personnel reliability.<sup>46</sup> Some press reports say that the United States provided Pakistan with Permissive Action Links (PALs) in 2003, although former Pakistani military officials have said Pakistan has developed PALs for their warheads without assistance.<sup>47</sup> PALs require a code to be entered before a weapon can be detonated. Pakistan reportedly requires the "standard two-man rule" to authenticate access to nuclear release codes, a standard practice in nuclear weapon states.<sup>48</sup> Security at nuclear sites in Pakistan is the responsibility of a 10,000-member security force, commanded by a two-star general.

Former Deputy Secretary of State Richard Armitage confirmed that there has been U.S. assistance in this area. In a recent interview, he said the US was unlikely to intervene militarily in a crisis in Pakistan because "we have spent considerable time with the Pakistani military, talking with them and working with them on the security of their nuclear weapons. I think most observers would say that they are fairly secure. They have pretty sophisticated mechanisms to guard the security of those."<sup>49</sup> Indian National Security Adviser M. K. Narayanan said that the Pakistani nuclear arsenal is safe and has adequate checks and balances.<sup>50</sup> While officials and experts have expressed some assurance as to the security of nuclear weapons themselves, the security of nuclear materials and know-how also pose a significant proliferation challenge.

---

<sup>44</sup> "Pentagon Readies Plan for Pakistan's Nuclear Arsenal," *The Guardian*, December 28, 2007. For a discussion of the difficulties of such a scenario, see Shaun Gregory, "The Security of Nuclear Weapons in Pakistan," Pakistan Security Research Unit Brief Number 22, University of Bradford, November 18, 2007. [[http://spaces.brad.ac.uk:8080/download/attachments/748/Brief\\_22finalised.pdf](http://spaces.brad.ac.uk:8080/download/attachments/748/Brief_22finalised.pdf)]

<sup>45</sup> Alex Wagner, "U.S. Offers Nuclear Security Assistance to Pakistan," *Arms Control Today*, December 2001. [[http://www.armscontrol.org/act/2001\\_12/paknucsecdec01.asp](http://www.armscontrol.org/act/2001_12/paknucsecdec01.asp)].

<sup>46</sup> Joby Warrick, "U.S. Has Concerns Over Security of Pakistan's Nuclear Weapons," *The Washington Post*, November 11, 2007; David Sanger and William Broad, "U.S. Secretly Aids Pakistan in Guarding Nuclear Arms," *The New York Times*, November 17, 2007.

<sup>47</sup> Kaushik Kapisthalam, "Guarding Pakistan's Nuclear Estate," *Asia Times*, April 6, 2005. [[http://www.atimes.com/atimes/South\\_Asia/GD06Df04.html](http://www.atimes.com/atimes/South_Asia/GD06Df04.html)]; Robert Windrem, "Pakistan's Nuclear History Worries Insiders," *NBC News*, November 6, 2007. [<http://www.msnbc.msn.com/id/21660667/>].

<sup>48</sup> David Wood, "Crisis Raises Alarm Over Arsenal," *Baltimore Sun*, November 8, 2007.

<sup>49</sup> "A Conversation With Former Deputy Secretary of State Richard Armitage," *PBS: The Charlie Rose Show*, November 6, 2007.

<sup>50</sup> "Pak Nukes Safely Guarded, Says Narayanan," *The Press Trust of India*, December 16, 2007.

## Proliferation Threat<sup>51</sup>

Many observers are concerned that other states or terrorist organizations could obtain material or expertise related to nuclear weapons from Pakistan.<sup>52</sup> Beginning in the 1970s, Pakistan used clandestine procurement networks to develop its nuclear weapons program. Former Pakistani nuclear official A.Q. Khan subsequently used a similar network to supply Libya, North Korea, and Iran with materials related to uranium enrichment.<sup>53</sup>

Al-Qaeda has also sought assistance from the Khan network. According to former Director of Central Intelligence George Tenet, the United States “received fragmentary information from an intelligence service” that in 1998 Osama bin Laden had “sent emissaries to establish contact” with the network.<sup>54</sup>

Other Pakistani sources could also provide nuclear material to terrorist organizations. According to a 2005 report by the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, al-Qaeda “had established contact with Pakistani scientists who discussed development of nuclear devices that would require hard-to-obtain materials like uranium to create a nuclear explosion.”<sup>55</sup> Tenet explains that these scientists were affiliated with a different organization than the Khan network.

The current status of Pakistan’s nuclear export network is unclear, although most official reports indicate that, at the least, it has been damaged considerably. Director of National Intelligence John D. Negroponte implied that the network had been dismantled when he asserted in a January 11, 2007 statement to the Senate Select Committee on Intelligence that “Pakistan had been a major source of nuclear proliferation until the disruption of the A.Q. Khan network.”<sup>56</sup>

However, when asked about the network’s current status during a July 25, 2007 Senate Foreign Relations Committee hearing, Undersecretary for Political Affairs Nicholas Burns replied that:

---

<sup>51</sup> This section was prepared by Paul Kerr.

<sup>52</sup> For more information on Pakistani proliferation, see CRS Report RL32745, *Pakistan’s Nuclear Proliferation Activities and the Recommendations of the 9/11 Commission: U.S. Policy Constraints and Options*, by Richard P. Cronin, K. Alan Kronstadt, and Sharon Squassoni. Also see CRS Report RL33498, *Pakistan-U.S. Relations*, by K. Alan Kronstadt.

<sup>53</sup> Libya obtained uranium enrichment technology and nuclear weapons designs that could support a nuclear weapons program. North Korea currently has a plutonium-based nuclear weapons program, but it is unclear whether it also has a uranium-based one. Iran is suspected of pursuing both plutonium- and uranium-based nuclear weapons programs.

<sup>54</sup> Tenet, George and Harlow, Bill, *At the Center of the Storm: My Years at the CIA*, HarperCollins: New York, 2007. p. 261.

<sup>55</sup> The report can be found at [<http://www.wmd.gov/report/index.html>].

<sup>56</sup> Unclassified Statement for the Record Annual Threat Assessment, Senate Select Committee on Intelligence, January 11, 2007.

I cannot assert that no part of that network exists, but it's my understanding based on our conversations with the Pakistanis that the network has been fundamentally dismantled. But to say that there are no elements in Pakistan, I'm not sure I could say that.

Similarly, the London-based International Institute for Strategic Studies found in a May 2007 report that "at least some of Khan's associates appear to have escaped law enforcement attention and could ... resume their black-market business."<sup>57</sup>

Asked about Pakistan's cooperation in investigating the network, Burns acknowledged that the United States has not had "personal, consistent access" to Khan, but added that he did not "have all the details of everything we've done." Similarly, the International Atomic Energy Agency (IAEA) has not yet been able to interview Khan directly, according to an agency official. However, Islamabad has responded to written questions from the IAEA and has been cooperative in its investigation of Iran's nuclear program.<sup>58</sup> Khan himself told *Dawn News TV* May 29, 2008, that he would not cooperate with U.S. or IAEA investigators.

A Pakistani Foreign Office spokesperson told reporters in May 2006 that the government considered the Khan investigation "closed" — a position that Islamabad continues to maintain.

## Pakistan's Response

Undersecretary Burns testified in July that the Bush administration has "told the Pakistani government that it is its responsibility ... to make sure" that neither the Khan network nor a "similar organization" resurfaces in the country. Since the revelations about the Khan network, Pakistan appears to have increased its efforts to prevent nuclear proliferation. But whether and to what extent these efforts have been successful is not yet clear. It is worth noting that, because Khan conducted these activities as a government official, they are not necessarily symptomatic of a failure of Islamabad's export controls.

Pakistani officials argue that Islamabad has taken a number of steps to prevent further proliferation of nuclear-related technologies and materials.<sup>59</sup> For example, Pakistan adopted new national export controls legislation in September 2004. This legislation includes a requirement that the government issue control lists for "goods, technologies, material, and equipment which may contribute to designing, development, stockpiling, [and] use" of nuclear weapons and related delivery systems. According to a February 2008 presentation by Zafar Ali, Director of

---

<sup>57</sup> See [<http://www.iiss.org/publications/strategic-dossiers/nbm>].

<sup>58</sup> Personal communication, November 9, 2007.

<sup>59</sup> Details of Pakistan's nuclear-related legislation can be found in the country's reports to the UN 1540 Committee. Both can be found at [<http://daccessdds.un.org/doc/UNDOC/GEN/N04/597/46/PDF/N0459746.pdf?OpenElement>].

Pakistan's Strategic Export Controls Division (SECDIV),<sup>60</sup> the lists, which were issued in October 2005 and are to be periodically updated, include items controlled by multilateral export control regimes, such as the Nuclear Suppliers Group, the Australia Group, and the Missile Technology Control Regime.<sup>61</sup> The export controls legislation also includes a catch-all clause, which requires exporters to notify the government if they are aware or suspect that goods or technology are intended by the end-user for use in nuclear or biological weapons, or missiles capable of delivering such weapons.<sup>62</sup>

The legislation includes several other important elements, such as end-use and end-user certification requirements and new penalties for violators. Since its adoption, Pakistan has established the SECDIV and an associated Oversight Board. The SECDIV is responsible for formulating rules and regulations for implementing the legislation. The board is comprised of officials from multiple agencies and is headed by Pakistan's Foreign Secretary.

Islamabad says that it has also taken several other steps to improve its nuclear security. For example, the government announced in June 2007 that it is "implementing a National Security Action Plan with the [IAEA's] assistance." That same month, Pakistan also joined the U.S. — and Russian-led Global Initiative to Combat Nuclear Terrorism. As noted above, the December 2007 National Command Authority Ordinance also includes measures to prevent the spread of nuclear-related materials and expertise.

The United States has also provided relevant assistance to Pakistan. Burns described several such efforts in his July testimony.<sup>63</sup> And according to an October

---

<sup>60</sup> Presentation given to Partnership for Global Security Workshop, "Meeting the Nuclear Security Challenge in Pakistan," February 21-22, 2008. [[http://www.partnershipforglobalsecurity.org/documents/zafar\\_export.pdf](http://www.partnershipforglobalsecurity.org/documents/zafar_export.pdf)].

<sup>61</sup> The Nuclear Suppliers Group is a multilateral, voluntary group of nuclear supplier states which have agreed to coordinate their exports of civilian nuclear technology and materials in order to prevent importers from using them to produce nuclear weapons. The Australia Group is a voluntary, informal, export-control arrangement through which participating countries coordinate their national export controls to limit the supply of chemicals and biological agents, as well as related equipment, technologies, and knowledge, to countries and nonstate entities suspected of pursuing chemical or biological weapons capabilities. The Missile Technology Control Regime is an informal, voluntary arrangement in which participants agree to adhere to common export policy guidelines applied to an "annex" that lists items related to the proliferation of ballistic and cruise missiles, rockets, and unmanned air vehicles capable of delivering weapons of mass destruction.

<sup>62</sup> The Chemical Weapons Convention Implementation Ordinance of 2000 regulates the import and export of chemicals in accordance with the convention.

<sup>63</sup> Burns mentioned Pakistan's participation in the Container Security Initiative and the Secure Freight Initiative. Under these programs, "the United States and Pakistan worked together to install screening and radiation detection equipment to scan U.S.-bound cargo." He also stated that the Department of Energy "is working with Pakistan on radiation source security and is in the process of finalizing an agreement to install radiation detection equipment at Pakistani ports and border crossings."

U.S. Government Accountability Office report, Islamabad was during fiscal years 2003-2006 the second-largest recipient of bilateral U.S. assistance designed to improve target countries' export controls. Pakistan received such assistance from the Departments of State, Energy, and Homeland Security.<sup>64</sup>

Pakistani officials participating in an April 2007 Partnership for Global Security workshop argued that Islamabad has improved the reliability of its nuclear personnel by, for example, making its security clearance procedures more stringent. However, the officials also acknowledged that Islamabad still needs to do more to control its nuclear expertise.<sup>65</sup>

---

<sup>64</sup> GAO Report, *Nonproliferation: U.S. Efforts to Combat Nuclear Networks Need Better Data on Proliferation Risks and Program Results*, October 31, 2007.

<sup>65</sup> Building Confidence in Pakistan's Nuclear Security: Workshop Synopsis. April 30, 2007.