

## **Pakistan's Nuclear Program**

By Volha Charnysh, NAPF Intern

September 3, 2009

### **Background**

In 1947, British India was separated into the Muslim state of Pakistan (with West and East sections) and the largely Hindu India. Pakistan's geostrategic position next to Communist China combined with the anti-communist attitude of its military made it a natural ally for the United States, and Pakistan joined a number of US-sponsored alliances in return for US military and economic assistance.<sup>1</sup> Pakistan's relationship with neighboring India remained in conflict, however. The states fought two wars over the disputed Kashmir territory – in 1947-48 and 1965.<sup>2</sup> A third war in 1971 resulted in East Pakistan becoming the separate nation of Bangladesh.<sup>3</sup>

The country's uneasy relationship with India explains its acquisition of nuclear weapons. Initially Pakistan seemed to have been seeking only civilian nuclear capabilities. Its civilian nuclear program began with participation in the US Atoms for Peace initiative.<sup>4</sup> In 1955, the Pakistani government formed a 12-member Atomic Energy Committee to advise the government on the peaceful uses of atomic energy and signed an agreement on nuclear cooperation with the United States, under which Pakistan was offered \$350,000 in aid to procure a pool type reactor.

As the relationship with India deteriorated, however, a clandestine nuclear weapons program was launched to offset the country's conventional inferiority against India and to earn it the "prestige" of being the first Muslim nation acquire the atomic bomb.<sup>5</sup> A turning point in Pakistani decision-making was the 1965 war with India, which showed the disparity between the two countries' military capabilities and endangered Pakistan's security alliances with the West.<sup>6</sup>

India's first nuclear test in 1974 strengthened Pakistan's determination to acquire its own nuclear arsenal. Pakistani Prime Minister Zulfikar Ali Bhutto regarded India's nuclear program as a vehicle for intimidating Pakistan and establishing "hegemony in the subcontinent."<sup>7</sup> He vowed that Pakistanis would "eat grass" to keep up with India.<sup>8</sup>

In September 1974, the Central Intelligence Agency (CIA) predicted that Pakistan would require at least 10 years to develop a nuclear weapon.<sup>9</sup> The same month, in a somewhat befuddling move, the head of Pakistan Atomic Energy Commission (PAEC), Dr. Munir Ahmad Khan, in his address at the IAEA conference, said that Pakistan would ask the United Nations General Assembly to declare the South Asian subcontinent to be a nuclear weapon-free zone.<sup>10</sup> Two months later, the UN General Assembly approved the Pakistani proposal by a vote of 82-2, with India and Bhutan voting against it.<sup>11</sup>

The Pakistani nuclear program received a boost in 1975 when Dr. Abdul Qadeer Khan, a German-trained metallurgist, returned to his home country with centrifuge designs stolen from his former employer, a contractor at the European URENCO enrichment consortium.<sup>12</sup> Khan

used the knowledge acquired in the West to develop a large, unsafeguarded centrifuge plant at Kahuta, which infused new energy into the Pakistani nuclear weapons program.

In 1979, alarmed by Pakistan's nuclear ambiguity and quick technological progress, the United States stopped its military and economic aid to Pakistan. Only three years later, the embargo on aid was lifted, however, as Pakistan remained US staunchest ally against communism in the region. In 1985, in a second attempt to slow down Pakistan's nuclear development, the US Congress passed the Pressler Amendment, prohibiting all US foreign aid to Pakistan until the state proved that it possessed no nuclear explosive devices. Instead, in a 1987 interview with an Indian journalist, A. Q. Khan shocked the international community by admitting that Pakistan had the ability to produce nuclear weapons.<sup>13</sup> His honesty was confirmed in 1990 as the United States concluded that with China's nuclear-related materials, scientific expertise, and technical assistance,<sup>14</sup> Islamabad had acquired the capability to assemble a first-generation nuclear device.<sup>15</sup> As a result, in 1990 US economic and military aid was cut off and sanctions were enacted to deter the country from developing nuclear weapons.<sup>16</sup> Despite sanctions and international disapproval, only two weeks after India again tested nuclear devices in May 1998, Prime Minister Nawaz Sharif announced that Pakistan had successfully conducted five nuclear tests and later declared that whether the country was "recognized as a nuclear weapons power or not" it was, in fact, "a nuclear power."<sup>17</sup>

Under military supervision, the scientists working on the nuclear program were allowed great latitude. Unfortunately, nonproliferation concerns hardly ever stopped members of the Pakistani nuclear team from making a profit. Reports of a Pakistan-Libya nuclear connection appeared as early as 1979,<sup>18</sup> and it was later discovered that in 1974 the two states had signed a 10-year nuclear agreement.<sup>19</sup> The nuclear cooperation agreement with Iran was signed in 1986, and in 1988, reports of Pakistanis helping Iran with nuclear enrichment technology emerged.<sup>20</sup> Pakistani nuclear scientists were also alleged to have met with al-Qaeda, and to have offered assistance with building nuclear centrifuges to Iraqi President Saddam Hussein.<sup>21</sup> The puzzle was finally put together when A.Q. Khan admitted in February 2004 on Pakistani television that he had set up a proliferation network supplying nuclear materials, knowledge, and technology to Libya, Iran, and North Korea.<sup>22</sup> The scientist took full responsibility for the transfers, of which Pakistan's government denied any knowledge.<sup>23</sup>

Pakistan's nuclear arsenal is estimated to contain approximately 60 warheads.<sup>24</sup> The country continues fissile material production and is adding to its weapons production facilities and delivery vehicles "even while racked by insurgency."<sup>25</sup> Having initially chosen the uranium enrichment route, in 1998 Pakistan began producing plutonium for more advanced nuclear weapons. Its Khushab research reactor is now capable of yielding 10-15kg of weapons-grade plutonium annually – enough for 2-3 nuclear weapons, assuming five kilograms of plutonium per nuclear weapon.<sup>26</sup> A second plutonium production plant at New Labs, Pakistan Institute of Science and Technology and a third plutonium production reactor are being constructed.<sup>27</sup> In the aftermath of the US-India civil nuclear agreement, China agreed to build two nuclear power plants in Pakistan. However, in the first half of 2009 the country's nuclear program underwent major financial cuts as a result of global economic crisis.<sup>28</sup>

Islamabad's nuclear doctrine is centered on a minimum deterrent and primarily aimed at deterring a conventional Indian attack.<sup>29</sup> Pakistan is not a party to the Nuclear Non-Proliferation Treaty (NPT) nor the Comprehensive Test Ban Treaty (CTBT) and is opposed to the Fissile Material Cut-Off Treaty (FMCT). However, Pakistan joined some multilateral nonproliferation

and anti-terrorism efforts such as the Global Initiative on Combating Nuclear Terrorism and the US Secure Freight Initiative.<sup>30</sup>

Pakistan frequently links its position on nuclear disarmament as well as its accession to the NPT and the CTBT to that of India.<sup>31</sup> It has been highly critical of the Indo-US nuclear cooperation agreement. However, Pakistan itself pursued a civilian nuclear cooperation agreement with the United States as well as the eventual exemption from Nuclear Suppliers Group (NSG) regulations (along the lines of India's exemption in 2008). Islamabad's overtures were turned down by Washington.

The National Command Authority (NCA), headed by the President of Pakistan, is the main nuclear decision-making body in the country.<sup>32</sup> Additionally, the Strategic Plans Division (SPD) controls the country's nuclear weapons and facilities, acting as the secretariat of the NCA.

In recent years, Pakistan has sought to strengthen export control of sensitive nuclear technologies and to improve nuclear safety by passing the 2004 Export Control Act, establishing the Ministry of Foreign Affairs' Strategic Export Control Division (SECDIV),<sup>33</sup> and adopting measures to strengthen physical security of nuclear weapons and installations.<sup>34</sup> Washington has also provided various levels of assistance to secure Pakistan's nuclear arsenal. Since September 2001, the Bush administration has spent almost \$100 million on a highly classified program to help Pakistan secure its nuclear arsenal, according to a November 2007 *New York Times* report.<sup>35</sup>

## **Timeline**

**October 1954:** Pakistan announces plans for the establishment of an atomic research body.

**August 11, 1955:** Pakistan and the United States sign an agreement on cooperation concerning the peaceful uses of nuclear energy.

**March 1956:** Pakistani Atomic Energy Commission (PAEC) is formed.

**1958:** Military takes power in Pakistan.

**1963:** Pakistan begins operation of the first research nuclear reactor at the Pakistan Institute of Nuclear Science and Research (PINSTECH) under comprehensive IAEA safeguards.

**May 1965:** Pakistan signs a contract with the Canadian General Electric Company (CGE) to build a 137MW heavy water nuclear power reactor on a turnkey basis at Karachi.

**1960-1967:** Pakistan sends 600 scientists and engineers abroad for training in the field of nuclear sciences.

**1969:** The United Kingdom Atomic Energy Agency (UKAEA) agrees to supply Pakistan with a nuclear fuel reprocessing plant capable of extracting 360g of weapons-grade plutonium annually. Five Pakistani nuclear scientists are sent to Britain for training.

**1970:** Pakistan builds a pilot-scale plant at Dera Ghazi Khan for the concentration of uranium ores. It does not sign the NPT, which comes into effect.

**December 20, 1971:** Zulfikar Ali Bhutto assumes power in Pakistan and tasks Munir Ahmad Khan to prepare a report on Pakistan's nuclear infrastructure.

**January 1972:** Munir Ahmad Khan replaces Dr. Ishrat Hussain Usmani as Chairman of the PAEC.

**May 1972:** Pakistani metallurgist Dr. Abdul Qadeer Khan takes up a job at the metallurgical section of Dutch Physical Dynamics Laboratory (FDO), a subsidiary of Verenigde Machine-Fabrieken.

**October 1972:** Two Pakistani nuclear scientists, Dr. Riazuddin (Riaz Uddin) and Dr. Mohammad Masud, temporarily working at the International Center for Theoretical Physics (ICTP), Italy, return to Pakistan to begin theoretical work on a fission explosive device.

**October 4, 1972:** Pakistan begins operation of the 137,000-kilowatt Karachi Nuclear Power Plant (KANUPP).

**March 1973:** Three Pakistani nuclear scientists – Khalil Qureshi, Zafarullah, and Abdul Majid – are sent to the headquarters of the Belgonucleaire in Mol, Belgium, to participate in the designing of a pilot nuclear fuel reprocessing facility as well as to gain training in reprocessing spent fuel.

**December 27, 1973:** Large uranium deposits are discovered in southern Punjab province.

**January 18, 1974:** Canada provides a line of credit to Pakistan for flood relief activities as well for the maintenance of the Karachi Nuclear Power Plant (KANUPP).<sup>36</sup>

**March 1974:** Chairman of the Pakistan Atomic Energy Commission (PAEC) Dr. Munir Ahmed Khan constitutes a team of scientists, the so-called “Wah Group,” to begin clandestine work on a nuclear explosive device.

**April 1974:** Pakistan signs a contract with France for the supply of a nuclear fuel reprocessing plant constructed at Chashma.<sup>37</sup>

**May 1974:** Pakistani Prime Minister Zulfikar Ali Bhutto meets with senior Pakistani officials to discuss India's nuclear test and warns that Pakistan will not be threatened by India's 'nuclear blackmail' and will not alter its current policies.<sup>38</sup>

**September 1974:** In a secret memorandum, titled "Prospects of Further Proliferation of Nuclear Weapons," the CIA predicts that Pakistan will require at least 10 years to carry out a nuclear weapons development program.<sup>39</sup>

**November 21, 1974:** The UN General Assembly approves a Pakistani proposal to create a nuclear weapon-free zone in South Asia. The proposal passes by a vote of 82-2, with India and Bhutan voting against the proposal.<sup>40</sup>

**1974:** Pakistan and Libya sign a 10-year nuclear cooperation agreement.<sup>41</sup>

**March 1976:** Pakistan sets up "Kahuta Research Laboratories" near Islamabad to establish a uranium enrichment plant to seek nuclear capability.

**1979:** The United States cuts off all aid to Pakistan after refusing to accept assurances that the nuclear program is peaceful.

**1982:** The United States lifts embargo and resumes economic and military aid to Pakistan.

**1983:** Dutch court sentences Abdul Qadeer Khan to four years' in jail after he is convicted in absentia of nuclear espionage. Decision is later overturned on a technicality.

**November 1986:** Pakistan and Iran sign nuclear cooperation agreement.

**October, 1990:** The United States stops all aid to Pakistan over suspicions that its nuclear program is weapons-oriented.

**1993:** Pakistan proposes to India the creation of a missile-free zone in south Asia

**1996:** India and Pakistan exchange lists of atomic installations, which each side has pledged not to attack under an over seven-year-old confidence-building agreement.<sup>42</sup> The agreement collapses when India tests a Prithvi II missile capable of carrying nuclear warheads. Pakistan says the missile is designed to attack its cities.

**April, 1998:** Pakistan tests 937-mile range Ghauri missile, which is meant to deter India.

**May, 11, 1998:** India conducts five nuclear tests.

**May 28, 1998:** Pakistan detonates five nuclear devices.<sup>43</sup>

**May 30, 1998:** Pakistan tests one more nuclear warhead, with a yield of 12 kilotons, bringing the total number of claimed tests to six.<sup>44</sup>

**March 2001:** Pakistani President Pervez Musharraf removes A.Q. Khan as head of Pakistan's nuclear programs and names him as scientific adviser to the president.

**2002:** Tensions between India and Pakistan rise after the attack on parliament in New Delhi is blamed on Pakistani-based militants.

**December, 2003:** Pakistan questions A.Q. Khan over allegations of proliferation.

**February 2004:** A senior Pakistani military official says Khan makes statement confessing to supplying sensitive nuclear technologies and materials to Iran, Libya and North Korea. Khan make personal apology to the nation on state television.

**February 2009:** Pakistani court lifts A. Q. Khan's house arrest and declares him a free man.

**August 29, 2009:** Pakistani court lifts any remaining restrictions on the movements of A.Q. Khan, but reinstates them on September 2.

## **Current issues**

It is still unclear whether Islamabad has disclosed and disbanded all links of the A.Q. Khan proliferation network, as Mark Fitzpatrick, Senior Fellow for Nonproliferation at the International Institute for Strategic Studies, pointed out at May 2007 Council on Foreign Relations meeting on nuclear black markets.<sup>45</sup> In fact, Pakistan's recent release of A.Q. Khan from house arrest and subsequent lifting of all travel restrictions on the nuclear scientists may signal that Pakistan does not take the risk of nuclear proliferation seriously.<sup>46</sup>

In addition, political instability in Pakistan<sup>47</sup> and increasing terrorist and insurgent attacks lead to concerns that Islamabad's nuclear technology or fissile material may end up in the wrong hands.<sup>48</sup> Some observers fear scenarios such as the capture of nuclear weapons by the Taliban, the ascension of religious extremists in Islamabad, or collapse of the Pakistani Government. Experts say the risk of accidents or theft increases exponentially if a war with nuclear-armed India erupts.<sup>49</sup> The conflict could flare up any time. For example, on December 13, 2001, after a terrorist attack on the Indian Parliament, India deployed forces along the border with Pakistan. In July 2009, Pakistani officials called India's launch of nuclear-powered submarine "detrimental to regional peace and stability" and warned against reviving the arms race in the region.<sup>50</sup>

Despite Pakistan's assurances, terrorist incidents inside the country continue. According to a recent scholarly article by Shaun Gregory, a professor at University of Bradford in Britain, militants have attacked Pakistani nuclear facilities three times since 2007.<sup>51</sup> In January 2008, the director general of the IAEA, Mohamed ElBaradei, expressed concern about the security of Pakistan's nuclear weapons. His warning was dismissed in Islamabad, however.<sup>52</sup> According to the Pentagon, US Defense Secretary Robert Gates and chairman of the US Joint Chiefs of Staff, Admiral Mike Mullen, are also "comfortable" with the security of the Pakistani nuclear arsenal.<sup>53</sup>

## **Recommendations**

As long as China and India retain their arsenals, so will Pakistan. Improving the relationship between Islamabad and New Delhi and stabilizing the region is the only way to avoid the rapid growth of Pakistan's nuclear arsenal and the proliferation risks such growth entails.

*Reduce incentives to test and deploy new nuclear weapons.*

The first step in preventing a new nuclear arms race between India and Pakistan is reducing incentives to test and deploy new nuclear weapons, which can be accomplished if the United States takes the lead in ratifying the CTBT and urges India and Pakistan to follow its example.

*Resolve the Kashmir issue.*

The United States should also continue to support of ongoing Indian and Pakistani efforts to resolve the Kashmir issue.<sup>54</sup> Washington should avoid creating an impression that one or the other country gets preferential treatment, as occurred after the US-India nuclear cooperation agreement was signed. Such double standards only erode US credibility and send reassuring signals to nuclear proliferants seeking easy profit without considering the gravity of consequences. Being strict with its own allies, like Pakistan, is a sure test of US nonproliferation commitment.

*Urge Pakistan to make its nuclear trading record transparent to the IAEA.*

Because of Pakistan's involvement in the nuclear black market in the past, the country must be urged to make its nuclear trading record transparent to the IAEA so the international community can know with whom and what Pakistan trades.<sup>55</sup> Additionally, greater intelligence sources should be devoted to Pakistan's export activities and expanding the scope of the Proliferation Security Initiative (PSI), including taking measures to stop illicit nuclear shipments and eradicating nuclear black market networks.

*Improve the security of Pakistani nuclear arsenal.*

Finally, the United States should continue to assist Pakistan with improving the security of its nuclear arsenal in ways that do not encourage new testing and modernization. It should also stress that the smaller the arsenal the lower the risks of weapons getting into the wrong hands and the lower the costs of protecting and maintaining the arsenal.

---

<sup>1</sup> Samina Ahmed, "Pakistan's Nuclear Weapons Program: Turning Points and Nuclear Choices," *International Security*, volume 23, issue 4, pages 178-204, Spring 1999: 181.

<sup>2</sup> Pakistan refused to accept the accession of the Muslim-majority state of Kashmir to India, which resulted in armed conflict in 1948. India, however, succeeded in retaining control over most of the state's territory. India and Pakistan have since rejected each other's authority over Kashmir, and a Line of Control, instead of an international boundary, divides Indian- and Pakistani-administered Kashmir. The dispute is ongoing, but discussions and confidence-building measures have led to decreased tensions since 2002.

<sup>3</sup> K. Shankar Bajpai, "Untangling India and Pakistan," *Foreign Affairs*, Vol. 82, No. 3 (May - Jun., 2003), pp. 112-126.

<sup>4</sup> Leonard Weiss, "Atoms for Peace," *Bulletin of the Atomic Scientists*, Vol. 59 No. 6 (Nov./Dec. 2003), pp. 34-44: 44.

<sup>5</sup> Sharon Otterman and Jayshree Bajoria, "Controls on Pakistan's Nuclear Technology," February 20, 2008. <http://www.cfr.org/publication/7742/> Accessed August 11, 2009.

<sup>6</sup> Ahmed, 182.

<sup>7</sup> Information Bank Abstracts, *New York Times*, 8 June 1974; in Lexis-Nexis Academic Universe, 8 June 1974, <http://web.lexis-nexis.com/>.

<sup>8</sup> William Epstein, "Why states go- and don't go- nuclear," *Annals of the American Academy of Political and Social Science*, Vol. 430, *Nuclear Proliferation: Prospects, Problems, and Proposals* (Mar. 1977), pp. 16-28: 19.

<sup>9</sup> AP, 27 January 1978; in Lexis-Nexis Academic Universe, 27 January 1978, <http://web.lexis-nexis.com/>.

<sup>10</sup> Information Bank Abstracts, *New York Times*, 18 September 1974; in Lexis-Nexis Academic Universe, 18 September 1974, <http://web.lexis-nexis.com/>.

<sup>11</sup> Kathleen Teltsch, Information Bank Abstracts, *New York Times*, 21 November 1974; in Lexis-Nexis Academic Universe, 21 November 1974, <http://web.lexis-nexis.com/>.

<sup>12</sup> An entire plant for producing the process gas UF<sub>6</sub> was smuggled from Germany. US Congress, Senate, *Hearing before the Subcommittee on Energy, Nuclear Proliferation, & Federal Services of the Committee on Governmental Affairs*, 96th Cong., 1st sess., May 1, 1979. See also US Congress, House of Representatives, *Hearing Before the Subcommittees on Asian & Pacific Affairs and on International Economic Policy and Trade of the Committee on Foreign Affairs*, 100th Cong., 1st sess., July 22, 1987. Cited in Joel Ullom, "Enriched Uranium versus Plutonium: Choice of Fissile Material," *The Nonproliferation Review*, fall 1994, pp. 1-15: 7.

<sup>13</sup> Christopher C. Lary, "A.Q. Khan and the limits of the non-proliferation regime," 2005 NPT Renewal Conference, Disarmament Forum, <http://www.unidir.org/pdf/articles/pdf-art2188.pdf> Accessed July 6, 2009.

<sup>14</sup> Fissile materials. Copy citation from other places. Shahid-ur-Rehman, "China Offers to Help Pakistan Build Two More Reactors at Chashma," *Nucleonics Week*, October 23, 2008.

<sup>15</sup> Pakistan Profile, NTI, [http://www.nti.org/e\\_research/profiles/Pakistan/Nuclear/index.html](http://www.nti.org/e_research/profiles/Pakistan/Nuclear/index.html).

<sup>16</sup> Robert M. Hathaway, "Confrontation and Retreat: The US Congress and the South Asian Nuclear Tests," *Arms Control Association*, [http://www.armscontrol.org/act/2000\\_01-02/rhchart](http://www.armscontrol.org/act/2000_01-02/rhchart). Accessed July 5, 2009.

<sup>17</sup> Quoted in "Prime Minister Links Pak-India Amity to Kashmir Solution," *News*, June 14, 1998.

<sup>18</sup> Leonard Weiss, "It's Déjà vu all over again," *Bulletin of the Atomic Scientists*, May/June 2004, pp. 52-59: 52.

- 
- <sup>19</sup> Don Oberdorfer, Michael Gatier, and Maralee Schwartz, "Pakistan: The Quest for Atomic Bomb; Problem Discussed by West, Moscow, Peking," *Washington Post*, 27 August 1979, First Section, A1; in Lexis-Nexis Academic Universe, 27 August 1979, <http://web.lexis-nexis.com/>.
- <sup>20</sup> Leonard Weiss, "It's Déjà vu all over again," *Bulletin of the Atomic Scientists*, May/June 2004, pp. 52-59: 52.
- <sup>21</sup> Sharon Otterman and Jayshree Bajoria, "Controls on Pakistan's Nuclear Technology," February 20, 2008. <http://www.cfr.org/publication/7742>. Accessed August 11, 2009.
- <sup>22</sup> "A Brief History of Pakistan's Nuclear Program, *Federation of American Scientists*, <http://www.fas.org/nuke/guide/pakistan/nuke>. Accessed June 25, 2009.
- <sup>23</sup> Sharon Otterman and Jayshree Bajoria, "Controls on Pakistan's Nuclear Technology," February 20, 2008. <http://www.cfr.org/publication/7742/> Accessed August 11, 2009.
- <sup>24</sup> Norris, Robert S.; Hans M. Kristensen. "Pakistani nuclear forces, 2007". *Bulletin of the Atomic Scientists*, Vol. 63 No. 3, pp. 71-73.
- <sup>25</sup> "Pakistan Is Rapidly Adding Nuclear Arms, US Says, *New York Times*, May 2009. <http://www.nytimes.com/2009/05/18/world/asia/18nuke.html>. Accessed August 13, 2009.
- <sup>26</sup> Ullom, 7.
- <sup>27</sup> avid Albright and Paul Brannan, "Pakistan Expanding Plutonium Separation Facility Near Rawalpindi," Institute for Science and International Security, May 19, 2009, [isis-online.org/publications/southasia/newkhushab.pdf](http://isis-online.org/publications/southasia/newkhushab.pdf).
- <sup>28</sup> The Pakistan Atomic Energy Commission (PAEC)'s classified projects were cut by 35%. "Pak Nuclear Programme Faces 35 pc Cut," *The News (Pakistan)*, May 1, 2009, [thenews.com.pk/top\\_story\\_detail.asp?Id=21848](http://thenews.com.pk/top_story_detail.asp?Id=21848). Cited in Pakistan Profile, NTI, [http://www.nti.org/e\\_research/profiles/Pakistan/Nuclear/index.html](http://www.nti.org/e_research/profiles/Pakistan/Nuclear/index.html)
- <sup>29</sup> Peter Lavoy, "Pakistan's Nuclear Posture: Security and Survivability," Nonproliferation Policy Education Center, January 2007, pp. 4-5, [www.npec-web.org](http://www.npec-web.org). Cited in NTI.
- <sup>30</sup> "Radiation Detection Testing Underway at Two Foreign Sea Ports," Press Release, Department of Homeland Security, April 11, 2007, [www.dhs.gov](http://www.dhs.gov). Cited in NTI.
- <sup>31</sup> "Pakistan Ready to Phase Out Nukes if India Does So," *The Daily Times*, May 24, 2009, [www.dailytimes.com.pk/default.asp?page=2009\05\24\story\\_24-5-2009\\_pg1\\_4](http://www.dailytimes.com.pk/default.asp?page=2009\05\24\story_24-5-2009_pg1_4).
- <sup>32</sup> The NCA was formally and legally established in December 2007, although it had been in existence since 2000. "Musharraf promulgates ordinance to establish NCA," *The Daily Times*, December 14, 2007, [www.dailytimes.com](http://www.dailytimes.com). Sharon Otterman and Jayshree Bajoria, "Controls on Pakistan's Nuclear Technology," February 20, 2008. <http://www.cfr.org/publication/7742/> Accessed August 11, 2009.
- <sup>33</sup> "Pakistan Joins Initiative to Combat Nuclear Terrorism, Establishes Strategic Export Control Division," *International Export Control Observer*, June/July 2007, pg. 3, [www.cns.mii.edu](http://www.cns.mii.edu).
- <sup>34</sup> Michelle Marchesano, "Meeting the Nuclear Security Challenge in Pakistan," Partnership for Global Security, Conference Report, April 2008, [www.partnershipforglobalsecurity.org](http://www.partnershipforglobalsecurity.org).
- <sup>35</sup> David E. Sanger and William J. Broad, "US Secretly helps Pakistan in Guarding its Nuclear Arms," *New York Times*, November 18, 2007. [http://www.nytimes.com/2007/11/18/washington/18nuke.html?\\_r=3&pagewanted=1](http://www.nytimes.com/2007/11/18/washington/18nuke.html?_r=3&pagewanted=1). Also see Sharad Joshi & Togzhan Kassenova, "Pakistan and Cooperative Threat Reduction," *Nuclear Threat Initiative*, Issue Brief, August 4, 2008, [www.nti.org/e\\_research/e3\\_ctr\\_pakistan.html](http://www.nti.org/e_research/e3_ctr_pakistan.html).
- <sup>36</sup> Information Bank Abstracts, *Wall Street Journal*, 18 January 1974; in Lexis-Nexis Academic Universe, 18 January 1974, <http://web.lexis-nexis.com/>.
- <sup>37</sup> "Ban this Bomb-To-Be," *Economist*, 14 April 1974, *World Politics and Current Affairs, International*, pg. 56; in Lexis-Nexis Academic Universe, 14 April 1974, <http://web.lexis-nexis.com/>
- <sup>38</sup> Information Bank Abstracts, *New York Times*, 20 May 1974; in Lexis-Nexis Academic Universe, 20 May 1974, <http://web.lexis-nexis.com/>.
- <sup>39</sup> AP, 27 January 1978; in Lexis-Nexis Academic Universe, 27 January 1978, <http://web.lexis-nexis.com/>.
- <sup>40</sup> --Kathleen Teltsch, Information Bank Abstracts, *New York Times*, 21 November 1974; in Lexis-Nexis Academic Universe, 21 November 1974, <http://web.lexis-nexis.com/>.
- <sup>41</sup> Don Oberdorfer, Michael Gatier, and Maralee Schwartz, "Pakistan: The Quest for Atomic Bomb; Problem Discussed by West, Moscow, Peking," *Washington Post*, 27 August 1979, First Section, A1; in Lexis-Nexis Academic Universe, 27 August 1979, <http://web.lexis-nexis.com/>.
- <sup>42</sup> <http://www.fas.org/nuke/guide/pakistan/nuke/chron.htm>
- <sup>43</sup> Pakistan claimed that the five nuclear tests measured up to 5.0 on the Richter scale, with a reported yield of up to 40 KT (equivalent TNT). <http://www.fas.org/nuke/guide/pakistan/nuke/chron.htm>
- <sup>44</sup> <http://www.fas.org/nuke/guide/pakistan/nuke/chron.htm>
- <sup>45</sup> Nuclear Black Markets: Pakistan, A.Q. Khan and the Rise Of Proliferation Networks [Rush Transcript; Federal News Service]. Council on Foreign Relations, May 9, 2007, <http://www.cfr.org/publication/13308/> Accessed August 13, 2009.

---

<sup>46</sup> Salman Massood, "Court Rules against Limiting Movements of Pakistani Scientist," *New York Times*, August 28, 2009. "Pakistan and Nuclear Proliferation," *The Boston Globe*, March 5, 2009.

<sup>47</sup> In December 2007 former prime minister Benazir Bhutto was assassinated and in February 2008 two nuclear officials were kidnapped in Pakistan's tribal areas. Sharon Otterman and Jayshree Bajoria, "Controls on Pakistan's Nuclear Technology," February 20, 2008. <http://www.cfr.org/publication/7742/> Accessed August 11, 2009.

<sup>48</sup> Pakistan's Nuclear Weapons: Proliferation and Security Issues  
Paul K. Kerr and Mary Beth Nikitin, CRS report for Congress, June 12, 2009.

<sup>49</sup> Sharon Otterman and Jayshree Bajoria, "Controls on Pakistan's Nuclear Technology," February 20, 2008. <http://www.cfr.org/publication/7742/> Accessed August 11, 2009.

<sup>50</sup> "India submarine 'threatens peace,'" *BBC News*, July 28, 2009. [http://news.bbc.co.uk/2/hi/south\\_asia/8171715.stm](http://news.bbc.co.uk/2/hi/south_asia/8171715.stm).

<sup>51</sup> Declan Walsh, "Pakistan denies al-Qaida targeting nuclear facilities," *Guardian*, August 12, 2009, <http://www.guardian.co.uk/world/2009/aug/12/pakistan-nuclear-al-qaida>.

<sup>52</sup> Pervez Hoodbhoy, chairman of the department of physics at Quaid-e-Azam University in Islamabad, writes in *The New York Times* op-ed that Pakistanis live in a state of denial, which could have disastrous consequences. Pervez Hoodbhoy, "A state of denial," *New York Times*, January 6, 2008.

[http://www.nytimes.com/2008/01/16/opinion/16iht-edhood.1.9260885.html?\\_r=1](http://www.nytimes.com/2008/01/16/opinion/16iht-edhood.1.9260885.html?_r=1) Assessed August 13, 2009.

<sup>53</sup> "Pakistan Military Denies Nuclear Security Report," *VOA*, August 12, 2009.

<http://www.voanews.com/english/2009-08-12-voa36.cfm>. Accessed on August 12, 2009.

<sup>54</sup> Leonard Weiss, "It's Déjà vu all over again," *Bulletin of the Atomic Scientists*, May/June 2004, pp. 52-59: 59.

<sup>55</sup> *Ibid.*