

CHAPTER 2

KAHN'S NUCLEAR EXPORTS: WAS THERE A STATE STRATEGY?

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HOW THE NETWORK OPERATED

Pakistani nuclear-related exports began about a decade after their imports network was set up in the mid-1970s. The Pakistanis thus had acquired a very significant experience in dealing with nuclear transfers, legal and illegal. Contacts and procedures used for Pakistani imports were sometimes of direct use to exports when they involved transfers from Western firms, intermediaries and shell companies.

The network exported two different things: know-how on uranium enrichment and weapons design, and centrifugation technology. Its clients were North Korea, Iran, Iraq, Libya, and maybe others. Once fully matured, it comprised several main “nodes”: the United Arab Emirates (UAE) (the “company’s headquarters” starting in 1999), Malaysia, Turkey, and South Africa – not including various personal properties around the world.¹ There were half a dozen “workshops” around the globe, with Dubai serving as the main platform for re-exporting.² A. Q. Khan set up dozens of shell companies to that effect, sometimes just for one-time use.

A total of about 50 people were actively involved in the network.³ But Khan operated with a dozen key close associates, who were sometimes in competition

with each other. It was a real “family business.” Those included:

1. Buhary Syed Abu Tahir, a Sri Lankan national. He was, so to say, the “chief operating officer” of the exports network. His involvement started in the second part of the 1980s.⁴ His “headquarters” was the Dubai-based firm, SMB Computers.

2. S. M. Farouq, an India-born businessman based in Dubai (and Tahir’s uncle), who made the initial contacts with Iran and was also involved in the Libya deal.⁵

3. Heinz Mebus, a German businessman and college classmate of Khan, who was also involved in the early deals with Iran.⁶

4. Peter Griffin, a British national who designed the Libyan “Machine Shop 1001.” He imported machines from Spain and other European countries for that project.⁷

5. Paul Griffin, Peter’s son, who operated Gulf Technical Industries, one of the main Dubai-based front companies.⁸

6. Urs Tinner, a Swiss national and long-time associate of Khan, who oversaw the production of centrifuge parts in Malaysia as a “consultant” until 2003.

7. Friedrich Tinner (Urs’s father, president of the Swiss firm CETEC).

8. Marco Tinner (Urs’s brother, president of the Swiss firm Traco). Both Friedrich and Marco were involved in the Iran and Libya enterprises. Their role was essentially to buy components from Europe.

9. Gotthard Lerch, another long-time associate, a German national who has been described as Tahir’s main contractor. Involved in both the Iran and Libya cases, he was, in particular, in charge of the South African “node.”⁹

10. Gerhard Wisser, a German mechanical engineer and an old acquaintance of Lerch, who involved him in the Libya operation. Wisser in turned involved Daniel Geiges (a Swiss mechanical engineer who worked in his company, Krisch Engineering) and Johan Meyer (a South African engineer).¹⁰

11. Mohammed Farooq, a KRL official in charge of procurement and sales abroad.¹¹

The main companies reportedly involved in centrifuge exports were Khan Research Laboratories (Pakistan), which provided ring magnets, aluminium and maraging steel, flow-forming and balancing equipment, vacuum pumps, noncorrosive pipes and valves, end-caps and baffles, and power supply; Scomi Precision Engineering (Malaysia), which provided aluminium and maraging steel, end-caps and baffles; SMB Computers (UAE) which provided noncorrosive pipes and valves, end-caps and baffles, and power supply; ETI Elektrotechnik (Turkey), which provided aluminium and maraging steel, power supply; and Trade Fin (South Africa) which provided flow-forming and balancing equipment, vacuum pumps, non-corrosive pipes and valves.¹² Other companies involved included Bikar Mettale Asia (Singapore), Hanbando Balance Inc. (South Korea), Krisch Engineering (South Africa), CETEC (Switzerland), Traco (Switzerland), and EKA (Turkey).¹³ Equipment for Libya was imported by the Tinner family from Spain (vacuum pumps, flow-forming machines), Italy (special furnaces), France, the United Kingdom and Taiwan (machine-tools), as well as Japan (a 3-D measuring tool).¹⁴

As will be seen, however, there is evidence that high-level political and military leaders were also involved in nuclear exports. This occurred despite the written assurances given twice to the United States (first by Zia ul-Haq in November 1984, then in October

1990 by president Ghulam Ishaq Khan) and countless official statements testifying to the immaculate state of Pakistan's proliferation record.

Thus, the network was not a "Wal-Mart," as International Atomic Energy Agency (IAEA) Director General Mohammed El-Baradei wrongly characterized it. Rather, it was an "Import-Export Enterprise." From the initial import-oriented network under the direction of M. A. Khan, a separate, export-oriented branch developed under the direction of A. Q. Khan starting in the mid-1980s. In the late 1990s, it became more decentralized as A. Q. Khan realized he was under surveillance. It became a "privatized subsidiary" of the imports network.

The story cannot be reduced to the simple "reversal of the flow" described by some. However, there were clear links between the import and export networks. Some of the components that A. Q. Khan exported were also components he needed for the national program; thus, starting in the mid-1980s, he reportedly began to order more components than necessary for the national program.¹⁵

Also, several key individuals involved in Pakistani exports were also involved in the imports. Mohammed Farooq, A. Q. Khan's principal deputy, was reportedly in charge of overseas procurement for KRL.¹⁶ Others were long-time associates, whom he had met in the 1960s and 1970s. They included Peter Griffin (who was involved in early imports of inverters from the UK); Gotthard Lerch (who used to work at Leybold Heraeus, which was to become a key contractor of Pakistan); Otto Heilingbrunner (same); Henk Slebos (who studied with A. Q. Khan, used to work at Explosive Metal Works Holland, and sold various equipment to Pakistan over the years, including bottom bearings in 2001 which

were probably meant for Iran or Libya); Friedrich Tinner (who used to work at Vacuum Apparate Technik, a firm which sold equipment to Pakistan in the 1970s); and Heinz Mebus (who was involved in the first centrifuge transfers to Iran in the mid-1980s).

Other elements of commonality exist between the two networks. Tactics designed to fool Western exports controls were learned for imports and used for exports. States such as the UAE and Turkey were major platforms for both imports and exports. And the Bank of Credit and Commerce International (BCCI) was, it seems, one of the conduits used (until its demise in 1991) for payments made to Pakistani officials.¹⁷

Iran.

The issue of transfers to Iran is complex. To this day, it remains difficult to tell the exact degree of implication of the various Pakistani centres of power in decisions related to the sharing of nuclear technologies with Tehran. One individual played a central role: Mirza Aslam Beg, Vice Chief of Army Staff (VCoAS, 1987-88), then CoAS from August 1988 until August 1991.¹⁸ There seem to have been three different phases.

Phase 1: 1986-88. First, beginning in 1986 there was a period of limited cooperation probably approved by general Zia-ul-Haq himself. In November 1986, the Pakistani press reported that Zia had answered favorably to an Iranian request for nuclear cooperation.¹⁹ A secret bilateral agreement was signed between the Pakistan Atomic Energy Commission (PAEC) and its Iranian counterpart in 1987, which provided *inter alia* for the training of Iranian scientists.²⁰ A. Q. Khan's dealings with Iran started at the same time. He may have visited Iran as early as January 1987.²¹ Later

that year, a negotiation took place in Dubai for the selling of P1 centrifuge diagrams, an enrichment plant diagram, and spare parts for at least one P1 machine (but probably many more, since the offer involved 2,000 machines).²²

President Zia, it seems, had authorized the initiation of bilateral nuclear cooperation while asking for it to remain limited.²³ He did not want Iran to get the bomb. He was wary of A. Q. Khan whom he saw as “politically naïve and a publicity seeker”; he was reportedly upset when Khan upstaged him in the famous 1987 interview that revealed to the world that Pakistan had the bomb.²⁴

Khan was reportedly telling military authorities that the transfers were of very limited importance, since they concerned only used and or obsolete equipment.²⁵ He probably felt “covered” by Zia’s approval for limited nuclear technology transfers to Iran. But he may also have been encouraged by general Mirza Aslam Beg, in his capacity as Army Vice Chief of Staff, who was ready to do more, and was probably in a position to do so: he was in fact the real CoAS, since Zia was also President. Beg reports that emissaries from Iran first approached Pakistan near the end of the Iran-Iraq war, with broad requests for military sales, which were, according to him, denied by President Zia. This is consistent with what a former Pakistani ambassador to Iran reported, namely that Zia refused to abide by an Iranian request made in Tehran in January 1988 for mastery of the fuel cycle.²⁶

Phase 2: 1988-91. After Zia’s death, the two parties may have envisioned a more complete cooperation, under pressure from general Beg, but probably with the knowledge of political authorities. A. Q. Khan was certainly encouraged to act in this direction by General

Beg and President Khan when they abruptly came to power after Zia's death in August 1988. According to a Pakistani account, A. Q. Khan's first move when Benazir Bhutto came to power (December 1988) was to ask her to make him PAEC director; when she refused, he chose to place his loyalty with Beg and G. I. Khan.²⁷

General Beg came back from a February 1990 visit to Iran with assurances from Tehran regarding support for Pakistan about Kashmir.²⁸ He has mentioned an Iranian request for the bomb made in Islamabad that same year.²⁹ He has consistently denied having approved such transfers, but has confirmed the scope of nuclear discussions between Tehran and Islamabad at the time. According to him, the contacts had been made at Iran's initiative; he and Benazir Bhutto (who remained Prime minister until August 1990) were playing "ping-pong" with their interlocutors, constantly telling them to go and see the other party.³⁰ A former U.S. administration official, Henry Rowen, says that Beg threatened in January 1990 to transfer military usage nuclear technology should Washington stop arms sales to Pakistan.³¹ A. Q. Khan himself says that the transfers were explicitly authorized by Beg.³²

There is evidence that Benazir Bhutto's government knew about this cooperation. She was told in 1989 by Hashemi Rafsandjani that the Pakistani military had offered nuclear technology to Iran, and that Rafsandjani wanted her approval – which she says she did not give.³³ (According to Beg, she told him that the Iranians had offered four billion dollars for nuclear technology.³⁴) A. Q. Khan says that the transfers were in fact encouraged by the military adviser to Mrs. Bhutto, General Imtiaz Ali.³⁵ And one meeting in Karachi between Khan and the Iranians reportedly took place at the request of another Bhutto adviser.³⁶ Mrs. Bhutto says that by 1989

she had made her way into the inner circle of nuclear decisionmaking.³⁷ She had been extensively briefed on her own country's program by the U.S. administration during her June 1989 visit to Washington.³⁸ (Former U.S. Ambassador Dennis Kux confirms that she was probably "in the loop" until early 1990.³⁹) In fact, her knowledge of nuclear transfers may also have been a factor in her dismissal. She was pressed hard by the United States about Pakistan's nuclear program. In the summer of 1990, she became seen as a problem, and A. Q. Khan reportedly asked Beg for her sacking.⁴⁰ Thus, even though there is no evidence that Mrs. Bhutto approved any transfer, she was aware of Iran-Pakistan discussions; and some of her advisers may have given the nod to Beg and Khan.

Phase three: 1991-95. In a third phase, the two countries seem to have begun a closer cooperation, in line with a growing convergence of interests.

Two events changed Pakistani perspective. One was the invasion of Kuwait. The other was the imposition of U.S. sanctions under the Pressler amendment, which became inevitable on October 1, as U.S. President George Bush refused to certify that Pakistan did not have a military program.

An Iranian-Pakistani nuclear cooperation was coherent with General Beg's strategic choices. Beg initially approved Pakistan's participation in the coalition against Iraq; but by the end of 1990, he changed his mind and made it public in late January 1991.⁴¹ He actively sought a partnership with Iran in order to protect both countries against the United States.⁴² (He ended up grudgingly accepting Pakistani participation in the coalition as long as it was limited to the defense of Saudi Arabia.) Political reasons were not the only ones at play. General Beg and others

thought it was a good way to finance the defense budget and Interservice Intelligence (ISI) operations in Afghanistan and Kashmir, especially in light of coming U.S. sanctions. Several former officials of Nawaz Sharif's first government (November 1990-July 1993) have separately confirmed that in 1991, General Beg tried to convince Mr. Sharif to undertake large-scale nuclear cooperation with Iran.⁴³

There were indeed high-level contacts to that effect between the two governments during 1991. Envoys of Hashemi Rafsanjani (including Mohsen Rezai, head of the Pasdarans from 1981 until 1987) visited Sharif in February and July 1991. Pakistani authorities have confirmed that Beg was involved in transfers to Iran in 1991.⁴⁴ In November 1991, general Asif Nawaz (who had succeeded Beg in August) went himself to Tehran; meanwhile, Beijing reportedly gave its blessing to Iran-Pakistan cooperation.⁴⁵ General Beg himself has confirmed that contacts with Iran continued after Benazir Bhutto's departure in August 1990.⁴⁶

It is difficult to know with certainty what became of these projects. Some claim that Pakistan and Iran did agree on nuclear cooperation and discussed the possibility of a mutual defense treaty.⁴⁷ According to Beg, an agreement was indeed reached in 1991 for nuclear cooperation in return for conventional weapons and oil.⁴⁸ However, several sources have stated that the Pakistani political authorities refused to go ahead. One claims that president G. I. Khan sought Sharif's approval for the deal; when he refused, the deal was abandoned.⁴⁹ According to U.S. Ambassador Robert Oakley, Nawaz Sharif and G. I. Khan told Rafsanjani that Pakistan would not implement the 1991 agreement.⁵⁰

What is clear is that the bilateral cooperation that was envisioned by the two countries was a two-way street; it did not concern only nuclear technology, but also conventional arms, probably oil, as well as mutual political support. In the nuclear realm, the known transfers of that period involved diagrams for P1 and P2 centrifuges, and 500 used P1 centrifuges in a disassembled form. (Three actual P2 machines may also have been delivered.⁵¹) The negotiation for these purchases took place in the fall of 1993, and the deal was reportedly struck in October 1994.⁵² The goods were delivered in 1994 and 1995. They included a document describing, *inter alia*, “the casting of enriched and depleted uranium metal into hemispheres, related to the fabrication of nuclear weapons components.”⁵³ According to a reported IAEA account, no less than 13 meetings took place between Tehran and representatives of the network in the years 1994 to 1999.⁵⁴ Some shipments reportedly took place after 1995, perhaps as late as 2000.⁵⁵

This second influx of Pakistani technology to Iran took place during Mrs. Bhutto’s second mandate (October 1993–November 1996). Given the extent of government-to-government contacts, it certainly took place with the knowledge of several key authorities. She has confirmed that an offer had taken place and that there was a debate in Pakistan’s ruling circles about it.⁵⁶

The full scope of Pakistani exports and transfers to Iran—be they envisioned, planned or realized—is probably not yet known. Several questions still need to be addressed. Did the infamous “Chinese blueprint” for a nuclear weapon ever find its way into Iran? How many P1 spare parts and P2 parts (ring magnets in particular) were actually delivered to Iran by the Khan

network?⁵⁷ Given the similarities between the Pakistani Khushab reactor and the planned Iranian Arak reactor, was there any Pakistani help involved?

Iraq.

Available sources indicate that the initial contact with Iraq was made just a few weeks after the invasion of Kuwait. A note from the Iraqi intelligence services, dated October 6, reports that A. Q. Khan was ready to help Baghdad to “establish a project to enrich uranium and manufacture a nuclear weapon.” It reported that A. Q. Khan was prepared to give Iraq “project designs for a nuclear bomb.” Equipment was to be transferred from European companies to Iraq via a Dubai-based company.⁵⁸ The Iraqi government, however, feared that it was a sting operation.⁵⁹

Such a gesture would have been consistent with General M. A. Beg’s opposition to Pakistani participation in the international coalition (an opposition he began to express at the end of 1990). At the same time, however, if Beg was keen to help Iran, it would have been illogical for him to support the development of an Iraqi bomb at the same time. Helping Saddam Hussein, Iran’s mortal enemy, to get nuclear weapons might have been consistent with Beg’s political preferences (a staunch opponent of U.S. influence in the region), but completely at odds with his personal culture (a Shi’a with strong admiration for Iran).

North Korea.

The Pakistan-North Korea strategic connection was established as early as in 1971, when Z. A. Bhutto made Pyongyang a major source of conventional

arms procurement. The Iraq-Iran war cemented the partnership between the two countries, both of which aided Tehran's missile program.⁶⁰ According to Indian sources, Pakistan and North Korea began their missile and nuclear cooperation in 1988.⁶¹ Most sources agree, however, that the nuclear side of the bilateral cooperation began only around 1993. A defense cooperation package was agreed upon at the occasion of Benazir Bhutto's December 1993 visit to Pyongyang.⁶² A. Q. Khan seems to have "paved the way" for Bhutto's visit. He and the military involved Benazir Bhutto for the missile deal, because of the good relations of her father with North Korea.⁶³ A. Q. Khan travelled extensively to North Korea. He was given a tour of Pyongyang's nuclear facilities in 1999.⁶⁴ That same year, Democratic People's Republic of Korea (DPRK) experts were seen visiting the Khan Research Laboratories (KRL).⁶⁵ But the extent of his personal initiative in the matter of nuclear transfers remains open to question. It is possible that he felt that he was "covered" by the military authorities because of the Iran precedent. In any case, it seems likely that the military knew about the nuclear exports. General Jehangir Karamat (CoAS from 1996 to 1998, and ambassador to the United States until 2006) seem to have played a significant role in the DPRK-Pakistan connection.⁶⁶ It is also possible that the DPRK sometimes would serve as a conduit for Chinese assistance to Pakistan.

The usual explanation of what happened with North Korea is that it was a quid pro quo. This is what the U.S. Government believed in the late 1990s.⁶⁷ However, the story seems to be more complex. Nuclear exports seem to have begun much later than missile imports. Benazir Bhutto insists that the North Korean missiles were bought, not exchanged for nuclear technology.⁶⁸

(Some well-informed analysts insist that the latter were financed by “*money and rice.*”⁶⁹) Later, the Pakistani “reserve crunch” might have prompted Pakistan to turn from cash to nuclear technology in return for missile technology.⁷⁰ A former aide to Kim Il-Sung states that this deal was concluded in the summer of 1996.⁷¹ Centrifuges went to North Korea between 1997 and 1999, but other transfers took place until around July 2002.⁷² According to an early Musharraf account, “probably a dozen” centrifuges were sold.⁷³ Most available sources refer to P1 technology, but some have suggested they may have included P2 centrifuges.⁷⁴ The transfer of P2s was later confirmed by Musharraf, who mentions in his memoirs a total of “nearly two dozen” centrifuges.⁷⁵ There are also allegations of a broader cooperation in the nuclear area.⁷⁶

The missile imports were discovered by the United States around 1997-98.⁷⁷ In April 1998, the State Department applied sanctions against KRL. At about the same time, Washington also discovered that Islamabad exported nuclear technology to Pyongyang.⁷⁸ It asked Nawaz Sharif to cease transfers; Sharif made a commitment not to transfer nuclear weapons to Pyongyang, but refused to go further.⁷⁹

Whatever the reality, the most detailed studies about the DPRK-Pakistan ballistic and nuclear relationship have refrained from drawing definitive conclusions about its nature, especially given the uncertainties about the exact scope of the nuclear relationship.⁸⁰

Libya.

The nuclear relationship with Libya began in the mid-1970s. It is likely that Tripoli financed Pakistan’s nuclear program up to several hundred millions of

dollars. During an internal Department of State (DoS) meeting in 1976, one of the participants mentioned “an intelligence report that Libya has agreed to finance the Pakistani reprocessing project in return for some unspecified future nuclear cooperation.”⁸¹ However, initial transfers to Libya were limited to knowledge and expertise through training. This first phase ended with the deposition of Z. A. Bhutto. Concrete transfers took place only after the reinvigoration of Libya’s program in 1995. Contact was made with A. Q. Khan at that time.⁸²

In 1997, Libya received 20 complete L1 centrifuges, and most of the components for another 200. In 2000, it received two complete but “second-hand” L2 centrifuges, as well as two small cylinders of UF₆. In early 2001, it received one larger cylinder containing 1.7 tons of UF₆. In late 2001 or early 2002, documentation on nuclear weapons design, including the “Chinese blueprint,” was transferred. A. Q. Khan was still directly in touch with the officials in charge of Libya’s nuclear program in 2002.⁸³ In late 2002, components for a large number of L2s began to arrive.⁸⁴ Libya is probably the only documented case of Pakistani nuclear exports where the expression “Wal-Mart” (used by IAEA Director El-Baradei) could apply.

There is little evidence of direct involvement of Pakistani authorities in the Libya deal. Some have even pointed out that Khan himself was not always involved in all transactions. The network, it seems, had then taken on a life of its own.⁸⁵

Saudi Arabia.

There is no hard evidence of Pakistani-Saudi cooperation on nuclear issues in the public domain. The

hypothesis of such cooperation rests on a combination of ample anecdotal evidence and strong political logic.

Saudi financial support for Pakistan's nuclear program in the 1970s is well-documented (see above). U.S., Israeli, and Saudi sources (including Mohammad al-Khilawi, a diplomat who defected to the United States in 1994) reported in the early 1980s that Saudi financial support for the Pakistani program was continuing.⁸⁶ The BCCI may have been one of the conduits used.⁸⁷ This would make the banks a key institution, both involved in imports and exports. Khalid Hassan, a former adviser to Ali Bhutto, confirmed that Saudi Arabia was indeed an essential foreign fundgiver to the Pakistani program. Nawaz Sharif called Prince Abdallah for his opinion before giving the go-ahead to the 1998 tests.⁸⁸

In 1990, Saudi Arabia was reportedly tempted to get Pakistani nuclear weapons for its CSS-2 missiles.⁸⁹ Islamabad is said to have refused because of the political risks involved.⁹⁰ In May 1999, Prince Sultan (then defence minister) was the first-ever foreign leader to visit Kahuta. A. Q. Khan, for his part, visited Saudi Arabia at least twice (November 1999, September 2000).⁹¹ Saudi leaders have attended Pakistani Ghauri test launches (2002 and 2004).

The nuclear question seems to have been raised anew after 2001, including in discussions with Islamabad.⁹² Prince Sultan was reportedly given a tour of Pakistani nuclear installations in August 2002.⁹³ President Bush himself is reported to have included Saudi Arabia in a list of countries of proliferation concerns in January 2003, and Ryad may have begun direct financing of KRL around that time.⁹⁴ According to U.S. ambassador Chas Freeman, in 2003 King Fahd asked for a nuclear

guarantee in case Iran produced the bomb.⁹⁵ Whatever was said by Washington, it is doubtful that in the post-September 11, 2001 (9/11) context Riyadh believes it will always be protected by the United States. (The 2003 U.S. military withdrawal from Saudi Arabia may have been another incentive.) According to the *Guardian*, three options for the Saudi nuclear future were considered that year by Riyadh: a nuclear deterrent; a security guarantee; or a nuclear-weapons free zone in the region.⁹⁶ (Prince Turki implicitly confirmed the existence of the document by stating it was not followed by action.⁹⁷) A visit by Prince Abdallah in October 2003 was reportedly the next occasion for Islamabad and Riyadh to discuss nuclear cooperation. Several sources have asserted that a “nukes for oil” barter was agreed upon on this occasion. Riyadh may have formally asked for nuclear warheads to equip its CSS-2.⁹⁸ Other sources say that several Saudi C-130s made return trips to Pakistan between October 2003 and October 2004, followed by visits of nuclear experts in 2004-05 under cover of the Hajj.⁹⁹ (The same sources say that Riyadh’s decision to recall 80 diplomats in January 2004, and general Musharraf’s unexpected trip to Saudi Arabia in late June 2005, were caused by the windfall of the Abdul Qadeer Khan affair.¹⁰⁰) In April 2006, a French media outlet stated that Prince Khaled, vice-minister for defense, visited KRL in October 2004. It affirmed that nuclear cooperation between the two countries was now well underway. It stated that an agreement on nuclear cooperation was made on the occasion of King Abdallah’s visit to Islamabad in February 2006, followed by a visit to KRL by Prince Sultan bin Abdulaziz, defense minister, in April.¹⁰¹ A few weeks later, a German report stated that the Al-Sulayyil base, where CSS-2s are believed to be hosted, now houses Pakistani *Ghauri* missiles.¹⁰²

Most of these elements are unconfirmed reports, but they are extraordinarily persistent. The doubts about Ryad's intentions have been further raised by the country's decision in April 2005 to ask the IAEA for a "Small Quantities Protocol" (SQP), exempting the Kingdom from intrusive monitoring of nuclear activities.

Other Countries.

It was reported in 1999 by a Pakistani newspaper that the UAE made a request for nuclear assistance to A. Q. Khan during a visit of minister of information Shaykh Abdullah Bin Zayid Al Nahyyan; A. Q. Khan reportedly said that he would not give nuclear weapons to the UAE "on a platter," but would consider nuclear training and education.¹⁰³ There are good reasons to believe that the UAE could have expressed an interest in nuclear weapons: (1) its central role in the foundation of the BCCI, which was probably used as a conduit for Pakistani imports and exports; (2) its pivotal role as a "node" in Khan's exports network; (3) its unease about the development of Iran's nuclear program; (4) its possession of *Black Shaheen* cruise missiles (as well as a few ageing *Scud B* ballistic missiles), which could probably host a small-size nuclear warhead.

It was reported in 2004 that an offer for nuclear technology and hardware was made by A. Q. Khan to Syria.¹⁰⁴ A. Q. Khan gave several lectures in Damascus in late 1997 and early 1998.¹⁰⁵ But he is also suspected of having met a top Syrian official in Beirut to offer assistance with a centrifuge enrichment facility.¹⁰⁶ After 2001, A. Q. Khan's meetings with Syrians were reportedly held in Iran.¹⁰⁷ Not much is known about the Syria case. Some intelligence sources reportedly

believe that the country has imported centrifuges from the network.¹⁰⁸ However, other sources have stated that the offer was declined.¹⁰⁹

Other countries have been mentioned. It was reported in 2004 that A. Q. Khan offered nuclear assistance to Egypt, which is said to have turned down the offer.¹¹⁰ Some suspect that A. Q. Khan may have transferred centrifugation technology to Brazil.¹¹¹ There have also been throughout the 1980s and 1990s several mentions of Turkey as a possible recipient of Pakistani nuclear technology.¹¹² Finally, several sources claim that Pakistan exported its URENCO centrifugation technology to China, which had a relatively weak centrifuge enrichment program.¹¹³

PAKISTANI NUCLEAR EXPORTS: WAS THERE A STATE POLICY?

An Individual Initiative?

Most knowledgeable observers of the Pakistani scene agree that A. Q. Khan had an important degree of autonomy. If nuclear weapons exports had been a consistent State policy, then it would have been logical that PAEC had a role in it too, which does not seem to have been the case. This does not exonerate Pakistani authorities, but as an informed observer put it, “Khan likely exceeded whatever mandate he received from the Pakistani leadership.”¹¹⁴ He may have felt that he was “covered” for whatever he did by the large amount of trust and autonomy he was enticed with.¹¹⁵ It seems, in fact, that A. Q. Khan was able to manipulate the government, and the Pakistani authorities did not want to know what was going on. For instance, he would tell the Prime minister that he needed to go to

Iran for reasons of national security, and that would be enough.¹¹⁶ “As long as Khan’s group delivered the goods, no state authority questioned his tactics.”¹¹⁷ That Pakistani Air Force planes were chartered does not necessarily indicate a government implication in nuclear transfers: In the case of North Korea, a legitimate explanation was the missile and other arms transfers (such as air defense systems); in the case of Libya, the explanation would have been the export of conventional weapons.

The network’s actions were made easy by the secrecy and compartmentalization of Pakistan’s program until the late 1990s, which did not create the best conditions for oversight. Security precautions were made to protect KRL from the outside world, not to protect the outside world from KRL—and security officers reported to Khan.¹¹⁸ Another reason was that KRL had become, by the late 1980s, a large weapons manufacturer embedded in Pakistan’s military-industrial complex; many officials did not have an interest in rocking the boat. An Army investigation for details about KRL and PAEC procurements went nowhere.¹¹⁹

However, at some point, it became not good enough. Three events changed the picture: the 1998 tests, the 1999 coup, and the 2001 attacks and their aftermath. There was a progressive reorganization of Pakistan’s nuclear program between 1998 and 2001. The nuclear laboratories, which for a long time had a large operational and financial autonomy, were reined in. A. Q. Khan was forced to retire from KRL in March 2001.

Several explanations exist as the reasons for this decision. Some U.S. administration officials have said that this was an American request.¹²⁰ It may also have been Musharraf’s own initiative—or a combination of

both. After the 1998 tests, Pakistan was under strong pressure from the United States to show responsible behavior, and it was in dire need of Western assistance. There was an ISI investigation of Khan's finances in 1998-99.¹²¹ Another inquiry by the newly-created National Accountancy Bureau at the request of Musharraf revealed unapproved financial transactions; it was not pursued due to the sensitivity of the matter.¹²² Then came reports of North Korean experts visiting KRL. Although the visits were even then denied by A. Q. Khan, according to Musharraf the event triggered surveillance of his activities.¹²³ According to several sources, the ISI—which since 1999 reported directly to Musharraf—followed A. Q. Khan to Dubai in the fall of 2000. When asked for an explanation by Musharraf, who was concerned about financial improprieties, he complained about the surveillance, gave false excuses, and continued his travels.¹²⁴ The same thing happened when he was asked by Musharraf to explain an aircraft landing in Zahedan, Iran.¹²⁵ But A. Q. Khan probably felt invulnerable. He was clearly reluctant to abide by the new rules, which included a better oversight of nuclear officials. He was making it known that he disapproved of the reorganization of Pakistani nuclear policy.¹²⁶

The official version, which includes in particular the report that Pakistani authorities only discovered A. Q. Khan's unsanctioned activities after the ISI raided a cargo plane leaving for North Korea in 2000, is not convincing.¹²⁷ But there was definitely a personal element in his activities.

Why, then, given that extensive transfer of nuclear technology to North Korea and Libya could have taken place from 2001 to 2003, at the exact time of Pakistan's consolidation of nuclear policymaking, and well after

Khan's dismissal in March 2001, was he allowed to continue his travels?¹²⁸ The reason may be that he had the keys to the imports network, still vital for the Pakistani nuclear program.¹²⁹ Note that A. Q. Khan remained Special Adviser to the Chief Executive on Strategic and KRL Affairs after his dismissal, until a Nuclear Command Authority (NCA) decision stripped him of this title on January 31, 2004.

Khan's motivations were complex and evolved over time. They cannot be reduced to a single factor. According to David Sanger, "to understand A. Q. Khan, you have to understand ego, greed, nationalism, and Islamic identity."¹³⁰ A first motivation was to ensure his personal role and legitimacy in Pakistan's nuclear program: Transfers were the counterpart of imports made for the sake of the Pakistani program, or of financial assistance given to Pakistan by countries such as Libya or Saudi Arabia. A. Q. Khan also reportedly wanted to deflect attention from Pakistan.¹³¹ He said in his debriefing sessions that he thought that "the emergence of more nuclear states would ease Western attention on Pakistan."¹³² A second motivation, which seems to have gained in importance over time, was pure and simple greed. Supply created demand: Excess inventories of centrifuges and spare parts (notably P1 centrifuges, since they were being replaced by P2s) were looking for customers. A third element was pure and simple hubris. A. Q. Khan was a man who enjoyed defying authority and norms. He talked about centrifugation technology as if it was his own property. This is where the Islamic dimension comes into play: He may have been willing to be recognized as the one who gave the Bomb to the *Umma*. He reportedly said that his transfers "would help the Muslim cause."¹³³ That said, some of those who know him say A. Q. Khan

is not an Islamist, and that he emphasized his faith to bolster his support in the country. A. Q. Khan may simply have wanted to “defy the West” – given that all known customers were on unfriendly terms with the United States and Europe.

A State Policy?

Most known exports happened between 1988 (the death of Zia) and 1999 (the Musharraf takeover). In August 1988, the program came into the hands of Senate chairman G. I. Khan (who immediately became President according to succession rules) and CoAS Mirza Aslam Beg.

In the ensuing decade, the structure of Pakistani power was complex, and divided among three individuals: the President, the Prime Minister, and the CoAS. For this reason, it is obviously difficult to answer the question “Who knew what?” As two knowledgeable observers put it, “The diffusion of authority enabled national security organizations to manipulate the system and become nearly autonomous. In this environment, Khan would have needed to convince only one of the centers of power that sharing nuclear technology with foreign entities would be in Pakistan’s interest.”¹³⁴

What seems clear is two-fold. First, the Prime Ministers during that period (Benazir Bhutto and Nawaz Sharif in particular) were not completely out of the loop. Indeed, the Pakistani government openly acknowledges the role of two (conveniently dead) individuals close to the Bhutto family: General Imtiaz Ali, military secretary to Z. A. Bhutto and defense adviser to his daughter, Benazir; and family dentist Zafar Niazi.¹³⁵ Second, a handful of Pakistani leaders

seem to have played a key role. One was General Mirza Aslam Beg, vice-CoAS, then CoAS from August 1988 until August 1991. There is ample evidence of his involvement in Iranian-Pakistani nuclear cooperation. As stated above, his personal background (a Shi'a) and political preferences led him to take a consistent pro-Iranian, anti-Western stance. Another key individual was Ghulam Ishaq Khan. One quasi-official statement reported G. I. Khan as being actually *in charge* of the nuclear program from 1975 until 1991.¹³⁶ As defense minister, he was involved in the decision to make Kahuta a separate entity under A. Q. Khan.¹³⁷ He was a member of the three-man KRL oversight board when it was created in 1976.¹³⁸ As finance minister, he was present at the first 1983 cold tests.¹³⁹ He also gave tax-free status to the BCCI, which was used as a conduit for Pakistani nuclear imports and exports.¹⁴⁰ Being chairman of the Senate, he automatically became president, at the same time as M. A. Beg became CoAS, after Zia's death, and remained in that position until July 1993. He was close to Beg and broke with him only when it became clear that he wanted to topple Nawaz Sharif. (G. I. Khan also opposed Beg's preferred candidate for his own succession, General Hamid Gul, a former ISI chief.) In 1990, A. Q. Khan acknowledged that G. I. Khan had been a key supporter of the nuclear program.¹⁴¹ He even described him as guarding the program "like a rock."¹⁴² When he died, A. Q. Khan had a mausoleum built for him in the "G. I. Khan Institute," for which he had been the project director. Finally, it is hardly conceivable that successors to M. A. Beg as chiefs of Army staff (Generals Azif Nawaz, Abdul Wahid Kakar, Jehangir Karamat, and Pervez Musharraf) were *completely* unaware of *any* transfers of nuclear technology. At the very least, they proved

unwilling to ensure that Khan was not able to proceed with unsanctioned exports. General Jehangir Karamat in particular may have been a key player in his capacity of CoAS from December 1996 until his resignation in October 1998. He was on good terms with A. Q. Khan. He reportedly ensured KRL participation in the 1998 tests.¹⁴³ (He was nominated ambassador to the United States in November 2004: but in March 2006, the Pakistani press announced his early departure from his position, for unknown reasons.) A. Q. Khan has reportedly admitted that both Kakar and Karamat knew and approved of his dealings with North Korea.¹⁴⁴

During 1987 to 1999, A. Q. Khan, who was certainly good at manipulating the system, may have been himself manipulated so as to ensure “plausible deniability.” A. Q. Khan’s personal profits were reportedly known by the ISI since 1988, but Pakistan’s military authorities refused to act.¹⁴⁵ In 1989, the ISI reported suspicious activities to President G. I. Khan, but, as the protector of A. Q. Khan, he just told Khan that he needed to be careful.¹⁴⁶ Knowledgeable observers suggest that a combination of factors in the year 1987 led to the emergence of the network: the shift towards P2 centrifuges, creating a large “excess inventory” of P1s; the arrival of M. A. Beg as VCoAS; the “Brasstacks” crisis with India; and the “dress-down” given by Zia to A. Q. Khan for having boasted about Pakistan’s nuclear capability in an interview.

So, were nuclear exports a personal initiative or a State policy? The answer is: a little bit of both, in various proportions, according to the circumstances. Different transfers probably reflected different situations. There are, first, the three cases where the network was not directly involved: China, North Korea, and possibly Saudi Arabia. The possible quid pro quo with China

(centrifugation technology in return for UF6 or heavily enriched uranium [HEU], as well as a weapon design) would have been a state policy. Some claim that such a deal was concluded in the mid-1980s. In any case, the scope of Pakistan's nuclear cooperation with China, which extends for more than a decade, strongly suggests governmental approval. The transfers to North Korea may have been a State policy made with knowledge of some high-level Pakistani authorities (including perhaps Benazir Bhutto and Nawaz Sharif), although this point remains unclear. In any case, no element of Islamic solidarity was present there. Rather, it was the need to ensure the continued development and reliability of the liquid-fuel (*Ghauri*-type) family of Pakistani ballistic missiles. Finally, any nuclear cooperation discussions with Saudi Arabia would have been, in all likelihood, sanctioned by the highest political and military authorities.

And then there are the cases where the network was directly involved: Iran, Libya, Iraq, possibly Syria, and others. Iran is the most complex case. The launching of a military-oriented nuclear cooperation was probably not sanctioned by President Zia ul-Haq. However, during 1988 to 1995, exports to Iran were known by most Pakistani leaders, including Prime Ministers Bhutto and Sharif, and deliberately encouraged by some, such as M. A. Beg and G. I. Khan. The case of Libya was probably a Khan initiative. To some, including Khan himself, this may also have been "payback time." When Tripoli agreed to give financial support for the Pakistani program in the early 1970s, it asked for nuclear technology in return. (Z. A. Bhutto never committed himself to go that far.¹⁴⁷ But he may have created expectations in Ghaddafi's mind.) Finally,

offers to Iraq and possibly to Syria were probably A. Q. Khan's own initiative.

It seems reasonable to say that there was no constant and consistent state policy governing the nuclear exports made, or sanctioned, by Pakistani officials in the past 30 years. Concrete interests, personal and national, seem to have been the primary driver behind these exports. They were made possible by the large freedom of manoeuvre given to A. Q. Khan's activities until the end of the 1990s. But there has been, at least in one instance, in the late 1980s, an attempt to make nuclear exports part of a broader national strategic orientation.

Some argue, however, that Pakistani nuclear exports do reflect a consistent State policy. According to Simon Henderson, there were two successive Pakistani strategies. First was a strategy of exchanges or barter: one with China (centrifuge technology for HEU and bomb design), and one with North Korea (centrifuge technology for ballistic missiles). Second was a strategy designed to blackmail the United States, through exports to Muslim States.¹⁴⁸ Alternatively, different actors of the Pakistani leadership may have had different strategies.

FUTURE RISKS

There is no reason to believe that the current Pakistani leadership would today deliberately transfer expertise and knowledge to other States or nonstate actors, at least in peacetime. The risk of further deliberate transfers of nuclear technologies by the Pakistani authorities appears much weaker today – at least as long as there is an objective alliance between Pakistan and the United States. And there are good

reasons to believe that Pakistan has put its nuclear house in order, as deduced from a series of decisions and reorganizations made between 1998 and 2003. The Strategic Planning Directorate (SPD) is a serious organization manned by serious people.

The Risk of Further Unsanctioned Transfers.

However, risks have not disappeared. It is not certain that the additional security procedures set up by Pakistan since 2001 make it impossible to have significant unsanctioned transfers of know-how and expertise by lower-level scientists or engineers. No less than 10,000 to 16,000 people are employed by PAEC.¹⁴⁹ A total of 6,500 scientists and 45,000 people are reportedly involved in the whole nuclear program.¹⁵⁰

Precedents are not reassuring. The full story of the travels of Sultan Bashiruddin Mahmood (a former PAEC director), Chaudry Abdul Majid (a former New Labs director), and Mirza Yusuf Baig (a PAEC engineer) to Afghanistan has yet to be written. The same for Suleiman Asad and Muhamed Ali Mukhtar's alleged links with Al-Qaida.¹⁵¹ Some of these individuals were previously associated with A. Q. Khan, including Mahmood who had been his first boss in 1975. The old question of "Who will guard the guardians?" remains relevant in Pakistan.¹⁵²

In the past, key government officials were known for their Islamist sympathies. This was apparently the case for key scientists such as Abdul Qadeer Khan and Bashiruddin Mahmood, or military leaders such as Mirza Aslam Beg and Hamid Gul (a former ISI director).¹⁵³ This was also the case of Muhammad Aziz Khan (a former chairman of the joint chiefs of staff and as such responsible for nuclear procurement until 2004,

and known to consider the United States as the enemy number one of the Muslim world). Some scientists and engineers may have divided loyalties if approached by a nonstate Islamist actor. For a long time, this was not viewed as a problem by those overseeing the program: It was thought that piety was conducive to respect for authority.¹⁵⁴

Risks of transfers would also exist in a crisis situation: Pakistan could pre-delegate launch authority for fear of preemption or decapitation.¹⁵⁵ Putting nuclear weapons systems on alert involves the relocation of several elements (physics packages, assembled warheads, and delivery systems), making them vulnerable during transit. Also, it should be noted that a pilot flying a nuclear-armed aircraft is reportedly given all necessary codes before taking off.¹⁵⁶ One former official has even mused with the idea of a deliberate transfer to a nonstate actor in wartime in order to ensure a capability to retaliate on Indian soil; such a scenario would fall into the category of sanctioned transfers.¹⁵⁷

The lack of real checks and balances and democratic controls in today's Pakistan might make it still possible in a post-Musharraf future for a Pakistani CoAS to order, on his own, a direct transfer of key technologies or equipments.

The Risk of Further Sanctioned Transfers.

If Iran encountered technical problems in the advancement of its nuclear program, it surely would like to benefit again from Pakistan's expertise. But it is very unlikely that Islamabad would agree. At the same time, two critical Iranian players of the Pakistan-Iran discussions of the 1980s are still in power in Tehran:

Rafsanjani (head of the Expediency Council) and Mohsen Rezai (secretary of the Expediency Council and a former candidate in the 2005 elections whose views on the United States are close to Ahmadinejad's). Their knowledge about the Pakistani system may put them in a position to approach certain players. In any case, new state-sponsored transfers would certainly suppose a breakdown in U.S.-Pakistan relations. Note also that Islamabad would have to make a choice between Riyadh and Tehran.

As far as Saudi Arabia is concerned, three scenarios can be conceived. A first scenario is a Pakistani nuclear guarantee without deployments, such as the one given by the United States to Japan. Ballistic missiles based in south-western Pakistan would have the range to cover a significant portion of the Saudi neighborhood, including U.S. bases (though not Israel).¹⁵⁸ Some Pakistani planners acknowledge that such an option would be conceivable.¹⁵⁹ It would not question the existence of U.S.-Saudi and U.S.-Pakistan alliances.¹⁶⁰

A second scenario would be a security guarantee involving nuclear deployments on Saudi soil, such as the one given by the United States to Germany. It would not be a violation of the Nuclear Nonproliferation Treaty (NPT), and if Pakistan continues to build up its arsenal, would not detract from immediate deterrence needs vis-à-vis India. It would be a win-win proposal, since Pakistan would gain in survivability against a hypothetical Indian preemptive strike (although even *Shaheen-2* missiles would not be able to threaten Delhi from Saudi territory). Being detectable, such deployments would only be conceivable if relations were good between Washington on the one hand, and Riyadh and Islamabad on the other. However, Pakistani planners acknowledge that such deployments would

be unacceptable to Israel.¹⁶¹ One of them calls the scenario “worse than the Cuban [missile] crisis.”¹⁶²

A third scenario would be a Saudi bomb, either with the help of Pakistan or completely indigenous. Though highly unlikely, it is not completely farfetched given the Kingdom’s wealth. A Nuclear Energy Research Institute was inaugurated in 1988, and Saudi publications show an interest in nuclear physics and technology.¹⁶³ The Saudi request for access to the small quantities protocol (SQP) in 2005 (immediately followed by an unexpected visit by Musharraf on June 25 and 26) raised eyebrows. Some sources assert that a second nuclear research center was created in 1975 at the Al-Suyyalil base.¹⁶⁴ This is where the CSS-2 missiles were stored in 1998—the same year as the creation of the Nuclear Energy Research Institute. Washington reportedly told Islamabad that the sale of Pakistani nuclear weapons to Saudi Arabia is a red line Pakistan should not cross.¹⁶⁵

Since 1999, Pakistan has made considerable efforts to put its nuclear house in order, and a sense of responsibility on nuclear matters seems to pervade the country’s leadership today. However, it will take time before Pakistan can be considered as “just another nuclear country.” Two conditions may have to be met: the establishment of a long-term alliance between the United States and Pakistan, based on the recognition of enduring common interests, allowing the restoration of mutual trust; and the diffusion of a culture of responsibility in the vast Pakistani nuclear complex, beyond the elites.

ENDNOTES - CHAPTER 2

1. There were a number of Pakistan-born and Iran-born officials and advisors in the entourage of M. M. Mandela et Mbeki, sometimes referred to as the "Karachi connection." A. Q. Khan's wife was a South African national.

2. Sudan was also a major platform of the network, at least during 1999 to 2001, in particular for materials destined to Iran. Ian Traynor and Ian Cobain, "Clandestine Nuclear Deals Traced to Sudan," *The Guardian*, January 5, 2006.

3. David Albright, "A. Q. Khan Network: The Case Is Not Closed," Testimony to the Subcommittee on International Terrorism and Nonproliferation, Committee on International Relations, House of Representatives, U.S. Congress, May 25, 2006.

4. Polis Dijara Malaysia, "Press Release by Inspector General of Police In Relation to Investigation on the Alleged Production of Components for Libya's Uranium Enrichment Program," February 20, 2004, accessed at www.ccc.nps.navy.mil/si/2007/Aug/tertraisAug07.asp.

5. Gordon Corera, *Shopping for Bombs. Nuclear Proliferation, Global Insecurity and the Rise and Fall of the A. Q. Khan Network*, London: Hurst & Co., 2006, pp. 59-60, p. 136.

6. *Ibid.*, p. 65.

7. Polis Dijara Malaysia.

8. Some sources also claim the involvement of Noman Shah, former son-in-law of A. Q. Khan.

9. Details on the South Africa operation are contained in High Court of Transvaal, "The State vs. 1. Daniel Geiges 2. Gerhard Wisser," (undated document, 2006), accessed at www.ccc.nps.navy.mil/si/2007/Aug/tertraisAug07.asp. The operation has been referred to as "Project A.F." (for "Arab Fuckers" [sic]); documents discovered in the investigation are reported to have involved Iran, Pakistan, India, and South Africa's own program. See Steve Coll,

"Atomic Emporium," *The New-Yorker*, August 7 and 14, 2006, p. 57.

10. Juergen Dahlkamp, Georg Mascolo, and Holger Stark, "Network of Death on Trial," *Der Spiegel*, March 13, 2006.

11. Simon Henderson, "Nuclear Spinning: The Iran-Pakistan Link," *National Review Online*, December 11, 2003; John Lancaster and Kamran Khan, "Pakistanis Say Nuclear Scientists Aided Iran," *The Washington Post*, January 24, 2004. Other officials arrested in December 2003 and January 2004 included Yassin Chauhan, Nazir Ahmed, and Islam ul-Haq, all KRL officials.

12. Special Report, "The A. Q. Khan Network: Crime . . . And Punishment?" *WMD Insights*, Issue 3, March 2006.

13. *Ibid.*

14. David Albright and Corey Hinderstein, *Uncovering the Nuclear Black Market: Working Toward Closing Gaps in the International Nonproliferation Regime*, Washington, DC: Institute for Science and International Security, July 2, 2004, www.isis-online.org/publications/southasia/nuclear_black_market.html; Polis Dijara Malaysia; "Nuke trail traced to M'sia, Pakistan, Libya," *The Korea Herald*, February 16, 2006.

15. William J. Broad, David E. Sanger, and Raymond Bonner, "A Tale of Nuclear Proliferation," *The New York Times*, February 12, 2004.

16. See Lancaster and Khan, "Pakistanis Say Nuclear Scientists Aided Iran."

17. Stephen Fidler and Farhan Bokhari, "Pakistan Investigates BCCI Role in Sale of Nuclear Know-How," *The Financial Times*, February 4, 2004.

18. A U.S. scholar says that M. A. Khan personally confirmed this (interview with U.S. scholar, Washington, October 2005).

19. NTI Global Security Newswire, Iran Nuclear Chronology.

20. *Ibid.*; Corera, p. 64. Steve Coll, "Atomic Emporium," *The New-Yorker*, August 7 and 14, 2006, pp. 56-57, reports that according to Leonard Weiss, the agreement was signed in 1985.

21. Yossef Bodansky, *Pakistan's Islamic Bomb*, Houston: Freeman Center for Strategic Studies, July 1998; Rajesh Kumar Mishra, *Pakistan as a Proliferator State: Blame it on Dr. A. Q. Khan*, Paper n° 567, India: South Asia Analysis Group, December 20, 2002.

22. The IAEA was shown in January 2005 a copy of a document reflecting "an offer said to have been made to Iran in 1987 by a foreign intermediary," involving the supply of "a disassembled machine (including drawings, descriptions and specifications for the production of centrifuges); drawings, specifications and calculations for 'a complete plant'; and materials for 2000 centrifuges machines." Vienna, Austria: IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, GOV/2006/15, February 27, 2006, p. 3. An Iranian opponent from the NCRI stated in a press conference in Vienna in November 2004 that Pakistan provided to Iran, in 2001, a small quantity of highly enriched uranium (HEU). However, this statement was made in answer to a question and was not subsequently used in NCRI propaganda documents. See Press Conference By Mohammad Mohadessin, Foreign Affairs Committee Chairman, National Council of Resistance of Iran, November 17, 2004; and Elaine Sciolino, "Exiles Add to Claims on Iran Nuclear Arms," *New York Times*, November 18, 2004.

23. Lancaster and Khan, "Pakistanis Say Nuclear Scientists Aided Iran"; and John Wilson, "Iran, Pakistan and Nukes," New Delhi, India: Observer Research Foundation, 2005.

24. Dennis Kux, *The United States and Pakistan 1947-2000. Disenchanted Allies*, Washington DC: Woodrow Wilson Center Press, 2001, p.284.

25. See John Lancaster and Kamran Khan, "Musharraf Named in Nuclear Probe," *Washington Post*, February 3, 2004; Mubashir Zaidi, "Scientist Claimed Nuclear Equipment Was Old, Official Says," *Los Angeles Times*, February 10, 2004.

26. Kathy Gannon, "Iran Sought Advice in Pakistan on Attack," Associated Press, May 12, 2006.

27. M. A. Chaudhri, "Pakistan's Nuclear History: Separating Myth from Reality," *Defence Journal*, May 2006.

28. Seymour Hersch, "On the Nuclear Edge," *The New-Yorker*, March 29, 1993.

29. Gannon, "Iran Sought Advice in Pakistan on Attack."

30. Kathy Gannon, "Explosive Secrets from Pakistan," *Los Angeles Times*, January 30, 2004. Gannon says she interviewed Beg himself on this subject in 2003.

31. Matt Kelley, "Pakistan Threatened to Give Iran Nukes," Associated Press, February 27, 2004; and Douglas Frantz, "Pakistan's Role in Scientist's Nuclear Trafficking Debated," *Los Angeles Times*, May 16, 2005.

32. David Rohde, "Pakistanis Question Official Ignorance of Atom Transfers," *New York Times*, February 3, 2004; Lancaster and Khan, "Musharraf Named in Nuclear Probe"; David Armstrong, "Khan Man," *The New Republic*, November 9, 2004.

33. Frantz, "Pakistan's Role . . ."; Douglas Frantz, "Iran Closes in on Ability to Build a Nuclear Bomb," *Los Angeles Times*, August 3, 2003.

34. Gannon, "Iran Sought Advice in Pakistan on Attack."

35. Rohde, "Pakistanis Question . . ."; Lancaster and Khan, "Musharraf Named . . ."; Armstrong, "Khan Man."

36. Zaidi; Gaurav Kampani, *The Military Coup: Implications for Nuclear Stability in South Asia*, CNS Report, CNS/MIIS, October 1999.

37. Kux, p. 209.

38. Hersch.

39. Kux, p. 299.

40. Hassan Abbas, *Pakistan's Drift into Extremism. Allah, the Army, and America's War on Terror*, New Delhi: Pentagon Press, 2005, p. 142. Mrs. Bhutto claims to have ordered, during her first mandate, that no Pakistani nuclear scientist leaves the territory without her written permission (quoted in Rohde, "Nuclear Inquiry . . .").

41. Kux, p. 313.

42. See John Lancaster and Kamran Khan, "Pakistanis Say Nuclear Scientists Aided Iran," *Washington Post*, January 24, 2004. Beg's concept was called "strategic defiance." The more precise expression "strategic depth" is attributable to General Hamid Gul, then-chief of ISI.

43. See Lancaster and Khan, "Pakistanis Say Nuclear Scientists Aided Iran"; and Gaurav Kampani, *Proliferation Unbound: Nuclear Tales from Pakistan*, Monterey, CA: Center for Nonproliferation Studies, Monterey Institute for International Affairs, February 2004. One of the former officials, Chaudhry Nisar Ali Khan, says that Beg declared to him at the time: "Iran is willing to give whatever it takes, \$6 billion, \$10 billion. We can sell the Bomb to Iran at any price." Wilson, "Iran, Pakistan and Nukes"; see also Gannon, "Explosive Secrets from Pakistan." Ishaq Dar mentions 12 billion dollars, see Shaukat Piracha, "Beg asked Nawaz to give nuclear technology to a 'friend', says Ishaq Dar," *Daily Times*, September 21, 2005. Still another one claims that Iran offered Beg "around 8 billion dollars" in 1991 (quoted in Powell and McGirk.).

44. Lancaster and Khan, "Musharraf Named in Nuclear Probe."

45. Kenneth R. Timmerman, *Countdown to Crisis. The Coming Nuclear Showdown with Iran*, New York: Crown Forum, 2005; and Udayan Namboodiri, "Dr. Khan's story: Thy Hand, Great Gen!," *Pioneer*, February 6, 2004.

46. Gannon, "Explosive Secrets from Pakistan"; David Rohde, "Nuclear Inquiry Skips Pakistan Army as Musharraf Tries to Protect Its Club," *New York Times*, January 30, 2004; and Namboodiri.

47. Timmerman, pp. 101-107.

48. See Rohde, "Nuclear Inquiry..."
49. Abbas, p. 148.
50. Lancaster and Khan, "Pakistanis Say Nuclear Scientists Aided Iran."
51. Corera, p. 233.
52. *Ibid.*, p. 69.
53. IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, p. 5.
54. Bill Powell and Tim McGirk, "The Man Who Sold The Bomb," *Time Magazine*, February 6, 2005.
55. William J. Broad and David E. Sanger, "New Worry Rises after Iran Claims Nuclear Steps," *The International Herald Tribune*, April 17, 2006.
56. See Corera, p. 76.
57. According to the IAEA, Iran had inquired into the delivery of 900 ring magnets suitable for P2 machines from a foreign entity in mid-2003. IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, p. 4.
58. "Memo # 78m, Subject: Proposal," Iraqi intelligence document, October 6, 1990.
59. David Albright and Corey Hinderstein, "The A. Q. Khan Illicit Nuclear Trade Network and Implications for Nonproliferation Efforts," *Strategic Insights*, Vol. V, Issue 6, July 2006.
60. Joseph S. Bermudez, Jr., *DPRK-Pakistan Ghauri Missile Cooperation*, Washington, DC: Federation of American Scientists, May 21, 1998.
61. George Wehrfritz and Richard Wolfe, "How North Korea Got the Bomb," *Newsweek*, October 27, 2003.

62. One source claims that the arrangement was agreed in December 1994, when Benazir Bhutto arranged it in Pyongyang at the request of Abdul Waheed Kakar, the Army CoAS. This may be a mistake and in fact a reference to Bhutto's December 1993 visit. Lancaster and Khan, "Musharraf Named in Nuclear Probe."

63. Corera, p. 87.

64. Powell and McGirk, "The Man Who Sold The Bomb."

65. Pervez Musharraf, *In The Line of Fire. A Memoir.* New-York : Free Press, 2006, pp. 288-289.

66. David Armstrong, "Khan Man," *The New Republic*, November 11, 2004; Lancaster and Khan, "Musharraf Named"

67. See Strobe Talbott, *Engaging India. Diplomacy, Democracy and the Bomb*, New Delhi: Penguin Books, 2004, p. 150.

68. See Corera, p. 89.

69. Owen Bennett Jones, *Pakistan: Eye of the Storm*, New Haven: Yale University Press, 2003, p. 206.

70. Congressional Research Service, *Weapons of Mass Destruction: Trade Between North Korea and Pakistan*, Report for Congress, March 11, 2004; Douglas Frantz, "Pakistan's Role in Scientist's Nuclear Trafficking Debated," *Los Angeles Times*, 16 May 2005.

71. See Corera, p. 92.

72. *Ibid.*, pp. 92-93.

73. "President's Interview with *New York Times*," www.presidentofpakistan.gov.pk, September 12, 2005.

74. Mubashir Zaidi, "Scientist Claimed Nuclear Equipment Was Old, Official Say," *Los Angeles Times*, February 10, 2004; William J. Broad and David E. Sanger, "New Worry Rises after Iran Claims Nuclear Steps," *The International Herald Tribune*, April 17, 2006; Corera, p. 94.

75. Musharraf, *op. cit.*, p. 296.

76. See Christopher O. Clary, *The A. Q. Khan Network: Causes and Implications*, Monterey, CA: U.S. Naval Postgraduate School, December 2005, pp. 62-71.

77. See Koch, "Pakistan Persists with Nuclear Procurement"; and Kux, p. 343.

78. The existence of nuclear exports to Pyongyang was reported in the 1998 Bermudez article.

79. Strobe Talbott, *Engaging India. Diplomacy, Democracy and the Bomb*, New Delhi: Penguin Books, 2004, pp. 150-151.

80. See Clary, *The A. Q. Khan Network . . .*, pp. 62-71.

81. Department of State, Memorandum of conversation, Subject: Proposed Cable to Tehran on Pakistani Nuclear Reprocessing, Secret, May 12, 1976, p. 3.

82. Wyn Q. Bowen, *Libya and Nuclear Proliferation. Stepping Back from the Brink*, Adelphi Paper n° 380, London: International Institute for Strategic Studies (IISS)/Routledge, 2006, pp. 30-43.

83. Corera, p. 190.

84. IAEA, *Implementation of the NPT Safeguards Agreement of the Socialist People's Libyan Arab Jamahiriya*, GOV/2004/12, February 20, 2004, p. 5.

85. See Corera.

86. "Saudi Nuclear Pact," *The Washington Post*, January 19, 1981; Marie Colvin and Peter Sawyer, "How an Insider Lifted the Veil on Saudi Plot for an 'Islamic Bomb'," *Sunday Times*, July 24, 1994; "Mohammed al-Khilewi: Saudi Arabia is Trying to Kill Me," *The Middle East Quarterly*, Vol. V, No. 3. Saudi Arabia was also reported to finance the Iraqi program.

87. "A Blind Eye to the Islamic Bomb," Dateline, Special Broadcasting Service, June 23, 2004.

88. See Abbas, pp. 162-163. At this occasion, Saudi Arabia reportedly proposed to guarantee to Pakistan preferential prices for its oil deliveries in order to cushion the cost of expected sanctions. Roula Khalaf, Farhan Bokhari, and Stephen Fidler, "Saudi Cash Joins Forces With Nuclear Pakistan," *The Financial Times*, August 5, 2004.

89. President H. G. W. Bush was reportedly told about this by U.S. intelligence in late November 1990. Bergman.

90. Mansoor Ijaz, "Pakistan's Nuclear Metastasis: How Widespread is the Cancer?" *The Weekly Standard*, January 8, 2004. According to the author, another option was to set up a secret nuclear base on the territory of another Gulf monarchy.

91. After the November 1999 visit, a Saudi nuclear expert reportedly declared: "Saudi Arabia must make plans aimed at making a quick response to face the possibilities of nuclear warfare agents being used against the Saudi population, cities or armed forces." Gopalaswami Parthasarathy, "Pakistan Plays Nuclear Footsie; Does Anyone Care?" *Wall Street Journal*, January 2, 2004.

92. "Saudi Arabia Takes Steps To Acquire Nuclear Weapons," *Defense & Foreign Affairs*, October 30, 2002. See also "Saudi Looking to Go Nuclear? Intel Analysts Say Royal Family Wants to Keep Up with Tehran," *Geostrategy-Direct Intelligence Brief*, June 19, 2003.

93. Selig S. Harrison, "U.S. Must Clamp Down on Pakistan Nuke Dealing," *San José Mercury News*, May 30, 2003.

94. See Corera, p. 168.

95. Harrison.

96. Ewan MacAskill and Ian Traynor, "Saudis Consider Nuclear Bomb," *The Guardian*, September 18, 2003. This information was confirmed by Simon Henderson in "Toward a

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137. Chaudhri, "Pakistan's Nuclear History...."

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145. John Wilson, "Notes from the Nuclear Underground," *The Pioneer*, June 9, 2006.

146. Corera, p. 96.

147. Herbert Krosney and Steve Weissman, *The Islamic Bomb*, New York: Times Books, 1981, p. 65.

148. NPEC Seminar, Washington, April 2006.

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150. Corera, p. 213.

151. Mahmood and Majid were arrested on October 23, 2001 ("Two Retired Nuclear Scientists Admit to Meeting Osama bin Laden," *Dawn*, November 12, 2001). Mahmood had been fired from PAEC in 1998, perhaps due to a very peculiar conception of "Islamic science." See Rory McCarthy, "Worrying times?" *The Guardian*, November 8, 2001; and T. Sreedhar, "New Threat from the Taliban," *The Hindu*, May 18, 2001. Suleiman Asad and Muhamed Ali Mukhtar were sent to Burma at the end of 2001, officially to help build a nuclear reactor.

152. The ISI has no role in nuclear security (see David Rohde, "Nuclear Inquiry . . ."). But it may have a role in the monitoring of SPD security personnel.

153. Some sources have reported that A. Q. Khan, Bashiruddin Mahmood, and Hamid Gul participated in the Lashkar-e-Toiba meetings. Kaushik Kapisthala, "Pakistan's Forgotten al-Qaeda Nuclear Link," *Asia Times*, June 4, 2004; B. Raman, "The Omens from the White House," South Asia Analysis Group Papers, No. 381, December 23, 2001.

154. Ehsan Masood, "A. Q. Khan: Nuclear Outcast, but Scientific Benefactor," *SciDevNet*, February 6, 2004.

155. Peter R. Lavoy and Major Stephen A. Smith, "The Risk of Inadvertent Nuclear Use Between India and Pakistan," *Strategic Insight*, February 3, 2003.

156. This procedure was confirmed by General Durrani's report (p. 33). However, according to one account, the pilot would reportedly receive the codes only once he had left the country's airspace (Bennett Jones, p. 212.)

157. Personal communication by a former ISI director, October 2004.

158. A *Ghauri-2* missile based in Baluchistan could cover a significant part of the Middle East. *Shaheen-2* missiles would also be conceivable, but they are the "crown jewels" of the Pakistani deterrent.

159. Interview with Pakistani officials, Rawalpindi, October 2005.

160. According to Saudi defector Mohammad Al-Khilawi, such a guarantee was a condition given by Riyadh to its financing of the Pakistani program. Colvin and Sawyer.

161. Interviews with Pakistani officials, Rawalpindi, October 2005.

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163. Mark Gorwitz, *Saudi Arabian Nuclear Science Bibliography: Open Literature Citations*, Washington, DC: Federation of American Scientists, May 2005; see also *Saudi Arabia Country Profile*, Stockholm, Sweden: Stockholm International Peace Research Institute (SIPRI).

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