

# Report for Congress

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## **Weapons of Mass Destruction: Trade Between North Korea and Pakistan**

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# Weapons of Mass Destruction: Trade Between North Korea and Pakistan

## Summary

In October 2002, North Korea reportedly admitted it had a clandestine uranium enrichment program, and the press reported that Pakistan had exchanged centrifuge enrichment technology for North Korean help in developing longer range missiles. On March 24 and 27, 2003, the Bush Administration imposed sanctions on North Korean and Pakistani entities involved in missile cooperation, but did not impose sanctions for nuclear cooperation. This report describes the nature and evidence of the cooperation between North Korea and Pakistan in weapons of mass destruction (WMD), the impact of cooperation on their WMD programs, and the apparent impact on the international nonproliferation regime. It will be updated as events warrant.

Although they may appear to be unlikely proliferation bedfellows, North Korea and Pakistan have been engaged in conventional arms trade for over thirty years. In the 1980s, as North Korea began successfully exporting ballistic missiles and ballistic missile technology, Pakistan began producing highly enriched uranium at the Khan Research Laboratory. Serious missile cooperation seems to have begun in 1993 with a visit from Benazir Bhutto to Pyongyang; it is harder to pinpoint the genesis of Pakistan's nuclear cooperation with North Korea, although there are some reports of equipment exports from the mid-1980s. By the time Pakistan probably needed to pay North Korea for its purchases of medium-range *No Dong* missiles in the mid-1990s (upon which its *Ghauri* missiles are based), Pakistan's cash reserves were low. With nuclear tests in 1998, which validated its weapons designs, Pakistan could offer North Korea a route to nuclear weapons using highly enriched uranium (HEU) that would circumvent the plutonium-focused 1994 Agreed Framework signed with the United States and be difficult to detect.

WMD trade between North Korea and Pakistan raises significant issues for Congress in its oversight role. First is the question of sources of leverage over proliferators that do not belong to nonproliferation regimes; second is the role of sanctions, interdiction, and intelligence as nonproliferation tools; third is a general interpretation of the threat of proliferation and how it affects the nexus of terrorism and WMD. Fourth, Congress may decide to consider the impact of tradeoffs between counterterrorism cooperation and nonproliferation cooperation and whether there are approaches that would make both policies mutually supportive. This could have particular implications for potential plans to expand cooperative threat reduction programs to states outside the former Soviet Union, as provided for in the Senate version of the Defense Authorization bill, S. 747.

See also CRS Issue Brief IB91141 *North Korea's Nuclear Weapons Program*, CRS Report RS21391, *North Korea's Nuclear Weapons: How Soon an Arsenal?*, and CRS Report RS21237, *Indian and Pakistani Nuclear Weapons Status*.

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# Weapons of Mass Destruction: Trade Between North Korea and Pakistan

## Introduction

More than thirty years ago, states agreed that controls on trade involving weapons of mass destruction (WMD) were needed to support the framework of agreements comprising the nonproliferation regime. Almost all agree that the controls are not foolproof, but many observers believe that national and multilateral export controls can slow, deter, and make WMD acquisition more difficult or costly for the determined proliferator until political change makes the weapons irrelevant or no longer desirable.<sup>1</sup>

One of the recurrent problems in controlling technology transfers is the exclusion of some countries from the regimes. Although they are targets of supply-side restrictions, some proliferating states now are able to reproduce WMD technologies and systems and sell them abroad without formal restraints on trade. North Korea, Pakistan, and India are three such examples in the case of nuclear weapons and missile technology.<sup>2</sup>

When export controls and interdiction efforts fail, some U.S. laws impose penalties on countries, entities, or persons for proliferation activities. The provisions are varied and extend across the range of foreign policy tools (aid, financing, military sales).<sup>3</sup> Penalties for engaging in enrichment or reprocessing trade were established by the 1977 Glenn-Symington amendments to the Foreign Assistance Act (later incorporated by the Nuclear Proliferation Prevention Act of 1994 into the Arms Export Control Act). Later penalties were added for nuclear detonations, and other provisions established penalties for individuals. Missile proliferation-related sanctions were established in the Missile Technology Control Act 1990, which added

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<sup>1</sup> Some countries have made political decisions to stop WMD programs, which have sometimes coincided with regime changes, for example, Argentina and Brazil stopped their nuclear weapons programs in the 1990s; the U.S. stopped its biological weapons program in advance of the Biological Weapons Convention; South Africa dismantled its nuclear weapons program in the early 1990s.

<sup>2</sup> China has also presented a proliferation problem for many years because it did not belong to the supplier restraint groups. A member of the Zangger Committee, but not the Nuclear Suppliers' Group, China joined the NPT in 1992 and has agreed to adhere to MTCR guidelines. China has also given assurances that it will not export nuclear-related items to unsafeguarded facilities. However, it is clear that China continues to supply technical assistance to Pakistan's missile program.

<sup>3</sup> See CRS Report RL31502, *Nuclear, Biological, Chemical, and Missile Proliferation Sanctions: Selected Current Law*, by Dianne E. Rennack.

Chapter VII to the Arms Export Control Act and similar language at Section 11B of the Export Administration Amendment Act of 1979. In addition to legislated penalties, administrations have also imposed sanctions through relevant executive orders.

In October 2002, the Bush Administration announced that North Korea had been pursuing a clandestine uranium enrichment program; U.S. intelligence officials leaked to the press a few days later that Pakistan, among other countries, was implicated. The outlines of a missiles-for-nuclear technology trade were reported in the press.<sup>4</sup> Pakistani government officials denied such trade. The State Department responded by offering assurances that cooperation between the two was a thing of the past. In March 2003, the Bush Administration imposed sanctions on North Korean and Pakistani entities for cooperation in missiles.<sup>5</sup> In a letter to Congress, the State Department explained that “the facts relating to the possible transfer of nuclear technology from Pakistan to North Korea...do not warrant the imposition of sanctions under applicable U.S. laws.”

Both North Korea and Pakistan have been subject to sanctions in the past for WMD trade. North Korea has been under one form or another of sanctions for close to fifty years; Pakistan has been sanctioned in what some observers deem an “on again, off again” fashion, mostly for importing WMD technology, and also for testing a nuclear device. The sanctions on the North Korean entity, Changgwang Sinyong Corporation, were imposed pursuant to the Arms Export Control Act and the Export Administration Act on the basis of knowing involvement in the transfer of Category I (under the Missile Technology Control Regime) missiles or components. The sanctions on the Pakistani entity, Khan Research Laboratories, were imposed pursuant to Executive Order 12938, reportedly for making a material contribution to Pakistan’s missile program. Both of these entities have been sanctioned repeatedly in the past for missile trade.

## **Rogue State Symbiosis?**

At first glance, North Korea and Pakistan do not seem the likeliest of proliferation bedfellows. However, they have traded in conventional armaments for over thirty years and forged a firm relationship during the Iran-Iraq War (1980-1988), during which both provided assistance to Iran. North Korea’s sale of Scuds and production capabilities proved particularly important to Iran.<sup>6</sup>

Neither state lies completely outside the nonproliferation regimes. Despite its extreme isolation, North Korea signed the Nuclear Nonproliferation Treaty (NPT) in 1985 under pressure from the Soviet Union, and is a party to the Biological Weapons Convention (BWC). However, North Korea never lived up to its NPT obligations

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<sup>4</sup> See “Pakistan’s Benazir Oversaw Korea Nuclear Deal - sources,” *Reuters News*, November 20, 2002.

<sup>5</sup> *Federal Register*, Vol. 68, No. 63, April 2, 2003, pp. 16113-16114.

<sup>6</sup> Unpublished paper by Joseph S. Bermudez, Jr., “DPRK-Pakistan Ghauri Missile Cooperation,” 1996.

since joining, and formally withdrew from the treaty, effective April 10, 2003.<sup>7</sup> Most observers believe North Korea has 1 or 2 nuclear weapons (or at least the plutonium for them) and may be able to add 5 or 6 weapons to its arsenal within 6 months of restarting its reprocessing plant. North Korea announced on April 18, 2003 that it was reprocessing, although there is still some ambiguity about what that statement means and questions whether or not it is true. Most observers believe North Korea probably has biological weapons. North Korea is neither a party to the Missile Technology Control Regime (MTCR) nor the Chemical Weapons Convention (CWC). After successfully reverse-engineering Soviet-origin Scud missiles, North Korea became a leading exporter of ballistic missiles beginning in the 1980s. According to the Central Intelligence Agency (CIA), North Korea attaches high priority to exporting ballistic missiles, which is a major source of hard currency.<sup>8</sup>

Pakistan, on the other hand, has never been as isolated as North Korea. It has relied significantly on outside sources of technology for its weapons programs but has not been a major exporter of WMD-related items. Pakistan has long rejected the NPT and tested nuclear weapons in 1998, but is a party to the BWC and the CWC. Nonetheless, the U.S. Department of Defense believes Pakistan has “the resources and capabilities to support a limited BW research and development effort,” and likely has a chemical weapons capability.<sup>9</sup> Pakistan has sought technical assistance in its ballistic missile programs from North Korea and China for over a decade.

To some, proliferation by states that have newly acquired WMD is inevitable, resulting from diffusion of technology, insufficient political will to enforce controls, or demand fueled by perceived threats or the continuing prestige of WMD. In the past, however, technology transfers between countries outside of the control regimes seemed limited by the lack of technical skill and technology or hard currency. By the mid-1990s, however, North Korea had a proven track record in ballistic missiles, and Pakistan had demonstrated its uranium enrichment capabilities. Although Pakistan apparently was hampered by a lack of hard currency, it could provide North Korea with a route to nuclear weapons using highly enriched uranium (HEU). This route would not only circumvent North Korea’s Agreed Framework with the United States, but would also be difficult to detect using satellite imagery.

## North Korean Enrichment

At the time the 1994 Agreed Framework with North Korea was negotiated, there was concern about, but scant evidence of, North Korean interest in uranium enrichment. Reports relating to North Korea’s procurement of enrichment-related equipment date as far back as the mid-1980s, a time when North Korea was progressing rapidly in its plutonium production program. For example, in 1987,

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<sup>7</sup> See CRS Issue Brief IB91141, *North Korea’s Nuclear Weapons Program*, by Larry Nicksch. North Korea also tried to withdraw from the NPT in 1994, but suspended its withdrawal.

<sup>8</sup> See [[http://www.cia.gov/cia/publications/bian/bian\\_jan\\_2003.htm](http://www.cia.gov/cia/publications/bian/bian_jan_2003.htm)]

<sup>9</sup> Department of Defense, *Proliferation: Threat and Response*, January 2001.

North Korea reportedly received a small annealing furnace from the West German company Leybold AG. Although they have many other uses, annealing furnaces can be used in production of centrifuge rotors for uranium enrichment. A five-year-long German intelligence investigation conducted from 1985 to 1990 concluded that Iraq, and possibly Iran and North Korea obtained uranium melting information from Pakistan in the late 1980s; Pakistan had obtained it from Urenco, the European uranium enrichment consortium.<sup>10</sup> U.S. intelligence sources also believed that technicians employed by Leybold AG were involved in transferring equipment and information to North Korea. One or two such technicians were in North Korea in 1989 and another Leybold employee reportedly was seen there in 1990. Subsidiaries of Leybold AG were also involved in exporting centrifuge-related welding equipment to Iraq in the late 1980s.<sup>11</sup>

Negotiators of the Agreed Framework were aware that North Korea's NPT obligations did not prohibit uranium enrichment, and that the Agreed Framework did not directly address uranium enrichment.<sup>12</sup> North Korea was bound not to possess plutonium reprocessing or uranium enrichment facilities by virtue of the 1992 Joint Declaration of a Denuclearized Korean Peninsula – a bilateral agreement with South Korea that called for subsequent meetings. The U.S.-North Korean Agreed Framework required North Korea to make progress in implementing the joint declaration, but the process languished. Throughout the 1990s, the U.S. government continued to look for signs of enrichment and in 1998, the United States sent a team to Kumchang-ni to look for undeclared nuclear activities, including uranium enrichment. The team concluded that the site was not nuclear-related. By 1999, according to one former official, however, there were clear signs of active North Korean interest in uranium enrichment. According to one report, U.S. officials raised with Islamabad suspicions of nuclear technology transfers between Pakistan and North Korea in 2000, prompting Pakistani officials to cut off cooperation.<sup>13</sup> In March 2001, AQ Khan was removed from his position as head of Khan Research Laboratories, but retains the post of presidential adviser. Khan, one of whose key contributions as the head of the Pakistani nuclear weapons program was the “procurement” of enrichment technology blueprints from URENCO in 1975, most likely still wields considerable influence. Shortly after Khan's dismissal, Deputy Secretary of State Armitage was quoted by the *Financial Times* as saying that “people who were employed by the nuclear agency and have retired,” could be spreading nuclear technology to other states, including North Korea.<sup>14</sup> A senior U.S.

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<sup>10</sup> “Agencies Trace Some Iraqi URENCO Know-How to Pakistan Re-Export,” *Nucleonics Week*, November 28, 1991, pp. 1, 7-8.

<sup>11</sup> “Iraq's Bomb, Chip by Chip,” *New York Times*, April 24, 1992.

<sup>12</sup> Under North Korea's safeguards agreement with the International Atomic Energy Agency (IAEA), North Korea would only have to declare such facilities when safeguarded material was introduced into the facility. Natural uranium, the feedstock, is not safeguarded under INFCIRC-153, but slightly enriched uranium would be.

<sup>13</sup> “Pakistan Informed US of ‘Personal’ Nuclear Technology Transfer: Report” December 25, 2002, *Agence France-Presse*.

<sup>14</sup> “US Fears North Korea Could Gain Nuclear Capability through Pakistan,” *Financial Times* (continued...)

nonproliferation official explained later that Armitage's statement led to confusion about the cooperation; that it was really limited to missile cooperation.<sup>15</sup> When asked in October 2002 about a possible link between Armitage's June 2001 remarks and the October 2002 reports of Pakistani assistance to North Korea's enrichment program, the State Department cited a policy of not commenting on intelligence matters.<sup>16</sup> Khan reportedly has made 13 visits to North Korea, beginning in the 1990s.<sup>17</sup>

## Current Status

On November 18, 2002, the Central Intelligence Agency distributed a one-page, unclassified white paper to Congress on North Korean enrichment capabilities.<sup>18</sup> The paper noted that the United States had "been suspicious that North Korea has been working on uranium enrichment for several years," and that it obtained clear evidence "recently" that North Korea had begun constructing a centrifuge facility. The CIA concluded that North Korea began a centrifuge-based uranium enrichment program in 2000. Further, the paper noted that, in 2001, North Korea "began seeking centrifuge-related materials in large quantities. It also obtained equipment suitable for use in uranium feed and withdrawal systems." The CIA "learned that the North is constructing a plant that could produce enough weapons-grade uranium for two or more nuclear weapons per year when fully operational – which could be as soon as mid-decade."

Media reports suggested that the CIA had evidence of construction and of procurement. "Clear evidence" of construction of a centrifuge facility could mean photographs of construction sites, but the phrasing that the CIA "learned that the North has begun constructing a plant" is ambiguous enough to suggest the possibility that such information comes from a defector. According to former U.S. ambassador Donald Gregg, who became ambassador to South Korea in 1989 after retiring from

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<sup>14</sup> (...continued)

*Times*, June 1, 2001

<sup>15</sup> "North Korea Got a Little Help from Neighbors — Secret Nuclear Program Tapped Russian Suppliers and Pakistani Know-How," *Wall Street Journal Europe*, October 21, 2002; "North Korean-Pakistan Collusion Said Limited to KRL and Missiles," *Nuclear Fuel*, June 25, 2001.

<sup>16</sup> "United States Knew About Nuclear Link Between North Korea, Pakistan," *San Jose Mercury News*, October 24, 2002.

<sup>17</sup> Seymour Hersh, "The Cold Test: What the Administration Knew About Pakistan and the North Korean Nuclear Program," *New Yorker*, January 27, 2003. "So Far U.S. Skirting Sanctions Issue on Pakistan's Centrifuge Aid to DPRK," *Nuclear Fuel*, December 9, 2002, quotes a Western source that A.Q. Khan was in the DPRK when the two countries' representatives closed a deal to cooperate on ballistic missiles and uranium enrichment. "The Evil Behind the Axis?" *Los Angeles Times*, January 5, 2003, quotes U.S. officials that Khan initiated talks with the North Koreans in 1992 for *No Dong* missiles.

<sup>18</sup> Untitled working paper on North Korea's nuclear weapons and uranium enrichment distributed by CIA to Congressional staff on November 19, 2002.

the CIA, North Korea is “an extraordinarily difficult target to go after.”<sup>19</sup> The unclassified one-page paper distinguishes between North Korea seeking materials and actually obtaining equipment.

According to U.S. intelligence officials, the CIA does not know where North Korea is enriching uranium.<sup>20</sup> According to a State Department official, the Administration has narrowed possible uranium enrichment sites down to three. Outside observers have suggested that Yongjo-ri, Hagap, Taechon, Pyongyang, and Ch'onma-san might all be potential sites for enrichment. One defector, who was debriefed by Chinese officials in 1999 (he later returned to North Korea, where, it is assumed, he was killed), claimed that North Korea was operating a secret uranium processing site under Mt. Chun-Ma. Commercial satellite photos of Hagap show tunnel entrances but little else.

Detecting clandestine uranium enrichment is generally considered to be more difficult than detecting clandestine plutonium production for several reasons. First, satellite imagery is most useful when changes can be detected at known facilities, or in detecting new facilities. Reactors and reprocessing facilities used in plutonium production often have telltale signatures (shape, size, features like no windows in a reprocessing plant, connection to a water source, power plants or connection to an electricity grid, environmental releases), which facilitate remote detection. Uranium enrichment plants often do not, although this varies among the techniques used. For example, gaseous diffusion enrichment plants often are very large and require tremendous amounts of electricity, offering some distinguishable features. In contrast, centrifuge plants can be small, emit few environmental signatures, and do not require significant amounts of energy to operate.

## **Pakistani Assistance**

The White House revealed publicly that North Korea had a clandestine uranium enrichment program on October 16, 2002, more than ten days after Assistant Secretary of State Kelly's meetings with North Korean officials. Intelligence officials apparently leaked to the press that Pakistan had provided assistance to North Korea.<sup>21</sup> There is currently no detailed, unclassified information on the assistance Pakistan might have offered. One media report cited Western officials that the aid included a complete design package for a centrifuge rotor assembly; another report from Japan stated that Pakistan had exported actual centrifuge rotors (2,000-3,000) to North Korea.<sup>22</sup> The *Washington Post* reported that North Korean efforts to procure high strength aluminum and reports of significant construction activity tipped off the

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<sup>19</sup> “N. Korea Keeps U.S. Intelligence Guessing,” *USA Today*, March 11, 2003.

<sup>20</sup> *Ibid.*

<sup>21</sup> “A Nuclear North Korea: Intelligence; U.S. Says Pakistan Gave Technology to North Korea,” *New York Times*, October 18, 2002.

<sup>22</sup> “CIA Assessment on DPRK Presumes Massive Outside Help on Centrifuges,” *Nuclear Fuel*, November 25, 2002.

United States.<sup>23</sup> Reportedly, the procurement evidence points to North Korean efforts to obtain materials from China, Japan, Pakistan, Russia, and Europe, but that Pakistan provided most of the assistance related to the rotors. Another open question is when Pakistan began to provide assistance. Some observers have suggested cooperation could have begun before the Agreed Framework was signed in 1994; others suggest it began around 1997, when Pakistan first began receiving missiles from North Korea.<sup>24</sup>

In response to a question posed by Senator Hagel on what the United States knows about Pakistan's involvement in helping North Korea, Deputy Secretary of State Richard Armitage stated on February 4, 2003 that:

We know it's both ways and we know a good bit about a North Korean-Pakistan relationship. I myself have, however, have had conversations personal-direct with President Musharraf, who has assured us these are over, and they were in the past.<sup>25</sup>

One media report stated that U.S. intelligence agencies discovered the "Pakistan-North Korea link" in the summer of 2002 by tracing the routes of equipment shipments and pinpointing dealers involved in the transactions.<sup>26</sup> Other reports suggest that intelligence agencies knew earlier, but that there was evidence of transactions as late as the summer of 2002. Overseas reports stated that Pakistan told the United States in 2000, as a result of a U.S. request, that nuclear technology was transferred on a personal basis, without the acquiescence or knowledge of the Pakistani government. According to that and other reports, the apparent tip-off was the deposit of tens of thousands of dollars into the personal bank accounts of Pakistani scientists at Kahuta (Khan Research Laboratories).<sup>27</sup>

In a letter to key senators and members of Congress on March 12, 2003, Assistant Secretary of State for Legislative Affairs Paul Kelly wrote that "the Administration carefully reviewed the facts relating to the possible transfer of nuclear technology from Pakistan to North Korea, and decided that they do not warrant the imposition of sanctions under applicable U.S. laws."

## Technical Implications

If North Korea may already have plutonium-based nuclear weapons, what is the technical significance of it acquiring a uranium enrichment capability? On the one hand, acquiring fissile material is, to many observers, the most difficult part of nuclear weapons acquisition. On the other hand, North Korea's plutonium production

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<sup>23</sup> "U.S. Followed the Aluminum; Pyongyang's Effort to Buy Metal was Tip to Plans," *Washington Post*, October 18, 2002.

<sup>24</sup> "Pyongyang bought N-components in '97," *Daily Yoimuri*, October 23, 2002.

<sup>25</sup> Hearing on North Korea, Senate Foreign Relations Committee, February 4, 2003.

<sup>26</sup> "Pyongyang bought N-components in '97," *Daily Yoimuri*, October 23, 2002.

<sup>27</sup> "Pakistan informed US of 'personal' nuclear technology transfer," *Agence France-Presse*, December 25, 2002 (based on report from *Jiji Press* news agency).

program is no longer bound by the Agreed Framework. North Korea began operating its 5MW reactor and stated in April 2003, that it is reprocessing material (although the U.S. has not confirmed this). By many accounts, North Korea may be able to augment its current stockpile of 1-2 weapons' worth of plutonium within 6 months of the reprocessing plant start-up. Fuel ready for reprocessing would yield about 5 to 6 weapons, although estimates vary.

Most accounts suggest that North Korea does not have a completed enrichment plant that could substantially increase its weapons-usable fissile material before 2005. In order to produce enough HEU for 1 to 2 weapons (about 50kg), North Korea would require cascades of thousands of centrifuges. Although an enrichment plant would clearly add to North Korea's overall fissile material production capability, it should be viewed in the context of other options – for example, finishing construction of the much larger reactors at Yongbyon and Taechon. The CIA estimates that the two reactors together could generate 275kg of plutonium per year, enough perhaps for between 35 and 50 weapons. By contrast, the plant that North Korea is constructing to enrich uranium, according to the CIA, could produce enough weapons-grade uranium for two or more nuclear weapons per year when fully operational.<sup>28</sup>

It may be that the main benefit of a centrifuge enrichment program – the ability to produce fissile material clandestinely – is no longer of great importance to North Korea. However, the production of highly enriched uranium, together with plutonium production, could give the North Koreans the option of producing more sophisticated nuclear weapons, for example, using composite pits or boosted fission techniques, although there are no indications that they have the technical skill to do so. Moreover, the difficulty in detecting centrifuge enrichment facilities makes the program less exposed to possible military strikes.

## Pakistan's Missile Development

In the early 1980s, the Pakistan National Development Complex (PNDC) collaborated with the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) in developing Pakistan's first ballistic missiles. Despite claims of indigenous development, there are many indications that the *Hatf* 1, 2, and 3 benefitted from Chinese and European assistance. Some believe that Pakistan renamed some imported Chinese M-11 missiles as *Hatf* 2a missiles in the early 1990s; many believe that the *Hatf* 3 are variants of Chinese M-9 missiles, and there are those who believe that the *Hatf* 4 (*Shaheen* 1) may be based on Chinese M-11s.

The *Hatf* 1 — a short-range, solid propellant, unguided missile considered by some to be too small for a nuclear warhead — was flight-tested in 1989 and fielded in 1992. The 80km-range was extended to 300km in the *Hatf* 2a, and to 800km in the *Hatf* 3.

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<sup>28</sup> Untitled working paper on North Korea's nuclear weapons and uranium enrichment distributed by CIA to Congressional staff on November 19, 2002.

## North Korean Assistance

Pakistan's interest in procuring missiles from North Korea apparently developed in the early 1990s, although Pakistani ballistic missile engineers reportedly developed working relationships with North Korean engineers in the mid-1980s when they both assisted Iran during the Iran-Iraq war. In 1992, Pakistani officials visited North Korea to view a *No Dong* prototype, and for a *No Dong* flight test in May 1993.<sup>29</sup> There are reports that then-Prime Minister Benazir Bhutto visited Pyongyang for one day in December 1993 and many analysts believe missile sales were on the agenda of her visit, despite her public denial.<sup>30</sup> According to one report, North Korea sent 5 to 12 *No Dong* missile assembly sets to Pakistan between 1994 and 1997; North Korea denies the allegation.<sup>31</sup> Pakistan's official description of the *Ghauri* missile program is that Khan Research Laboratories initiated the program in 1993 and publicly announced it in 1997. At the end of 1997, intelligence agencies observed regular flights from North Korea to Pakistan, accelerating in the beginning of 1998 when there were about 9 flights per month. These flights reportedly followed the visit of high-level North Korean officials to Pakistan.<sup>32</sup> Many observers believe Pakistan accepted between 12 and 25 complete *No Dong* missiles in the late 1990s. The *Ghauri* 1 missile (also known as *Hatf* 5), a liquid-propellant, nuclear-capable, 1500km-range ballistic missile, was successfully flight-tested in April 1998. One month later, Pakistan tested its first nuclear weapons.

## Technical Implications

In missile development, some important milestones include extending range and payload, improving accuracy, and enhancing deployability (for example, through stable propellants and mobile launchers). The medium-range *Ghauri* missiles significantly increase Pakistan's ability to target India and improve Pakistan's ability to deploy nuclear warheads by increasing the payload. With a payload and range, respectively, of 1200kg and 1500km, the *Ghauri* well exceeds the MTCR standard for a Category I, or nuclear-weapons capable, missile (500kg/300km). By contrast, the *Hatf* 1 missiles have a range and payload of 80km and 500kg. A.Q. Khan, former head of Khan Research Laboratory, stated that the *Ghauri* is Pakistan's only nuclear capable missile. The *Ghauri* 2, still in development, will have a range of between 1800 and 3000km. Both could reach major Indian cities with large payloads.

The *Ghauri* missiles, because they use liquid propellant, are not as easily deployed as the *Shaheen* 1 and 2 missiles (*Hatf* 4 and 6). These solid-fueled, medium-range missiles apparently are based on Chinese M-11s. The *Shaheens* are

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<sup>29</sup> See Joseph S. Bermudez, Jr., "A History of Ballistic Missile Development in the DPRK," Center for Nonproliferation Studies Occasional Paper No. 2, Monterey Institute of International Studies, 1999, pp. 23-24.

<sup>30</sup> Daniel A. Pinkston, "When Did WMD Deals between Pyongyang and Islamabad Begin?" <http://cns.mis.edu>

<sup>31</sup> Duncan Lennox, editor, *Jane's Strategic Weapon Systems*, Issue 36, January 2002, p. 125.

<sup>32</sup> "Pakistan's Missile 'Was a Nodong'," *Jane's Missile and Rockets*, Volume 2, Number 5, May 1998, pp. 1-2.

easier to prepare, require fewer support vehicles and personnel, and are far more accurate than the *Ghauris*.<sup>33</sup> There have been reports that the *Ghauri* missiles will be shelved in favor of the *Shaheens*, but these are unconfirmed. On the other hand, the *Shaheen 1* has a range of just 600km, but the *Shaheen 2* is expected to have a range of 2500km. The *Shaheen 2* reportedly has not yet been flight tested.<sup>34</sup>

North Korea has not flight-tested ballistic missiles since it pledged a moratorium in September 1999. However, U.S. intelligence officials believe that it has continued other kinds of testing. North Korea threatened to end the moratorium in November 2002 if normalization with Japan did not progress, and then in January 2003, after North Korea declared its withdrawal from the Nuclear Nonproliferation Treaty. Some officials believe it is only a matter of time until North Korea breaks the moratorium.<sup>35</sup> The implications of ballistic missile testing for North Korean-Pakistani missile cooperation are not clear because objectives of North Korean testing and future directions of the Pakistani program are not known. However, Pakistan probably would be interested in increasing the payload and improving the accuracy and mobility of its missiles, which could indicate more interest in Chinese than North Korean assistance.

## Pakistan's Nuclear Sales

The genesis of Pakistan's nuclear cooperation with North Korea is murkier. There are a few reports in trade journals of equipment passing through Pakistan on the way to North Korea, but it is difficult to pinpoint from these reports when cooperation began. In 1986, Swiss officials seized equipment (autoclaves and desublimers that are useful in uranium enrichment) en route to Pakistan that is typically used in the uranium enrichment process. Special steel containers were also seized. One source reports that uranium enrichment information may have been diverted from the German partner in Urenco, Uranit GmbH, to Pakistan via Switzerland and then reexported to North Korea.<sup>36</sup>

In 1996, Pakistani foreign currency reserves dropped severely; the government was able to avoid defaulting on external debt with help from the International Monetary Fund and borrowed \$500M from domestic banks.<sup>37</sup> The reserves at that time were \$773 million, the equivalent of about three weeks of imports.<sup>38</sup> One analyst has suggested that this crisis in reserves may have made a barter arrangement

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<sup>33</sup> Duncan Lennox, editor, *Jane's Strategic Weapon Systems*, Issue 36, January 2002, p. 126.

<sup>34</sup> *Ibid*, p. 127.

<sup>35</sup> "North Korea Prepares New Test of Missile," *Washington Times*, March 12, 2003.

<sup>36</sup> "Agencies Trace Iraqi Urenco Know-how to Pakistan Re-Export," *Nucleonics Week*, November 28, 1991.

<sup>37</sup> "Emerging Market ADRs -2: Pakistan Currency Reserves Low," *Dow Jones News Service*, February 4, 1997.

<sup>38</sup> Currently they stand at about \$10 billion.

with North Korea attractive.<sup>39</sup> By the end of 1997, as noted above, a flurry of visits took place between North Korean and Pakistani officials.

In May 1998, Pakistan conducted nuclear tests. In June 1998, Pakistani government officials stated that Pakistan did not intend to proliferate its nuclear technology. Pakistani Prime Minister Nawaz Sharif said on 14 June 1998 that “Pakistan is a very responsible nation. It has never passed on the technology. If we had to do it, we would have done it 10 years ago.”<sup>40</sup> Sharif was overthrown by the military in a coup in 1999 and the following year, the Pakistani government published an advertisement announcing procedures for commercial exports of nuclear material. Prospective exporters would need a “no objection certificate” from the Pakistan Atomic Energy Commission, which would also have the authority to verify and inspect all prospective nuclear exports. According to an article in the Pakistan daily, *Dawn*:

The items listed in the advertisement can be in the form of metal alloys, chemical compounds, or other materials containing any of the following: 1. Natural, depleted, or enriched uranium; 2. Thorium, plutonium, or zirconium; 3. Heavy water, tritium, or beryllium; 4. Natural or artificial radioactive materials with more than 0.002 microcuries per gram; 5. Nuclear-grade graphite with a boron equivalent content of less than five parts per million and density greater than 1.5g/cubic centimeter.<sup>41</sup>

Many of those items would be useful in a nuclear weapons program. The advertisement also listed equipment "for production, use or application of nuclear energy and generation of electricity" including:

- Nuclear power and research reactors
- Reactor pressure vessels and reactor fuel charging and discharging machines
- Primary coolant pumps
- Reactor control systems and items attached to the reactor vessels to control core power levels or the primary coolant inventory of the reactor core
- Neutron flux measuring equipment
- Welding machines for end caps for fuel element fabrication
- *Gas centrifuges and magnet baffles for the separation of uranium isotopes* (emphasis added)
- UF6 mass spectrometers and frequency changers
- Exchange towers, neutron generator systems, and industrial gamma irradiators

In the aftermath of the October 2002 revelations, Pakistani officials denied any involvement with North Korea’s nuclear program. Pakistan’s ambassador to the

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<sup>39</sup> Daniel A. Pinkston, “When Did WMD Deals between Pyongyang and Islamabad Begin?” [<http://cns.mis.edu>]

<sup>40</sup> *Dawn*, June 15, 1998.

<sup>41</sup> “Government Regulates Export of Nuclear Materials,” *Dawn*, July 24, 2000.

United States, Ashraf Jehangir Qazi, told the *Washington Post* that “No material, no technology ever has been exported to North Korea,” adding that while “Pakistan has engaged in trade with North Korea, nobody can tell us if there is evidence, no one is challenging our word. There is no smoking gun.”<sup>42</sup> The picture that many see in the press reports is a “don’t ask, don’t tell” relationship. Secretary of State Powell told ABC’s *This Week* that “President Musharraf gave me his assurance, as he has previously, that Pakistan is not doing anything of that nature...The past is that past. I am more concerned about what is going on now. We have a new relationship with Pakistan.”<sup>43</sup> Powell stressed that he has put President Musharraf on notice: “In my conversations with President Musharraf, I have made clear to him that any, any sort of contact between Pakistan and North Korea we believe would be improper, inappropriate, and would have consequences.”<sup>44</sup>

## Issues for Congress

North Korea’s actions alone raise significant policy questions for Congress, including what nonproliferation tools and strategy might still be effective with North Korea. However, WMD trade between two proliferators raises a host of other issues that may be pertinent to Congress’ oversight of nonproliferation programs and strategy and counterterrorism. First, leverage might be needed from outside the traditional nonproliferation framework, since neither North Korea nor Pakistan is a member of the missile or nuclear control regimes. China is an obvious source of leverage because of its longstanding diplomatic, military, and economic ties to both countries, but the development of a new relationship between the United States and Pakistan based on counterterrorism cooperation may also be a source of leverage.

Second, this example of secondary proliferation highlights the critical roles of sanctions, interdiction, and intelligence. Although some nonproliferation sanctions are mandatory, others are not. Likewise, the administration can be flexible in choosing to interdict shipments and in choosing to use intelligence to demarche other states on their proliferation activities, or not. The collection of U.S. nonproliferation laws seeks to provide both global restrictions (such as penalizing cooperation in enrichment or reprocessing) and country-specific restrictions. While it may be impossible to be completely consistent in the implementation of nonproliferation policies, country-specific approaches could undermine global norms of behavior.

Third, the example of WMD trade between North Korea and Pakistan raises questions about how to interpret proliferation threats. Is the security of the United States and its allies compromised because Pakistan and North Korea are refining their WMD programs and developing new capabilities, or because sales of sensitive

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<sup>42</sup> “Pakistan’s N. Korea Deals Stir Scrutiny; Aid to Nuclear Arms Bid May Be Recent,” *Washington Post*, November 13, 2002.

<sup>43</sup> Reported in “North Korea Got a Little Help from Neighbors — Secret Nuclear Program Tapped Russian Suppliers and Pakistani Know-How,” *Wall Street Journal Europe*, October 21, 2002. Transcript of ABC *This Week* from October 20, 2002.

<sup>44</sup> *Wall Street Journal*, December 2, 2002.

technologies continue unabated and could expand to terrorists? Since September 2001, the nexus of proliferation of WMD and terrorism has been deemed one of the greatest threats to U.S. security. Although North Korea is one of the seven state sponsors of terrorism, some in the administration believe that the nexus of terrorism and WMD is not as pronounced in North Korea as it has been elsewhere, for example, in Iraq.<sup>45</sup> Others believe, however, that there is a danger of North Korea proliferating its nuclear technology. Pakistan, while not a state sponsor of terrorism, clearly has terrorist activities on its soil, and has been a particular concern with respect to terrorist access to WMD since September 11, 2001. At that time, nonproliferation concerns about Pakistan focused on the security of Pakistani nuclear weapons from terrorist acquisition and the activities of Pakistani nuclear scientists providing assistance to terrorists or other states. The inadvertent leakage of nuclear know-how appeared to be a serious threat. Although the Pakistani government repeatedly has assured the world that its nuclear program is safe, there are those who believe this may not be true. In the case of trade with North Korea, it is unclear whether alleged nuclear transfers occurred with the blessing of the Pakistani government or on the personal initiative of scientists. Some have maintained that Pakistan should be able to provide evidence that it provided cash – rather than nuclear technology – in return for North Korean missiles and components that apparently were loaded onto government-owned C-130 aircraft.

A broader question is whether the Bush Administration has given higher priority, since September 2001, to cooperation on terrorism than to cooperation in nonproliferation. For example, when North Korea shipped Scud missiles to Yemen in December 2002, North Korea was sanctioned while Yemen was not sanctioned for receiving them; Yemen has been actively cooperating with the United States in counterterrorism activities.<sup>46</sup> When asked if the countries that provided assistance to North Korea on the enrichment program would risk being cut off from U.S. assistance, White House spokesman Ari Fleischer responded:

Well, yes, since September 11th, many things that people may have done years before September 11th or some time before September 11th, have changed. September 11th changed the world and it changed many nations' behaviors along with it. And don't read that to be any type of acknowledgment of what may or may not be true. But September 11th did change the world.<sup>47</sup>

Fleischer's statement appears to imply that forgiveness of bad proliferation behavior before September 11, 2001 may be in order because cooperation in

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<sup>45</sup> Remarks by Deputy Secretary of State Armitage to Senate Foreign Relations Committee Hearing on North Korea, February 4, 2003.

<sup>46</sup> When asked at the daily press briefing on December 11, 2002 about waiving sanctions against Yemen for its receipt of Scuds from North Korea, State Department Richard Boucher said, "We decided to waive it because of the commitments that they [Yemen] had made and in consideration of their support for the war on terrorism." He later elaborated that: "We have done a lot of cooperation, training, exchange of information, law enforcement cooperation with the Government of Yemen and we want to continue to do that."

<sup>47</sup> Transcript, White House press briefing, October 18, 2002.

opposing terrorism has become of primary importance and because enrichment cooperation halted after September 11, 2001. On the first point, it is possible to waive sanctions for reasons of national security. Section 101 of the Arms Export Control Act (22 USC 2799a) prohibits foreign economic or military assistance to countries that deliver or receive nuclear enrichment equipment, materials, or technology unless the supplier agrees to place such under safeguards and the recipient has full-scope safeguards. The President, who makes the determination, can waive sanctions if they will have a serious adverse effect on vital U.S. interests, given assurances that the recipient will not acquire, develop, or assist others in acquiring or developing nuclear weapons. If the Administration found sufficient evidence of Pakistani enrichment assistance to North Korea, the United States could neither supply foreign economic or military assistance to Pakistan as the supplier of that technology nor to North Korea as the recipient of that technology unless safeguards were placed on the equipment or material in question or North Korea rejoined the NPT with full-scope safeguards. In the absence of those nuclear safeguards, President Bush could waive sanctions against Pakistan on the basis that they would have a serious adverse effect on Pakistan's cooperation in counterterrorism, and hence the U.S. war on terrorism as a vital U.S. interest. However, the Arms Export Control Act would still require North Korea as the recipient to provide assurances that it will not acquire, develop, or assist others in acquiring or developing nuclear weapons. It is hard to see how sanctions against North Korea for receiving such assistance could be waived under the national security clause, since what little assistance the U.S. provides has pretty much been cut off after the collapse of the Agreed Framework. However, there may be those who could argue that additional sanctions could tilt North Korea's nuclear weapons program in the direction of having an even more serious adverse effect on U.S. vital interests. Again, waiving those sanctions would require North Korea to provide assurances that it will not acquire, develop, or assist others in acquiring or developing nuclear weapons.

Combating terrorism and weapons of mass destruction are both important objectives and Congress may consider, in its oversight role, how the United States can successfully balance both. One of the mechanisms under consideration for addressing the problem of terrorist access to WMD is expansion of Cooperative Threat Reduction programs (or Nunn-Lugar) to states outside the former Soviet Union. Among the countries that have been mentioned as potential recipients of potential assistance are Pakistan, Iran, Syria, and Libya. According to Senator Lugar:

Now we live in an era when catastrophic terrorism is our foremost security concern. We must not only accelerate weapons dismantlement efforts in Russia, we must broaden our capability to address proliferation risks in other countries and attempt to build a global coalition against the proliferation of weapons of mass destruction. Last year I introduced legislation to facilitate the use of the Nunn-Lugar program outside the former Soviet Union. The restrictions that limit cooperative threat reduction to the former Soviet Union are an unacceptable hindrance to our national security. The President must have the ability to respond

to threats posed by weapons of mass destruction anywhere in the world.<sup>48</sup>

In the 107<sup>th</sup> Congress, Senator Lugar introduced a bill to provide legislative authority for the Department of Defense to spend \$50 million of unobligated CTR funds in states outside the former Soviet Union. The bill was folded into the FY2003 defense authorization bills; the provision was passed by the Senate, specifically prohibited by the House, and dropped in conference. The same process occurred in passing the FY2003 supplemental budget authorization. In the Senate version of FY2004 Defense Authorization bill (S. 747), a similar provision has been included.

Senator Lugar has noted that the precise replication of the program will not be possible everywhere, but potential application of a CTR-like program to Pakistan would raise significant questions. First, given the sensitivity of Pakistan's nuclear weapons program, are there viable and verifiable assistance options? Would assistance to a state that is not a part of the nonproliferation regime violate U.S. nonproliferation laws? Would assistance potentially damage nonproliferation regimes by implicitly accepting Pakistan's nuclear weapons status? Would U.S. assistance, in the absence of sanctions for aiding other proliferating states, send the wrong message to Pakistan regarding the acceptability of its nuclear weapons program and its nuclear exports? Some experts advise that U.S. policy cannot rollback proliferation in South Asia but should "manage" it. Some have maintained that a key component of a new "management" approach should be assurances that nuclear technology will not proliferate further, and that any contemplated future assistance should be predicated on the strength of those assurances.

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<sup>48</sup> Senator Lugar, Richard, "War on Terror in a World Awash in Weapons of Mass Destruction," Opening statement to Senate Foreign Relations Committee hearing on March 19, 2003 on the status of U.S. efforts to stop the proliferation of weapons of mass destruction.