

Briefing  
North Korean  
WMD Trading Relationships



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# North Korea and WMD Networks Overview

## Executive Summary & Contents

The Democratic People's Republic of Korea (DPRK), or North Korea, threatens world security by hastening the spread of nuclear weapons and related technologies to state and non-state actors interested in acquiring nuclear weapons. The North uses two pathways to acquire banned nuclear equipment for itself and for others: through state-to-state contact and through its network of individuals engaged in illicit trade. Both pathways pose a danger to the international community, but it is increasingly North Korea's collaborations with other states interested in nuclear weapons technology that threaten the global nonproliferation regime. North Korea's unscrupulous history of selling narcotics, counterfeiting currency, and selling arms does not encourage optimism in its willingness to refrain from spreading nuclear weapons technology. Indeed, the examples in this paper demonstrate that North Korea's relationships with Pakistan, Syria, and Iran have advanced the nuclear programs of all four states, despite United Nation's sanctions.

From the early 1990's through 2003, North Korea forged a relationship with Pakistan through the sale of missiles and later became involved in A.Q. Khan's nuclear smuggling operation. After selling missiles and related technology to Syria, North Korea provided design plans, expert advice, and parts for Syria's secret nuclear reactor at al Kibar from 2001-2007. Finally, Iran also initially bought missiles from the DPRK, but soon began joint research with North Korean scientists on missile and rocket designs that continues

today. North Korea's cash strapped regime has a history of selling nuclear technology to anyone who can pay for it. The possibility exists that North Korea could sell a ready-made nuclear device, instructions on how to build one, or fissile material to a terrorist organization.

The economic sanctions imposed on North Korea by U.N. Security Council resolutions, combined with the enforcement of stricter export controls worldwide, have had a limited impact on reducing North Korea's ability to both export and import sensitive goods and know-how. Nevertheless, shipments of banned goods to and from North Korea are stopped too infrequently to seriously hinder either the North's nuclear program, or its exports to other actors. China's border with North Korea is a particularly active point of entry for illicit goods into the DPRK.

This report analyzes North Korean cooperation on nuclear weapons development with Pakistan, Syria, and Iran, the DPRK's internal and external smuggling activities, and its potential to sell nuclear materials or expertise to terrorist groups. North Korea's smuggling program provides the equipment it needs to continue its own nuclear weapons research, while the relationships it develops with other states allow it to either find new markets for its nuclear know-how or to benefit from mutual cooperation on nuclear research. Understanding how these networks operate can offer insights into how to disrupt them.

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# North Korea and WMD Networks

## Useful Definitions

### Enrichment

■ ■ ■ Uranium found in nature is composed of both U-235 and U-238 isotopes. The U-235 isotope is the one suitable for fissile material, though it makes up less than 1% of the

weight of uranium found in nature. In order to produce material for a nuclear weapon, the proportion of U-235 needs to be increased to at least 90%. While several methods can

increase the amount of U-235 in uranium, the centrifuge method is most applicable for the purposes of this paper.

### Gas Centrifuge

■ ■ ■ A tube made of high-strength steel which spins uranium at nearly the speed of sound and uses centripetal force to separate U-235 isotopes, which are lighter, from U-238 isotopes, which are heavier. Uranium is

introduced into the centrifuge as a gas, called uranium hexafluoride (UF<sub>6</sub>), and it is this gas which is increasingly made purer until it reaches weapons grade purity. Typically, thousands of centrifuges need to spin for

months or years to produce enough highly enriched uranium (HEU) for a nuclear weapon.

### Pathways to Fissile Material

■ ■ ■ Nuclear weapons can be made by following one of two so-called "pathways." The HEU pathway requires acquiring uranium enriched to at least 90% (uranium used in nuclear reactors is typically enriched to 3-4%). The HEU pathway is simpler than the plutonium pathway in that there are fewer steps to take until a nuclear weapon is ready for use, and one can utilize a simpler nuclear weapon design. If centrifuges are used to enrich uranium, then these can be hidden quite easily and lessen the chance of detection by the international community.

Pakistan followed the HEU pathway to acquire its nuclear weapons.

Plutonium can also be used to make a nuclear weapon. Weapons made with plutonium can be more sophisticated and more powerful than those made with HEU, though this may, in fact, be a disadvantage to states looking to acquire nuclear weapons both illicitly and as quickly as possible. Plutonium is a byproduct of nuclear reactors and is found in spent nuclear fuel. A technique called reprocessing separates the useful plutonium from the rest

of the spent fuel so that it is suitable for a nuclear weapon. Reprocessing is both expensive, technically challenging, and releases airborne isotopes that can be detected by such agencies as the IAEA or states that suspect a country is trying to acquire nuclear weapons illicitly. North Korea followed the plutonium pathway to acquire its nuclear weapons, though it is now pursuing uranium enrichment capabilities as well.



# North Korea and WMD Networks

## Introduction

Halting North Korea's pursuit of nuclear weapons has proven to be one of the most difficult diplomatic challenges of the last two decades. Despite the efforts of the international community, North Korea has not been willing to abandon its nuclear weapons program, even when faced with the "carrots" of economic aid or the "sticks" of severe economic sanctions.<sup>1</sup> Today, North Korea is a nuclear-armed state, though estimates of the number, quality, and deliverability of its nuclear weapons vary. North Korea chooses to devote its scant resources to developing nuclear weapons partly because of its extreme sense of vulnerability to larger powers. The 20th century saw the annexation of Korea by Japan, followed by a civil war between North and South Korea which involved the United States, Russia, and China. The authoritarian regime ruling North Korea emerged from these conflicts believing that acquiring nuclear weapons was the only way to ensure it stayed in power, since its conventional forces proved no match for the armies of the larger powers that surround it.

One of the most compelling questions about North Korea's nuclear program is how a country that regularly has difficulty feeding its own people has been able to acquire the prodigious amounts of high technology equipment and very specific expertise needed to produce nuclear weapons. The answer lies in the fact that the regime prioritizes its own survival above the well-being of its people. This allows North Korea to allocate vast resources to defeat U.N. sanctions. The North has thus become proficient at procuring individual parts for nuclear facilities on the black market and at cultivating relationships with states experienced in developing nuclear weapons.

The economic sanctions imposed on North Korea through numerous U.N. Security Council resolutions, combined with the enforcement of stricter export controls worldwide since September 11th, have had an impact on reducing North Korea's ability to both export and import sensitive goods. Nevertheless, shipments of banned goods to North Korea are stopped all too rarely to

seriously hinder either the North's nuclear program, or its exports to other states. China's border with North Korea is a particularly active point of entry for illicit goods into the country. Any steps that can slow down the North's nuclear advancement and its ability to advance the nuclear programs of others are valuable. However, North Korea's ruling regime has faced sanctions for years and these have not loosened Kim Jong-il's grip on power, nor stopped North Korea from acquiring nuclear weapons. From information available publically, it is known that during the last two decades Pakistan and Syria have collaborated with North Korea on nuclear weapons technology procurement and that Iran has teamed with North Korea on nuclear warhead miniaturization research, all while North Korea continues to acquire the nuclear equipment it needs through its own smuggling networks.



# North Korea and WMD Networks

## Origins of North Korea's Nuclear Program

The ruling regime of the DPRK exists in a perpetual state of perceived insecurity, and has done so since its very inception. The Soviet Union installed Kim Il-sung and his communist regime in North Korea at the end of World War II, after it took responsibility for the northern half of Korea, which had earlier been occupied by Japan. At the same time, the United States took responsibility for the southern half of Korea and installed Syngman Rhee, a vehement anti-Communist, as leader of South Korea. Both sides assumed that Korea would be reunified within a few years and maneuvered to ensure that their respective political system became the dominant one on the Korean Peninsula. Then, in 1950, Kim Il-sung launched a surprise invasion of the South and managed to take Seoul, its capital, in three days. The United States quickly gathered a coalition of U.N. states and landed troops to support South Korea.

The Korean War and its aftermath convinced Kim Il-sung that his country needed nuclear weapons if it was ever going to deter larger states from threatening it militarily. North Korea's rulers saw U.N. forces, led by the United States, defeat their large military (despite its modern Soviet-made tanks and equipment) and push it back almost to the Chinese border. Only the arrival of hundreds of thousands of Chinese soldiers balanced the scales and pushed the U.N. forces back to the original dividing line between the two states: the 38th Parallel. The defeat of his large military, combined with U.S. General MacArthur's request to use nuclear weapons during the war, confronted Kim Il-sung with the reality that the country and regime was not able to ensure its own survival with conventional means alone, since larger

invading powers could move their forces across its territory at will.<sup>2</sup>

The Korean War ended in 1953 with an uneasy truce that established the 38th Parallel as the border between the communist North and the democratic South, as it remains to this day. North Korea's sense of insecurity mounted as it saw the Soviet Union's relationships with two prominent communist allies deteriorate soon after the Korean War. Relations between China and the USSR cooled after an initial period of warm friendship. Also, North Korea interpreted the Cuban Missile Crisis as a sign that the Soviet Union would abandon its smaller allies if pressed by the U.S.<sup>3</sup> These perceived signals of the limits of Soviet sponsorship, combined with the presence of American nuclear weapons across the border in South Korea, added to North Korea's urgency to develop an indigenous nuclear capability itself.

The North Korean nuclear program began in earnest in 1963, when it received a small research reactor from the Soviet Union. The Soviet government provided economic aid to North Korea, including some access to nuclear technology and specialized training, as a way of supporting a fellow communist state. The USSR had been careful to try to limit North Korea to peaceful nuclear applications, though it appears that the authoritarian regime of Kim Il-sung began to research centrifuges for uranium enrichment in the mid-1970's to acquire highly enriched uranium (HEU). These efforts were not very successful, by all accounts. However, the small research reactor provided North Korea with valuable experience in building and operating nuclear reactors and it later built a larger 5 megawatt reactor, which became

operational in 1987. The breakup of the Soviet Union in 1991 frightened North Korea's ruling regime, since it could no longer depend on the Soviet Union's economic patronage or military protection in the event of a South Korean or American invasion. The North redoubled its efforts to acquire nuclear weapons.

North Korea's 5 megawatt reactor produced plutonium as a byproduct of electricity generation, and this plutonium could be used for nuclear weapons. However, a nuclear weapon made from plutonium is more difficult to achieve than one made from HEU. North Korea's plutonium would need to be separated from other spent fuel byproducts once it left the 5 megawatt reactor before it could be fashioned into a nuclear weapon (an expensive and technically challenging process). Also, North Korea's nuclear reactor was not very large and could not produce enough plutonium for more than roughly one bomb's worth of material every year.<sup>4</sup> North Korea resolved to try to overcome these challenges, having no other option. Experts estimate that it had tried to produce HEU to develop a simpler path to the bomb during the 1970's and 1980's, but was unable to master the centrifuge technology required to enrich uranium.<sup>5</sup>

One way that the North was able to improve its uranium enrichment capabilities was to forge relationships with countries that were also pursuing nuclear weapons. Starting in the 1990's, the North's collaborations with other states with nuclear ambitions helped to replace the lost patronage of the Soviet Union, starting with Pakistan in the early 1990's.



# North Korea and WMD Networks

## State-to-State Collaboration

### Pakistan

Since the 1970's, Pakistan has been developing a robust nuclear weapons production complex to match that of its rival, India. The Pakistani government tasked Dr. Abdul Qadeer Khan (A.Q. Khan), a nuclear engineer trained in Europe, to head the project in 1976 and he successfully delivered the fissile material necessary for a Pakistani nuclear weapon. Khan also became infamous for providing nuclear equipment to any country that could afford it, including North Korea.

Khan had previously worked on developing centrifuges (the cylindrical machines that enrich uranium enough to be used for nuclear power, or ultimately, for a nuclear weapon) in Europe and had given Pakistan the ability to assemble and run centrifuges, which were well established by the early 1980's. A.Q. Khan had become famous as the "father of the Islamic bomb" by using his contacts in Europe and around the world to buy equipment to develop Pakistan's nuclear weapons production capability. In late 1984, Pakistan had workable nuclear weapons, based on HEU, ready to be tested.<sup>6</sup> However, Pakistan looked to improve the delivery capabilities of its missiles, since its first nuclear weapons were large and not suitable for deployment on contemporary Pakistani missiles. North Korea's perpetually militarized economy produced all manner of military goods for sale abroad, and its missiles, based on Soviet designs, were one of its best sellers. North Korea began selling short-range ballistic missiles to Pakistan in the early 1990's.<sup>7</sup> This trade relationship soon grew into a mutually beneficial nuclear technology exchange.<sup>8</sup>

Allegedly, Prime Minister Benazir Bhutto

approached North Korea in 1993 for help in advancing Pakistan's missile upgrade program. Pakistan wanted to produce its own short-range missiles, based on North Korean designs, instead of buying them from North Korea each time.<sup>9</sup> She travelled to North Korea with a set of computer disks containing designs for centrifuges as either payment for missile assistance or as an added bonus.<sup>10</sup> North Korea agreed to a deal, strengthening the relationship between the two countries. A.Q. Khan invited North Korean technicians to his laboratory to instruct Pakistani scientists in missile component production in 1993 and 1994. While there, the North Korean technicians became interested in centrifuges and reportedly received training in their operation and manufacture.<sup>11</sup> A deal for the sale of Pakistani centrifuges to North Korea was agreed to in 1996, though the actual delivery of the centrifuges was delayed for several years because of a dispute over payment.

It seems that North Korea flew missile components to Pakistan in 2000, and the plane returned with the several dozen promised centrifuges aboard. These centrifuges helped North Korea accelerate the gas centrifuge program for uranium enrichment that it had experimented with in the 1970's and 1980's. While North Korea was engaged in developing its stock of plutonium into nuclear weapons during the early 1990's, it still hoped to acquire uranium enrichment capability to make fuel for nuclear power plants.

In addition to procuring equipment for Pakistan's nuclear program, A.Q. Khan actively sought out governments interested in hiring him to acquire nuclear equipment

for them using his black market connections. Khan sold nuclear technology to Iran, North Korea, and later, Libya.<sup>12</sup> The contract with Libya was his most lucrative and also the one that would expose his activities to the rest of the world. Colonel Muammar Qaddafi sought a complete, ready-made nuclear weapons production center without the hassle of buying each machine individually. Khan reached an agreement with Qaddafi's representative in 1997, though the first centrifuge was not set up in Libya until 2000.<sup>13</sup> A.Q. Khan could provide most of the parts that Libya needed for a gas centrifuge uranium enrichment plant, but he could not provide uranium hexafluoride (UF<sub>6</sub>), the feed gas pumped into the centrifuges needed for the enrichment of uranium for nuclear weapons. North Korea had just begun perfecting the manufacture of UF<sub>6</sub> for its own budding centrifuge program, which Khan's centrifuge delivery in 2000 had greatly helped.

However, North Korea was experiencing difficulty in producing UF<sub>6</sub> pure enough for use in centrifuges. Khan's laboratory, named Khan Research Laboratories after himself, could produce UF<sub>6</sub>, but did not have the authority to do so, since that was the purview of another department within the Pakistani nuclear program. In order to make good on his promise to Libya, Khan orchestrated another mutually beneficial arrangement. It appears that in 2002 Khan provided North Korea with the expertise required to produce pure UF<sub>6</sub> and that North Korea agreed to mass produce the gas for Libya's centrifuge program.<sup>14</sup> It is not known whether North Korea intended to make money from the regular sale of the gas for Libya's centrifuges, or whether the gas was being delivered as

payment to Khan, whose assistance was necessary for the production of the gas in the first place.

In 2003, before large scale shipments of UF<sub>6</sub> could begin, British and American intelligence agents intercepted a container ship carrying centrifuge parts bound for Libya that Khan had bought. This undeniable proof of a Libyan secret nuclear weapons program

forced Qaddafi to publically admit his pursuit of nuclear weapons and to formally announce the abandonment of the program in December 2003. A.Q. Khan was arrested in Pakistan in January 2004 and removed from his position as head of Khan Research Laboratories. North Korea lost its access to Khan after his arrest and was not able to continue commissioning him to acquire nuclear equipment on its behalf. However, as

David Albright puts it, Pakistan and A.Q. Khan had given North Korea a valuable uranium enrichment "starter kit."<sup>15</sup> Details of North Korea's role in providing uranium hexafluoride for Libya, and the extent of its relationship with the A.Q. Khan network in general, are still coming to light, though the full depth of these relationships will be difficult to uncover.

Syria's authoritarian regime has a long history of WMD involvement. It is widely recognized as having a chemical weapons program and has been suspected of attempting to acquire nuclear weapons. However, it was never able to make much progress on nuclear weapons until its collaboration with North Korea.<sup>16</sup> Syria has purchased arms, especially missiles, from North Korea for decades, although evidence of nuclear cooperation has only recently emerged.<sup>17</sup> From information made public in 2007 and 2008, it appears that North Korea provided reactor designs, offered technical expertise while Syria built a nuclear reactor in secret, and was able to procure parts for the reactor using its smuggling networks.<sup>18</sup>

The reactor was built in a remote valley in eastern Syria, not far from the Euphrates River, from 2001 until its destruction in 2007. A false roof and walls were built over the top of the rising reactor to hide its shape from satellite photos sometime between 2002 and 2003.<sup>19</sup> The reactor subsequently looked like a box-shaped building after the roof and walls were built and had no visible

distinguishing characteristics of a nuclear reactor. However, American and Israeli intelligence obtained photographs of the interior of the building and of "nuclear-related North Koreans" meeting with Syrian atomic energy officials.<sup>20</sup> The evidence that this was a covert nuclear reactor mounted as more photographs were obtained, taken from inside the fake roof and walls, and these showed the features of a Calder Hall-type reactor: an obsolete gas-graphite reactor that has not been built anywhere in the world in the last 35 years, except for the North Korean reactor at Yongbyon.<sup>21</sup> This type of reactor produces plutonium suitable for nuclear weapons as a byproduct of generating electricity. The Syrian reactor was far from major population centers and had no transmission wires or anything that would signal that it was being used to generate electricity. Nonproliferation experts seem to agree that its sole purpose was to produce plutonium for nuclear weapons.<sup>22</sup>

The Syrian reactor was destroyed by an Israeli airstrike on September 6, 2007, before it could be loaded with nuclear fuel.<sup>23</sup> Syria

publicly claimed that the bombed site was an unused military building with no nuclear facilities. North Korean advisors reportedly visited the site after the bombing to conduct a damage assessment and determined that the reactor was too heavily damaged to try to repair.<sup>24</sup> Syria bulldozed the site after the raid, poured a new concrete foundation over the spot of the destroyed reactor, and built a new building on the foundation. Much of this work was done at night, or under tarps, again, to disguise the work from satellites.<sup>25</sup>

Few hard facts are known about North Korea's agreements with Syria regarding the reactor. Questions still persist on how Syria would have obtained nuclear fuel for the reactor and how it would have reprocessed the plutonium into a form usable for nuclear weapons, since no such facilities have been identified in Syria. The absence of such facilities led some to speculate initially that North Korea planned on supplying the fuel and reprocessing capability for the Syrian reactor, or even that the reactor was built in Syria exclusively for North Korean use.<sup>26</sup> Experts seem to have discounted these

## Syria




possibilities and believe that North Korea's involvement in the project went beyond simply selling the reactor to Syria for a cash payment. However, no solid answers about the extent of cooperation between the two states have emerged and speculation continues.

There have even been allegations of Iranian involvement with the Syrian reactor.<sup>27</sup> A report by the Congressional Research Service notes that a number of German and Japanese newspaper articles have cited sources claiming that Iran either financed the reactor in Syria, or that some of the plutonium that

the reactor would have produced was destined for Iran's nuclear program.<sup>28</sup> While none of these reports have been officially confirmed, there is a history of reports alleging North Korean and Iranian cooperation on nuclear weapons.

## Iran

 Iran has been interested in developing nuclear capabilities since the 1950's and claims that it is only interested in peaceful nuclear power generation. Despite its plentiful oil and natural gas resources, it has invested more in nuclear research than in its established oil and gas sector.<sup>29</sup> Iran has a long history of pursuing clandestine nuclear research and only admitting to it after these facilities are revealed. It has repeatedly failed to cooperate fully with IAEA investigations of these facilities and its nuclear-related activities. Instead, it is aggressively pursuing uranium enrichment as a path to nuclear fuel, although at this point it has no facilities to use such fuel. The United States and other countries believe Iran's nuclear program is not entirely for peaceful purposes and have tried to confront Iran about the issue, to little avail.<sup>30</sup> Iran has been determined to develop its program using indigenous equipment and expertise as much as possible, although it has relied extensively on active covert external procurement networks and/or individuals and states, such as A.Q. Khan of Pakistan and more recently, North Korea, to obtain needed materials, parts, equipment, or technical assistance.

While Iran is not believed to have developed a working nuclear weapon to date, there are reports of high Iranian interest in several topics crucial to nuclear weapons capability.<sup>31</sup> Just as North Korea's nuclear cooperation relationships with Pakistan and Syria began with missile sales, Iran is believed to have signed an agreement with North Korea to cooperate on missile development and manufacturing in 1993 or 1994. The recent release of U.S. diplomatic cables from Wikileaks reveals a dozen cables about North Korean missile sales to Iran. The cables span four years and report, with varying levels of certainty, a range of activities from direct sales of fully functional Nodong missiles to the transfer of missile technology and production expertise.<sup>32</sup>

The Congressional Research Service mentions newspaper reports claiming that North Korea has agreed to share data from its 2006 nuclear test with Iran and also that Iran sent a seven person delegation to attend the second North Korean nuclear test in 2009. Analyzing data from both of these tests would be helpful in the event that Iran wanted to test one of its own nuclear

weapons in the future.<sup>33</sup> Perhaps even more alarming are reports of Iran potentially financing North Korea's nuclear program, and of the two countries working together on adapting nuclear warhead designs to fit the Nodong missile, which North Korea produces for its own use and has often sold to other countries, including Iran.<sup>34</sup> Reportedly, cooperation on warhead designs began in 2003 and continues today. North Korean technicians are even believed to have helped adapt parts from the Nodong missile for use in the rocket which launched Iran's first satellite and were present during its launch in 2009.<sup>35</sup> A rocket launch like this is significant because rocket and missile technologies are related. Advances in rockets able to reach Earth orbit will help Iran to perfect its long range missiles. These advances, combined with North Korean help in adapting a nuclear warhead to a long range missile, potentially have serious implications for U.S. allies in the region, such as Israel.



# North Korea and WMD Networks

## North Korea, Inc.

### Official Smuggling Networks

To bypass UN sanctions, North Korea turns to illicit trade that includes conventional arms trafficking, drug and fake pharmaceutical sales, counterfeit currency and cigarette manufacturing, and trafficking in endangered species to help prop up its economy. Arguably the most threatening of North Korea's international smuggling activities are its acquisition and dispersion of nuclear weapons technology and equipment. North Korean smuggling networks are run using a combination of modern logistics and low-tech, briefcase-full-of-cash style transactions to acquire banned goods.

North Korea was heavily involved in procuring Western goods prohibited by sanctions through its embassies until the late 1990's. Intense scrutiny by Western intelligence agencies has since limited the most egregious smuggling through North Korean embassies. However, the North has since become proficient at a broad range of more sophisticated smuggling operations, which are more difficult to detect. Today, the DPRK uses front companies like Namchongang Trading Company (NCG) to exploit gaps in the international export control regime.<sup>36</sup>

Another incident worth noting occurred in Germany in 2002. A German man named Hans Werner Truppel ran a small business named Optronic out of his own home that arranged sales of electronic and optical equipment. A North Korean man spoke with Truppel about acquiring some high strength aluminum tubes. He claimed to

NCG usually contracts with small, private trading companies in Europe or Asia who then place an order on NCG's behalf. The order can be for anything, from mundane yet essential spare parts for machinery that the North can not make itself to special equipment used to make centrifuges.<sup>37</sup> The small trading company will usually falsify the end-user of the supplies to disguise their true destination and then will ship the goods through multiple countries, further confusing potential investigations. It is believed that North Korea owns many companies around the world like NCG, which then contract with many more private trading companies, making it very difficult to uncover their smuggling activities due to the sheer volume of such transactions in the world economy.

One such company was uncovered in Bratislava in 2002. New World Trading Slovakia was a company founded by a North Korean couple who bought materials for missile production from their office in a high-rise in the heart of the capital of Slovakia. The goods they bought never entered Slovakia, but were instead routed through other states on their way to North Korea. Slovak authorities were not able to charge the North

represent NCG, which he said was buying the tubes on behalf of Shenyang Aircraft, which needed the tubes to make fuel tanks. A letter on Shenyang Aircraft letterhead arrived some time later to validate the request. Truppel bought the necessary tubes and they ended up on a French container ship heading to Asia. German authorities were fortunate to

Koreans with any crime, since they disappeared before authorities raided their office.<sup>38</sup>

However, North Korea's most troubling smuggling activities are those conducted in China. NCG maintains an office in Beijing and often receives shipments of goods banned by sanctions that it sends on to North Korea. This office has also been able to list Shenyang Aircraft Industry Co., a large Chinese airplane manufacturing company that has done business with Boeing and Airbus, as the end user of goods that are banned for North Korea. Shenyang Aircraft has a subsidiary in the small town of Dandong, which lies directly across the river dividing North Korea and China. Goods smuggled into China are often sent to the Dandong subsidiary before a quick trip across the border, with little or no interference from Chinese border guards. The Chinese government denies directly helping North Korea avoid export controls, though corruption and a lack of enforcement of export control laws creates opportunities that North Korea uses to its advantage.<sup>39</sup>

intercept the ship in the Mediterranean and recover the tubes, after their sale showed up on shipping records.<sup>40</sup> This incident illustrates how difficult it can be to locate the small number of unscrupulous trading companies among the many honest ones around the world. Small trading companies often change their names or go out of

### Export Controls

business fairly frequently, though dishonest ones tend to change their name or go out of business after every sale of illicit goods to throw off investigators.

The role of Shenyang Aircraft in procuring parts for North Korea is also very suspicious. The Chinese government seems unable to crack down on an obvious attempt by North Korea to impersonate a large Chinese firm to buy illicit goods. China's border guards lack the manpower (or DPRK bribes provide a disincentive) to inspect a high enough percentage of goods moving into North Korea to make a dent in WMD and missile materials moving into North Korea.


However, effectively enforced export control laws are extremely important to reducing illicit trafficking of all kinds, including trafficking of equipment for nuclear weapons programs. Globalization has complicated the enforcement of the global nonproliferation regime. A few countries no longer have an oligopoly on the ability to make dual-use parts and equipment for nuclear programs, as these can now be ordered just as easily from Malaysia as from Western Europe. A well-functioning export control regime requires that all countries effectively enforce their export controls. Many countries have taken steps to improve their capabilities by either installing export control laws or

strengthening existing ones in recent years. The passage of UN Security Council Resolution 1540 has furthered this effort, though there are still far too many states with weak export controls.<sup>41</sup> These states serve as hubs for illicit goods transshipment and allow nefarious actors to slip through the worldwide net of export controls. However, there is hope that states with weak export controls can improve in short order. One such success story was led by the Swiss firm Oerlikon and its vacuum pump manufacturing subsidiary Leybold.

During the 1970's and 1980's, Leybold was guilty of selling large quantities of vacuum pumps (dual-use goods used in a variety of high-tech industrial applications, but also in nuclear weapons development) to states pursuing nuclear weapons. In most cases, these sales did not violate the weak export controls in place at the time in Germany, where the company was headquartered, though company representatives often knew exactly who they were selling to. The final straw came after the First Gulf War, when IAEA inspectors found Leybold products in secret nuclear weapons facilities in Iraq. Facing international opprobrium and possible blacklisting by the U.S. government, Leybold decided to reform itself from the ground up.<sup>42</sup>

It dedicated itself to stopping sales linked to nuclear proliferation, even if it meant lower profits. It established an internal export control office tasked with identifying and investigating suspicious orders. This was a herculean task, since the company estimates that only one tenth of one percent of its orders are illegitimate.<sup>43</sup> Today, Leybold is in frequent contact with German export control authorities about suspicious orders. German export control laws have been significantly improved since the 1980's, thanks in part to Leybold's information about which of its parts were most sought after by suspicious purchase orders. The German government even teams with Leybold to share information about trends in illicit procurement and suspicious orders. The company's success has been dramatic, to the point that it is considered a model for the industry as a whole and the head of its export control office is frequently invited to speak at nonproliferation conferences to impart best practices on others. Examples like this are important because they show that significant progress can be made toward reducing illicit trade and that industry can be a strong partner in furthering these efforts, even to the point of enforcing export controls within the company that are stricter than national laws.

## Smuggling to Terrorists?

 Defense Secretary Robert Gates once said about North Korea that "Everything they make, they seem willing to sell."<sup>44</sup> This raises the question of whether the regime has sold, or would sell, weapons of mass destruction,

the materials needed to make them, or related expertise, to terrorist groups. An extremist group acquiring and using a weapon of mass destruction is the kind of low-probability, high-casualty scenario that is

frequently mentioned as the most pressing security concern faced by the U.S. and the international community today. As shown above, North Korea's past willingness to sell arms and nuclear technology to anyone who

can pay for it suggests that it would not hesitate to sell terrorists WMD materials.

A Congressional Research Service report from 2010 notes that North Korea sold arms to Hezbollah, the Tamil Tigers, and Iran's Revolutionary Guard Corps as recently as 2008 and 2009.<sup>45</sup> Still more alarming is a Washington Post story about an intelligence cable released by Wikileaks that describes the sale of ground-to-air missiles sold by North Korea to Al-Qaeda fighters in Afghanistan in 2005.<sup>46</sup> Two high ranking Al-Qaeda operatives apparently travelled to North Korea, bought an unspecified number of MANPAD's (shoulder-fired missiles, such as Stingers), and brought them back to Afghanistan to use against American aircraft.

One of these was supposedly used to down an American helicopter 18 months later. While these reports only mention conventional weapons, the prospect of documented meetings between Al-Qaeda and North Korean arms dealers is alarming.

North Korea's ruling regime is chronically short on funds and arms sales represent a sizeable share of its income. In addition, the DPRK has been reliably linked to the sale of illicit narcotics, cigarettes and other counterfeit goods. The South Korean newspaper Chosun ilbo reported in 2010 that Kim Jong-il told members of the regime that he would judge their loyalty based on how much hard currency they could contribute to his slush fund.<sup>47</sup> The sale of the fissile

material required to make a nuclear device, would surely command a high price. To be clear, the debate in the scholarly literature continues as to whether the DPRK would go so far as to sell nuclear material and expertise to terrorists. But, Osama bin Laden has said publically that it is a "religious duty" for Al Qaeda to acquire a nuclear weapon. He has even been granted permission to use one against the West by a Muslim cleric, and would presumably do so if he had the chance.<sup>48</sup> The potential for an eager buyer to close the deal with a potential seller known to have nuclear weapons is sobering and needs to be considered in any discussion of North Korea's smuggling operations.



# North Korea and WMD Networks

## Conclusion

The many instances of cooperation between North Korea, Pakistan, Syria, and Iran, as laid out above, paint a disturbing picture of four nuclear weapons programs achieving progress, even in the face of intense international opposition, including strict sanctions on North Korean arms imports and exports. Part of the difficulty in confronting North Korea's nuclear program and stopping its nuclear exports is the fact that U.N. sanctions are not universally enforced, leaving gaps that North Korea has become skilled at exploiting. Paradoxically, the stricter sanctions get, the more the DPRK turns to states that are sanctioned themselves or have no interest in obeying sanctions on North Korea as trading partners, leading to such collaborations as those described in this paper. North Korea further complicates efforts to interdict its illicit shipments by constantly adapting its tactics. For example, it increasingly uses air transport to avoid the interdiction of cargo vessels at sea, since airplanes are more difficult to stop and search. Tactics like these allow North Korea continued access to nuclear equipment, as explained by Siegfried Hecker,

an expert on the North Korean nuclear program, on a visit to North Korea in late 2010:

"The control room was astonishingly modern. Unlike the reprocessing facility and reactor control room, which looked like 1950's U.S. or 1980's Soviet instrumentation, this control room would fit into any modern American processing facility. They had five large panels in the back that had numerous LED displays of operating parameters. They had computers and four flat-screen monitors (similar to the ones we saw at the e-library at Kim Il-sung University in Pyongyang)."

It is clear that efforts to slow North Korea's nuclear program have not been effective.

Many questions remain, both about the North's WMD programs and about possible U.S. responses to them. Those grappling with the North Korea problem might consider the following questions when researching the problem or attempting to distill policy solutions.

- What can be done to address North Korean feelings of insecurity that drive them to seek nuclear weapons?
- How can we motivate China to do more to stop the North Korean nuclear program?
- What other states might decide that they need nuclear weapons within the next five years if the North Korean, Pakistani, Iranian, and Syrian nuclear programs continue advancing?
- How much overlap is there between North Korea's smuggling network and the smuggling networks used by Iran, Syria, etc.?
- Is there any nuclear collaboration between North Korea and Burma?



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# About The Fund for Peace

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## About The Center for the Study of Threat Convergence

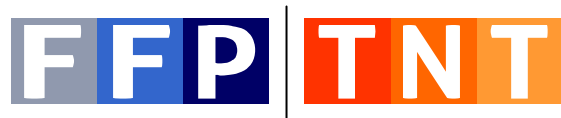
After three years of project work, in January 2009, The Fund for Peace established The Center for the Study of Threat Convergence (CSTC) to explore the linkages among the three biggest threats to global security: fragile states, the proliferation of weapons of mass destruction (WMD), and terrorism. The Center aims to:

- raise the profile of the challenges in vulnerable, fragile and ungoverned regions

on the nonproliferation agenda;

- explore how these regions may serve as enabling environments for nuclear terrorism;
- promote more coherent and strategic policy approaches to nuclear terrorism and illicit nuclear trafficking; and
- become a hub for threat convergence-related analysis.

The CSTC encourages innovative and fresh approaches to the issue by convening experts, performing extensive field research in some of the world's most difficult environments, and by partnering with international and regional organizations to explore how the threat of catastrophic terrorism emanating from weak and failing states can be prevented.



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