

**CHAPTER 5**  
**CHINA'S PROLIFERATION PRACTICES**  
**AND THE CHALLENGE OF NORTH KOREA**

*“PROLIFERATION PRACTICES. The Commission shall analyze and assess the Chinese role in the proliferation of weapons of mass destruction and other weapons (including dual-use technologies) to terrorist-sponsoring states, and suggest possible steps which the United States might take, including economic sanctions, to encourage the Chinese to stop such practices.” [P.L. 108-7, Division P, Sec. 2(c)(2)(A)]*

**KEY FINDINGS**

- China's assistance to weapons of mass destruction (WMD)-related programs in countries of concern continues, despite repeated promises to end such activities and the repeated imposition of U.S. sanctions. The Chinese government and Chinese enterprises have assisted such states to develop their nuclear infrastructure, chemical weapons capabilities, and/or ballistic missile systems notwithstanding a consistent history of denials. Libya's decision to open up its WMD programs, and the revelations by Pakistan that A.Q. Khan supplied uranium enrichment technology to Libya, Iran, and North Korea, provides new insight into China's legacy of proliferation. China's continued failure to adequately curb its proliferation practices poses significant national security concerns to the United States.
- The dangers posed by the North Korean nuclear weapons program are of grave concern for regional security, and global non-proliferation policies and actions and are exacerbated by a lack of real progress in the Six Party Talks. The extent of Chinese cooperation in those negotiations to achieve a complete, verifiable, and irreversible dismantlement of North Korea's nuclear weapons programs is a critical test of the U.S.-China relationship. Nevertheless, the closed nature of North Korea means intelligence assessments must be judged with caution. As U.S. intelligence estimates of North Korea's nuclear weapons capabilities increase, so too does the urgency for a resolution of the stalemate that has characterized those talks to date. Reports now indicate that North Korea may have reprocessed eight thousand spent fuel rods. This could provide enough plutonium to produce approximately nine weapons in addition to the one to two weapons the North already is believed to possess. China's efforts to convene the Six Party Talks are a commendable preliminary step, but Beijing does not appear to have used its substantial leverage to persuade North Korea to dismantle all elements of its nuclear weapons program.
- It appears that U.S. and Chinese goals for the Six Party Talks are not identical, given recent Chinese public statements that the

United States should modify its negotiating position. Furthermore, a fully developed strategy has not yet been developed for a reasonably staged process of steps, starting with a freeze of North Korea's nuclear programs and ending with irreversible dismantlement under an extensive verification regime. The Commission is concerned that the United States has not presented a detailed plan that puts pressure on North Korea to begin serious negotiations and that presses China to use its leverage on North Korea to negotiate and implement an agreement.

- China continues to permit North Korea to use its air, rail, and seaports to trans-ship ballistic missiles and WMD-related materials. North Korean officials recently stated they do not intend to curtail missile trade, as it provides badly needed foreign exchange. This is contrary to Beijing's stated position that it seeks to curtail this dangerous proliferation activity. China has not applied sufficient pressure on North Korea to stop these exports.
- The need for China's cooperation in resolving the North Korean nuclear crisis has been cited by commentators as a reason the United States has softened its position regarding other outstanding U.S.-China trade and economic disputes. The Commission believes that it is as much in China's national interests as it is in the U.S. national interest to achieve a nuclear-free Korean Peninsula without additional, nonrelated concessions or other inducements. Nevertheless, the expected benefits to the United States from China's cooperation in the Six Party Talks do not appear to have been forthcoming. North Korea's assertions that it is now moving forward with its weapons development programs, both qualitatively and quantitatively, should be taken seriously, with all the attendant risks for U.S. national security interests, regional stability, and global nonproliferation goals.

#### OVERVIEW

In its 2002 Report to Congress, the Commission stated that China's transfers of technology and components for WMD and their delivery systems to countries of concern, including certain designated terrorist-sponsoring nations, was helping to create a new tier of nations with the capability to produce weapons of mass destruction and ballistic missiles. Since that time, recent events unfortunately have confirmed this warning. Clearly, China is a key to stopping this proliferation.<sup>1</sup>

Chinese supplies of technology and components for weapons of mass destruction and their delivery systems to countries of proliferation concern continue to pose significant security issues for the United States. China's cooperation with Pakistan and Iran in nuclear and missile-related technologies; Beijing's continued economic support for North Korea and whether it will choose to exert its substantial economic leverage to help achieve a complete, verifiable, and irreversible dismantlement of North Korea's nuclear program; and whether China will effectively implement and enforce its export regulations to stem proliferation all remain grave security issues for the future of U.S.-China relations.

The Commission held a hearing on July 24, 2003, examining *China's Proliferation Practices and the Challenge of North Korea*. This hearing took place against the backdrop of a developing nuclear cri-

sis on the Korean Peninsula after North Korea admitted it secretly had resumed a nuclear weapons development program based on uranium enrichment. The Commissioners heard testimony from current and previous administration officials, as well as outside experts, on China's proliferation practices and its role as an intermediary in the Six Party Talks that are aimed at defusing the North Korean crisis.

#### ANALYSIS AND FINDINGS

##### **Proliferation Is Ongoing**

The all-too-real possibility that WMD will be acquired and used by terrorists is of the gravest concern for U.S. national security, unlike the Cold War era, when the prospect of mutual assured destruction between nuclear states made nuclear conflict ultimately unthinkable. The current era is characterized by concerns about transfers of WMD-related materials between states and nonstate actors. Today's challenge is to keep nuclear, chemical, and biological weapons out of the hands of terrorists and rogue nations that are willing to use any means to achieve their goals.

The consequence of more than twenty years of China's direct transfers, as well as associated re-transfers of WMD and related technologies, is that the United States now faces enhanced threats from rogue states or terrorist groups that can acquire WMD capabilities. Unfortunately, even in light of overwhelming evidence of the increased threat to global security, Chinese entities continue to proliferate. This activity calls into question the effectiveness of the U.S. government's pursuit of a partnership with Beijing in counterterrorism efforts or in resolving the crisis on the Korean Peninsula. Moreover, the extent to which U.S. actions to address economic and trade disputes with China may be deferred because of hoped for Chinese cooperation in achieving these U.S. security objectives is of concern. There is a risk in deferring such actions while the level of China's cooperation on counterterrorism and the North Korean crisis is an open question.

The history of Chinese proliferation behavior is one of broken promises during several decades. For years, China transferred ballistic and cruise missiles capable of acting as WMD delivery systems, missile technology, and missile-related components (especially dual-use items) to countries with troubling proliferation records such as Pakistan, Libya, Iran, and North Korea despite U.S. protests and the imposition of sanctions on numerous occasions.<sup>2</sup> Since 1992, the United States has expressed ongoing concern with regard to China's noncompliance with its nuclear commitments and its numerous pledges to the United States with respect to missile proliferation. The United States also believes that China retains undeclared chemical and biological weapons capability inconsistent with its Chemical Weapons Convention (CWC) and Biological Weapons Convention (BWC) obligations.

In contrast to the 1990s, Chinese transfers have evolved from sales of complete missile systems, to exports of largely dual-use nuclear, chemical, and missile components and technologies.<sup>3</sup> While this change represents a quantitative decrease, qualitatively these transfers are equally worrisome. The shift from complete systems to components and technologies continues to raise significant con-

cerns about the extent to which these exports are improving the WMD-related capabilities of recipient countries.<sup>4</sup> Recent activities “have aggravated trends that result in ambiguous technical aid, more indigenous capabilities, longer range missiles, and secondary (retransferred) proliferation.”<sup>5</sup> Continuing intelligence reports indicate that Chinese cooperation with Pakistan and Iran remains an integral element of China’s foreign policy.<sup>6</sup>

As recently as April 1, 2004, the United States imposed sanctions on five Chinese entities for exports to Iran of items that have the potential to make a material contribution to Iran’s WMD or missile capabilities. Several entities such as China North Industries Corporation (NORINCO), a state defense industrial firm, and its subsidiaries, and China Precision Machinery Import/Export Corporation (CPMIEC) have been sanctioned multiple times. NORINCO and any successor, subunit, or subsidiary was sanctioned under the Iran Non-proliferation Act of 2000 twice in 2003 and again in 2004. CPMIEC or its parent, for example, was sanctioned in 1991, 1993, 2002, 2003, and 2004 for missile-related transfers to Iran and/or Pakistan. (See Appendix A for history of U.S. sanctions against the PRC.)

In the summer and fall of 2002, Beijing issued a comprehensive set of export control regulations and control lists. But, at the same time that China was providing its first national training course on the new, missile-related export regulations in February 2003, Chinese entities continued to work with Pakistan and Iran on ballistic missile-related projects, were primary suppliers of advanced conventional weapons to Pakistan and Iran, and provided dual-use chemical weapons-related production equipment and technology to Iran.<sup>7</sup> In testimony to the Senate Select Committee on Intelligence in February 2004, CIA Director George Tenet stated that “although Beijing has taken steps to improve ballistic missile related export controls, Chinese firms continue to be a leading source of relevant technology and continue to work with other countries on ballistic missile-related projects.”<sup>8</sup> Reporting to Congress in mid-2003, the CIA stated that “firms in China provided dual-use missile-related items, raw materials, and/or assistance to . . . countries of proliferation concern such as Iran, Libya, and North Korea.”<sup>9</sup>

One key issue for the United States is the ability to determine the true relationship of proliferating entities in China and the Chinese government, and the extent to which the Chinese government is aware of these transfers.<sup>10</sup> Some analysts argue that because China is such a large country, the Chinese government may be unaware of the activities of each Chinese entity involved in proliferation. However, the ability of serial proliferators such as NORINCO, which is a state-owned entity, to continue to operate, calls into question China’s commitment to enforcing its export control laws. Beijing’s failure to control such transfers gives the appearance that these are allowed in accordance with an unstated national policy.

China has generally tried to avoid making fundamental changes in its transfer policies by offering the United States carefully worded commitments<sup>11</sup> or exploiting differences between agreements. With respect to nuclear nonproliferation, China joined the Zangger Committee in 1997, which requires item-specific safeguards, but not the Nuclear Suppliers Group (NSG), which requires full-scope

safeguards. The NSG covers exports of dual-use items, a major difference between it and Zangger and covers not just equipment and material but also technology for the development, production, and use of listed items. Full-scope safeguards allow for International Atomic Energy Agency (IAEA) inspections and verification of declared nuclear facilities.

Recent news reports indicate that China has applied to join the forty-nation NSG and also is discussing entry into the multilateral Missile Technology Control Regime (MTCR).<sup>12</sup>

China's entry into the MTCR may, however, be met with mixed reaction. MTCR membership could mean greater cooperation in controlling missile proliferation or, alternatively, "membership in MTCR would exempt China from certain sanctions, provide it with intelligence, give it a potentially obstructionist role in decision-making, and relax missile related export controls to China."<sup>13</sup>

China is party to the CWC and the BWC, but not to the Australia Group.<sup>14</sup> China has exploited differences between the CWC and Australia Group control lists to export "chemicals and equipment of proliferation concern to countries such as Iran."<sup>15</sup> China's new export control regulations do contain a "catchall" provision that can be used to restrict the export of items not specifically identified on the control list. But, once again, enforcement will be the key test of Beijing's commitment to restrict its exports.

### **Transfers to Countries of Proliferation Concern**

#### ***China-Pakistan Nuclear Weapons***

Chinese assistance to Pakistan was essential to the development of Pakistan's missile and nuclear programs<sup>16</sup> (see Appendix B). Pakistan's recent admission that its chief nuclear scientist, A.Q. Khan, operated a nuclear arms market and supplied uranium enrichment technology to Libya, Iran, and North Korea confirms the worst—that a huge arsenal of nuclear materiel and technology is now widely diffused without controls. Detailed Chinese nuclear plans initially supplied to Pakistan have been uncovered in Libya, with more discoveries possible. With the Pakistani government's revelations, and Libya's agreement to dismantle its nuclear program, new evidence is surfacing that shows how black market arms purveyors transfer nuclear weapons hardware and technologies from country to country either with government sanction or through underground networks. Although Beijing pledged in 1996 that it would not provide assistance to unsafeguarded nuclear facilities, U.S. intelligence does not "rule out, however, some continued contacts subsequent to the pledge between Chinese entities and entities associated with Pakistan's nuclear weapons program."<sup>17</sup>

China currently is in the process of negotiating the sale of a large, \$700 million nuclear reactor to Pakistan in Chasma. However, Pakistan has refused to open all of its facilities to full-scope IAEA inspections and is not a Nuclear Nonproliferation Treaty (NPT) signatory. Under NSG guidelines, no member is supposed to supply nuclear goods to declared non-nuclear weapon states unless the recipient is willing to open all of its nuclear facilities to full-scope IAEA inspections.<sup>18</sup> Arms control expert Henry Sokolski raises serious concerns about this sale to Pakistan and questions why it should be permitted, even though the agreement would be

grandfathered under the terms of China's accession to the NSG, asking:<sup>19</sup> "Is there any country less qualified financially or in need of buying such a reactor, more able to convert the reactor's fresh or spent fuel quickly into bomb material, or freer of legal constraints to proliferate?"<sup>20</sup>

Chinese entities have helped Pakistan to "move toward domestic serial production of solid-propellant SRBMs and supported Pakistan's development of solid-propellant MRBM's."<sup>21</sup> In the first half of 2003, the CIA reports that China also remained a primary supplier of advanced conventional weapons to Pakistan.<sup>22</sup>

### ***China-Iran Missile and Nuclear Cooperation***

China's continued assistance to Iran,<sup>23</sup> a designated state sponsor of terror, also is extremely troubling. U.S. intelligence reports that entities from China, Russia, and North Korea helped Iran become self-sufficient in ballistic missile production.<sup>24</sup> Iran produces Scud short-range ballistic missiles, is in the late stages of developing the Shahab medium-range ballistic missile, and is pursuing longer-range missiles.<sup>25</sup> Chinese entities continue to assist Iran with dual-use missile-related items, raw materials, and chemical weapons-related production equipment and technology as of the CIA's most recent unclassified reporting that covers the period from January through June of 2003.<sup>26</sup>

In October 1997, China agreed to end cooperation with Iran on supplying a uranium conversion facility, not to enter into any new nuclear cooperation with Iran, and to bring to conclusion within a reasonable period of time two existing projects.<sup>27</sup> But concerns remain within the intelligence community, as of the first half of 2003, that Chinese firms continued to cooperate with Iran in the nuclear field.<sup>28</sup>

According to news reports, "An Iranian opposition group found that Iranian front companies procured materials from China (and other countries) for secret nuclear weapons facilities."<sup>29</sup> It also was reported last year that in Iran "about fifty Chinese experts have been observed at a uranium mine at Saghand, and North Korean and Chinese experts supervised the installation of centrifuge equipment to enrich uranium near Isfahan."<sup>30</sup>

The United States is convinced that Iran is "pursuing a clandestine nuclear weapons program based on both enriched uranium and low burn up plutonium."<sup>31</sup> After enormous pressure from the international community and the IAEA, Iran has agreed to demands that its nuclear program be open for inspections and that it halt its uranium enrichment and reprocessing activities. The IAEA cited Russia, China, and Pakistan as "probable suppliers of the technology Iran used to enrich uranium."<sup>32</sup>

### ***Energy Security***

One potential explanation for China's history of proliferation to countries such as Iran, Iraq, and Libya, countries that have been on the State Department's list of terrorist sponsors is China's growing dependence on Middle East oil.<sup>33</sup>

China is a net importer of oil, and its need for foreign oil is expected to double by 2010. This need for energy security may help explain Beijing's history of assistance to terrorist-sponsoring states, with various forms of WMD-related items and technical assistance,

even in the face of U.S. sanctions. Such assistance to Iran appears to be ongoing.

Some research indicates that China's sales of arms-related material and technologies have not only been for hard currency but also for favorable oil concessions. Iran, for example, exported 12.4 million tons of crude oil to China in 2003.<sup>34</sup> The Zhuhai Zhenrong Corporation, a spin-off of NORINCO, a Chinese government-owned weapons producer and serial proliferator currently under sanction, has agreed to purchase \$20 billion worth of liquefied natural gas from Iran over twenty-five years and is expected to complete deals to develop three Iranian oil fields.<sup>35</sup> Sinopec Group, China's state-owned petrochemical company, which already has an oil project in Iran, is holding talks with the Iranian government to purchase liquefied natural gas. Analysts say this would be an important coup for Iran in the face of U.S. economic sanctions.<sup>36</sup>

But, this pursuit of oil diplomacy may support objectives beyond just energy supply. Beijing's bilateral arrangements with oil-rich Middle Eastern states also helped create diplomatic and strategic alliances with countries that were hostile to the United States. For example, with U.S. interests precluded from entering Iran, China may hope to achieve a long-term competitive advantage relative to the United States. Over time, Beijing's relationship-building may counter U.S. power and enhance Beijing's ability to influence political and military outcomes. One of Beijing's stated goals is to reduce what it considers U.S. superpower dominance in favor of a multipolar global power structure in which China attains superpower status on par with the United States. See Chapter 6 for further analysis of China's energy needs and strategies.

### **China and North Korea**

In October 2002, North Korea revealed that it secretly had resumed its nuclear weapons program. This was in violation of its commitments under the 1994 Agreed Framework, as well as the NPT, its IAEA safeguards agreement, and the Joint North-South Declaration on the Denuclearization of the Korean Peninsula. The North Korean government acknowledged to a U.S. delegation that it had a program to enrich uranium for nuclear weapons, which the North now denies, triggering the current crisis on the Korean Peninsula. In the late 1990s, the United States had evidence of the uranium enrichment program,<sup>37</sup> which now has been corroborated by Pakistan's A.Q. Khan, who began working with North Korea on uranium enrichment not long after the 1994 Agreed Framework was signed.

It is reported that around 1997, Pakistan's A.Q. Khan "made inroads with the government of Kim Jong Il, as it sought a way to make nuclear fuel away from the Yongbyon plant and the prying eyes of American satellites."<sup>38</sup> According to intelligence officials cited in the *New York Times*, Pakistan transferred to North Korea all of the equipment and technology it needed to produce uranium based nuclear weapons.<sup>39</sup>

In addition, CIA Director George J. Tenet stated that "[T]he Intelligence Community judged in the mid-1990's that North Korea had produced one, possibly two, nuclear weapons. The eight thousand rods the North claims to have processed into plutonium metal

would provide enough plutonium for several more.”<sup>40</sup> Recent reports now indicate that North Korea may have reprocessed all eight thousand fuel rods and that it may have sufficient stocks for an additional eight or nine nuclear weapons.<sup>41</sup>

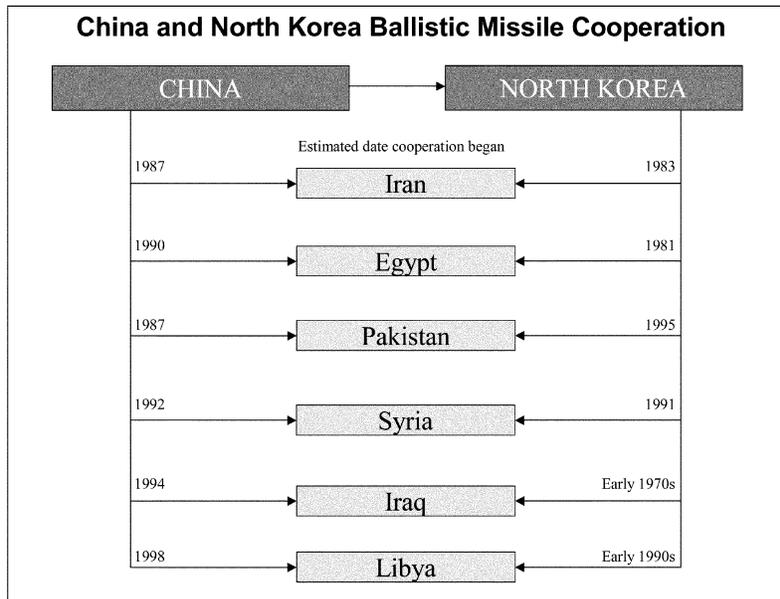
In June 2000, the Japanese newspaper *Sankei Shimbun* obtained a Chinese report on the North’s uranium production program, which it said was secretly operating since 1989 at the Mt. Chonma Power Plant in North Phyongan Province. The information was provided by a North Korean military defector.<sup>42</sup>

Open to question is when Beijing learned of North Korea’s nuclear weapons programs and how much it has known, given China’s close cooperation with Pakistan’s nuclear program and Pakistan’s cooperation with North Korea. China has provided assistance to North Korea’s missile program, its space program, and possibly its nuclear program, either directly or indirectly through Pakistan.<sup>43</sup> Since the 1990s, Chinese airspace, military airfields, and ports were used to transport WMD and related technologies between Pakistan, North Korea, and Iran.<sup>44</sup> According to the CIA, “[f]irms in China have provided dual-use missile-related items, raw materials, and/or assistance to . . . North Korea.”<sup>45</sup>

Similarities also exist between Chinese and North Korean missiles. “China’s CSS-3 booster stage rocket and the DPRK’s [North Korea] Taepo Dong-1 (fired over Japan on 31 August 1998) used liquid hydrogen-nitrogen mixed fuel.”<sup>46</sup> As reported in the spring 2001 issue of the *Journal of International Affairs*, the CIA also noted that following the U.S. bombing of the Chinese embassy in Belgrade, Chinese state-owned enterprises increased exports of high-technology components to North Korea.<sup>47</sup> According to the *Washington Times*, U.S. intelligence believes a Chinese chemical manufacturer in Dalian, which is a Chinese seaport near North Korea, shipped “tons” of tributyl phosphate (TBP), a dual-use chemical, to North Korea. U.S. intelligence believes the TBP was intended for the North’s nuclear weapons program.<sup>48</sup>

Several North Korean government-trading firms are located in China. For example, the Korea Daesong Bank operates a branch called the Korea Daesong Trading Corporation which is located in Hong Kong.<sup>49</sup> The Zokwang trading company in Macau is part of the Korea Daesong Trading Corporation and handles exports of industrial products. U.S. intelligence has linked this company to North Korea’s covert WMD program.<sup>50</sup> Moreover, in Shanghai are the Maebong Trading Co. and the Amur River National Development General Bureau.<sup>51</sup> In 1997, a former official of North Korea’s Ministry of Foreign Affairs testified before Congress stating that the Maebong Trading Company was responsible for importing high-technology weapons such as missiles.<sup>52</sup>

Chinese and North Korean assistance to global ballistic missile proliferation is extensive. With respect to ballistic missiles, China and North Korea have been providers of ballistic missiles, cruise missiles, and their production facilities to Iran, Iraq, Syria, and Egypt. In fact, very few programs have not directly benefited from Chinese and/or North Korea assistance and, with the exception of Libya and Iraq, cooperation continues today. These interrelationships are highlighted below.



Source: See Appendix D for background information.

### ***China's Role in the North Korea Crisis***

From the onset of the current crisis, the United States has been seeking China's assistance in resolving the stand-off with North Korea. China exerts significant leverage over North Korea and is its largest trading partner. Moreover, a Treaty of Friendship, Cooperation and Mutual Assistance between China and North Korea dates back to 1961. Without Chinese assistance, it is difficult to imagine how the regime in the North could remain in power. China provides approximately ninety percent of North Korea's oil and forty percent of its food<sup>53</sup> (approximately \$500 million in food and heavy oil)<sup>54</sup> and has consistently allocated twenty-five to thirty-three percent of its foreign assistance budget to North Korea since 1996.<sup>55</sup> It was reported that the oil pipeline between China and North Korea experienced "technical difficulties" and was shut down for three days in February 2003<sup>56</sup>—an event analysts say sent a powerful signal to Pyongyang and helped to persuade North Korea to join three-country talks in April 2003.<sup>57</sup> One estimate holds that the North Korean economy would be paralyzed within a period of six months should Chinese energy assistance be halted.<sup>58</sup> Another study estimates that Leader Kim Jong Il's regime would collapse within two years if international economic sanctions were imposed.<sup>59</sup>

Nonetheless, despite China's active role in the Six Party Talks, in which it is serving as the key intermediary with North Korea, to date it appears unwilling to use its leverage in a significant way. Notably, China has been opposed to sanctions and to discussing the North Korean nuclear issue in the United Nations.<sup>60</sup> If North Korea were to carry out nuclear tests publicly, China reportedly has indicated that it would not oppose a proposal to impose economic sanctions in the United Nations.<sup>61</sup> But thus far, China has

resisted attempts to put this issue before the United Nations, presumably in support of promises it made to Pyongyang.<sup>62</sup>

China's position in the "Six Party Talks is that it seeks elimination of North Korea's nuclear weapons program and that it agrees with the U.S. position that a complete, verifiable and irreversible dismantling of the North's nuclear capabilities is required. North Korea has indicated that it will dismantle its nuclear weapons program in return for economic aid and security guarantees. But, subsequent to the last round of Six Party talks in February 2004, Pyongyang's official news agency stated that allowing nuclear inspections and the dismantling of its nuclear weapons program would only lead to a U.S. invasion,"<sup>63</sup> not prevent it.

Beijing's desire to avoid regional instability and regime change in Pyongyang, its long-time ally and buffer state, may be inducing its active participation in the Six Party Talks. Regime change in North Korea, either through economic blockade or a military strike, could result in a democratic and reunified Korea, likely increasing American influence in Asia. On the other hand, Beijing's active role in facilitating talks fosters good relations with the United States, its most important trading partner, and enhances China's prestige. Further, China's participation may help to assuage the security fears of its neighbors, prevent a regional arms buildup, and preclude the United States from taking preemptive military action against the North or forcing imposition of an economic blockade.

But time is not on our side in confronting this crisis. As the Six Party Talks drag on, North Korea's nuclear weapons and ballistic missile programs keep moving apace. While we cannot be sure just how far North Korea has progressed, there seems to be a growing consensus that it already possesses significant capabilities in this regard and will advance considerably further within a matter of months. As these capabilities are attained, the prospects for achieving a complete, verifiable, and irreversible dismantlement by North Korea are dimming substantially. Such an outcome, while contrary to U.S. objectives, may on the other hand satisfy Beijing's strategic objectives—its desire to keep the North Korean regime in place while also being perceived to have worked cooperatively with the international community.

The key question is not only whether China will be willing to exert leverage in a meaningful way on North Korea, but also whether China is prepared to press the North Koreans to accept a robust and intrusive dismantlement verification regime, an essential component of a complete, verifiable, and irreversible dismantlement scenario. North Korea's failure to comply with the 1994 Agreed Framework underscores the absolute requirement for onsite inspections and verification. Given China's posture to date on the Proliferation Security Initiative (PSI), not to mention its own continuing proliferation problems, it is certainly a questionable proposition.

The Commission is concerned that the United States, with little benefit in return, may be offering unrelated trade concessions or other inducements to China for its cooperation in this crisis. The Commission believes that it is as much in China's national interests as it is in the U.S. national interest to achieve a nuclear-free Korean Peninsula and therefore that unrelated inducements for China's help should not be necessary.

The recent visit of Leader Kim Jong Il to meet with China's leaders, including President Hu and Central Military Commission Chairman Jiang Zemin, followed a visit by Vice President Cheney, during which Mr. Cheney presented Beijing with new evidence on North Korea's nuclear weapons program and reportedly warned that time is running out for ending the stalemate. President Hu is said to have advised Kim to soften his stance on North Korea's nuclear weapons program, after reassuring Kim that chances were slim that the United States would invade North Korea. Kim is also believed to have requested more aid.<sup>64</sup> On the heels of Kim's return to Pyongyang, North Korea's number two leader Kim Yong-nam told a U.S. policy expert visiting the North that "If Bush insists on his present policy of a complete, irreversible and verifiable dismantling first, we wouldn't be interested in having a deal with the United States. . . . We are going to use this time one hundred percent effectively to strengthen our nuclear deterrent, both quantitatively and qualitatively."<sup>65</sup>

### **Export Controls**

In November 2000, the Chinese government pledged to the United States that it would not assist "in any way, any country in the development of ballistic missiles that can be used to deliver nuclear weapons" and that it would publish comprehensive, missile-related export controls. In return, the United States agreed to waive sanctions for Chinese assistance to Iranian and Pakistani missile programs. In August 2002, as part of this commitment, the Chinese government published a comprehensive export control list.<sup>66</sup>

It remains to be seen how China will progress in implementing its new regulations. According to a recent in-country assessment by the Monterey Institute of International Studies, the Chinese government has taken steps to strengthen its "export control infrastructure, increase communication among various branches and levels of government, offer training to local officials and exporters and improve the transparency of its system."<sup>67</sup> Problems, however, remain with respect to end-use verifications, the number of personnel dedicated to training, the ability of companies to skirt the law through falsified documentation, and a lack of information on the part of some exporters.<sup>68</sup> The Commission believes that the Chinese government has not made an adequate effort to monitor its companies, as evidenced by the cases of serial proliferators that are government entities or spin-offs of formerly state-owned enterprises.

The Monterey study points to the lack of public evidence that firms have been punished for illegal exports, in contrast to Chinese government claims that in fact violators have been punished discretely with fines, revocation of licenses, and other legal punishments.<sup>69</sup>

During April 2004 talks, the U.S.-China Joint Commission on Commerce and Trade, a government-to-government consultative forum, reached agreement on procedures to strengthen end-use visit cooperation and help ensure that U.S. exports of controlled dual-use items are being used by their intended recipients for their intended purposes.

How China implements its export control regime will be a key test of its commitment to cooperate with the United States to stem

proliferation. Implementation will depend on the Chinese government's foreign policy objectives which may override any interest in pursuing nonproliferation objectives: China's "strategic relationship with Pakistan, its desire to avoid instability or regime change in North Korea, or its desire to demonstrate its opposition to a unipolar world."<sup>70</sup>

### **The Proliferation Security Initiative**

In May 2003, the United States launched the Proliferation Security Initiative to combat further spread of WMD. So far, the United Kingdom, Japan, Australia, Italy, France, Germany, Poland, Portugal, the Netherlands, Spain, and Liberia have agreed to support the initiative. Canada, Singapore, and Norway are also expected to provide support. The PSI is aimed at air, sea, and land interdiction of WMD and their delivery systems and related materials to state and nonstate actors of proliferation concern.

Although it is not a member of the PSI, China has been informed about the progress of the talks and has been invited to participate but has not agreed to do so. The chances of China agreeing to aggressive measures against the North Korean arms trade along the lines of the PSI appear unlikely. The Chinese foreign ministry on July 11, 2003, stated that China "does not approve of sanctions, blockages and other measures which are aimed at putting pressure on (North Korea). . . . Doing so will not only be useless to solve the problem, but will escalate antagonism and tension."<sup>71</sup> Further, China appears to be working through the United Nations to not only undermine the initiative but also to render it globally ineffective. This has been accomplished by getting the United States to drop a provision on the interdiction of foreign vessels carrying banned weapons on the high seas.<sup>72</sup>

Whether through a deterrent effect, or actual interdictions of WMD and missiles or their components, the PSI could put a serious dent in the North's ability to earn income from illicit exports to rogue states. In 2001, Pyongyang reportedly earned more than \$560 million from missiles sales, and income from illegal drugs was between \$500 million and \$1 billion.<sup>73</sup> The North has stated that an economic embargo would be grounds for war. PSI interdictions, as contemplated, appear designed to fall short of enforcing an indiscriminate embargo on outbound North Korean maritime traffic, with the focus instead on WMD shipments. Whether such interdictions would be considered a less provocative measure than an embargo remains to be seen. President Bush has proposed that the PSI be expanded to include greater cooperation in law enforcement, such as through Interpol, "to bring to justice those who traffic in deadly weapons, to shut down their labs, to seize their materials, to freeze their assets."<sup>74</sup>

The Bush administration believes the PSI was an important factor in convincing Libya to end its nuclear program after American and British intelligence led to the interception of a German-owned ship bound for Libya with parts of sophisticated centrifuges. The administration hopes that North Korea will follow Libya's example and find that it would be to its own benefit to renounce its nuclear ambitions.

**RECOMMENDATIONS**

- Should the current stalemate in the Six Party Talks continue, the Commission recommends that Congress press the administration to work with its regional partners, intensify its diplomacy, and ascertain North Korean and Chinese intentions with a detailed and staged proposal beginning with a freeze of all North Korea's nuclear weapons programs, followed by a verifiable and irreversible dismantlement of those programs. Further work in this respect needs to be done to determine whether a true consensus on goals and process can be achieved with China. If this fails, the United States must confer with its regional partners to develop new options to resolve expeditiously the standoff with North Korea, particularly in light of public assessments that the likely North Korean uranium enrichment program might reach a stage of producing weapons by 2007.
- The Commission recommends that Congress press the administration to renew efforts to secure China's agreement to curtail North Korea's commercial export of ballistic missiles and to encourage China to provide alternative economic incentives for the North Koreans to substitute for the foreign exchange that would be forgone as a result of that curtailment.
- As recommended in the Commission's 2002 Report, and now similarly proposed by President Bush and the U.N. Secretary General, the Commission reiterates that Congress should support U.S. efforts to work with the U.N. Security Council to create a new U.N. framework for monitoring the proliferation of weapons of mass destruction and their delivery systems in conformance with member nations' obligations under the Nuclear Non-Proliferation Treaty, the Biological Weapons Convention, and the Chemical Weapons Convention. This new monitoring body would be delegated authority to apply sanctions to countries violating these treaties in a timely manner or, alternatively, would be required to report all violations in a timely manner to the Security Council for discussion and sanctions.<sup>75</sup>
- As recommended in the Commission's 2002 Report, the Commission reiterates that Congress should act to broaden and harmonize proliferation sanctions by amending all current statutes that pertain to proliferation to include a new section authorizing the president to invoke economic sanctions against foreign nations that proliferate WMD and technologies associated with WMD and their delivery systems. These economic sanctions would include import and export limitations, restrictions on access to U.S. capital markets, restrictions on foreign direct investment into an offending country, restrictions on transfers by the U.S. government of economic resources, and restrictions on science and technology cooperation or transfers. The new authority should require the president to report to Congress the rationale and proposed duration of the sanctions within seventy-two hours of imposing them. Although the president now has the authority to select from the full range of economic and security-related sanctions, these sanctions are case specific and relate to designated activities within a narrow set of options available on a case-by-case basis.<sup>76</sup>

### Appendix A Current U.S. Sanctions on the PRC

ACT	SANCTIONED PARTY(IES)	SANCTION	REASON FOR SANCTION	DATE OF SANCTION	DATE SANCTION WAIVED
Foreign Relations Authorization Act of 1990-91 (Tiananmen Sanctions)		<ul style="list-style-type: none"> <li>• Suspension of: 1) Export of Satellites for Launch by the People's Republic of China</li> </ul>	<ul style="list-style-type: none"> <li>• Tiananmen Square crackdown</li> </ul>	<ul style="list-style-type: none"> <li>• 1990</li> </ul>	1) Presidential waivers for the export of satellites for launch by the PRC occurred in the following cases: —Aussat-1 and -2 and Frijia, 1991 —Asiasat-2, Apsat, Intelsat-7A, Starsat, and AfriStar, 1992 —Iridium and Intelsat-8, 1993 —Echostar, 1994 —Cosat, Mabuhay and Chinasat-7, 1996 —Asia Pacific Mobile Telecommunications (APMT) satellite, 1996 —Globalstar, 1996 —Satellite parts for PRC Fengyun-1, 1996 —Sinosat, 1996 —Chinasat-8 (built by Loral), 1998 2) 1998 (Presidential waiver)
1990 Missile Technology Control Act	<ul style="list-style-type: none"> <li>• China Precision Machinery Import-Export Corp. and China Great Wall Industry Corp.</li> <li>• China's Ministry of Aerospace Industry</li> </ul>	<ul style="list-style-type: none"> <li>• Prohibition of the export of missile-related computer technology and satellites</li> <li>• Prohibition of the export of Missile Technology Control Regime (MTCR) items and U.S. government contracts</li> </ul>	<ul style="list-style-type: none"> <li>• PRC transferred missile-related technology to Pakistan</li> <li>• PRC shipped M-11 related equipment to Pakistan</li> </ul>	<ul style="list-style-type: none"> <li>• 1991</li> <li>• 1993</li> </ul>	<ul style="list-style-type: none"> <li>• 1992 (Presidential waiver)</li> <li>• 1994 (Presidential waiver)</li> </ul>

Iran Nonproliferation Act of 2000	<ul style="list-style-type: none"> <li>China Metallurgical Equipment Corporation</li> <li>Liyang Chemical Equipment, China Machinery and Electric Equipment Import and Export Company (aka China National Machinery and Electric Equipment Import and Export Company), and a Chinese individual</li> <li>Jiangsu Yongli Chemicals and Technology Import and Export Corporation</li> <li>Liyang Chemical Equipment Company (aka Liyang Yunlong), Zibo Chemical Equipment Plant (aka Chemet Global Ltd.), China National Machinery and Electric Equipment Import and Export Company, Wha Cheong Tai Company, China Shipbuilding Trading Company, China Precision Machinery Import/Export Corporation, China National Aero-Technology Import and Export Corporation, and one Chinese individual</li> </ul>	<ul style="list-style-type: none"> <li>Prohibition of U.S. exports of MTCR annex items to the sanctioned entity</li> <li>Prohibition of U.S. government procurement of goods and services from the sanctioned entities. Prohibition of U.S. government assistance to the entities. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> <li>Prohibition of U.S. government procurement of goods and services from the sanctioned entity. Prohibition of U.S. government assistance to the entities. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> <li>Prohibition of U.S. government procurement of goods and services from the sanctioned entity. Prohibition of U.S. government assistance to the entities. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> </ul>	<ul style="list-style-type: none"> <li>Proliferation of missile technology to Pakistan</li> <li>Supplying Iran with materials used in the manufacture of chemical and biological weapons</li> <li>Reports indicate company was involved in export of dual-use items covered in the Australia Group</li> <li>Aiding Iran's weapons of mass destruction programs</li> </ul>	<ul style="list-style-type: none"> <li>2001 (Duration of a minimum of 2 years)</li> <li>January 2002 (Duration of a minimum of 2 years)</li> <li>2001 (Duration of a minimum of 2 years)</li> <li>May 2002 (Duration of a minimum of 2 years)</li> </ul>
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**Appendix A Current U.S. Sanctions on the PRC—Continued**

ACT	SANCTIONED PARTY(IES)	SANCTION	REASON FOR SANCTION	DATE OF SANCTION	DATE SANCTION WAIVED
	<ul style="list-style-type: none"> <li>Taian Foreign Trade General Corporation, Zibo Chemical Equipment Plant, Liyang Yunlong Chemical Equipment Group Company, NORINCO, CPMIEC</li> <li>Beijing Institute of Opto-Electronic Technology (BIOET), NORINCO, CPMIEC, Oriental Scientific Instruments Corporation (OSIC), Zibo Chemical Equipment</li> </ul>	<ul style="list-style-type: none"> <li>Prohibition of U.S. government procurement of goods and services from the sanctioned entity. Prohibition of U.S. government assistance to the entities. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> <li>Prohibition of U.S. government procurement of goods and services from the sanctioned entity. Prohibition of U.S. government assistance to the entities. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> </ul>	<ul style="list-style-type: none"> <li>Missile proliferation</li> <li>Sold equipment or expertise that Iran could use in nuclear, chemical, and biological weapons programs</li> </ul>	<ul style="list-style-type: none"> <li>June 2003 (2 years)</li> <li>April 2004 (2 years)</li> </ul>	
Chemical and Biological Weapons Control and Warfare Act of 1991	<ul style="list-style-type: none"> <li>Nanjing Chemical Industries Group (PRC), Jiangsu Yongli Chemical Engineering and Technology Import/Export Co. (aka Jiangsu Yongli Chemicals and Technology Import and Export Corporation) (PRC), Cheong Yee Limited (Hong Kong), and five Chinese individuals</li> </ul>	<ul style="list-style-type: none"> <li>Prohibition of U.S. government procurement of goods or services from the sanctioned entities or persons. Prohibition of importation into the United States of products produced by the sanctioned entities.</li> </ul>	<ul style="list-style-type: none"> <li>Contributed to Iran's chemical weapons program</li> </ul>	<ul style="list-style-type: none"> <li>1997</li> </ul>	<ul style="list-style-type: none"> <li>In effect</li> </ul>

Iran-Iraq Arms Proliferation Act	<ul style="list-style-type: none"> <li>Jiangsu Yongli Chemicals and Technology Import Export Cop., Q.C. Chen, China Machinery and Equipment Import Export Corp., China National Machinery and Equipment Import Export Corp., CMEC Machinery and Equipment Import Export Co., CMEC Machinery Electrical Import Export Co., China Machinery and Electric Equipment Import Export Co., Wha Cheong Tai Co.</li> <li>China Shipbuilding Co.</li> </ul>	<ul style="list-style-type: none"> <li>Prohibition of U.S. government procurement of goods and services from the sanctioned entity. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> <li>Prohibition of U.S. government procurement of goods and services from the sanctioned entity. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> </ul>	<ul style="list-style-type: none"> <li>Chemical weapons technology to Iran</li> <li>Transfer of cruise missile technology to Iran</li> </ul>	<ul style="list-style-type: none"> <li>July 2002 (2 years)</li> <li>July 2002</li> </ul>	
Executive Order (12938)	<ul style="list-style-type: none"> <li>North China Industries Corporation (NORINCO)</li> </ul>	<ul style="list-style-type: none"> <li>Prohibition of the importation into the United States of any goods, technology, or services produced or provided by this entity. Prohibition of U.S. government procurement of goods and services from the sanctioned entity. Prohibition of U.S. government assistance to the entities. No new licenses shall be granted for the transfer to these foreign entities of controlled items.</li> </ul>	<ul style="list-style-type: none"> <li>Missile technology to Iran</li> </ul>	<ul style="list-style-type: none"> <li>May 2003 (2 years)</li> <li>In effect</li> </ul>	

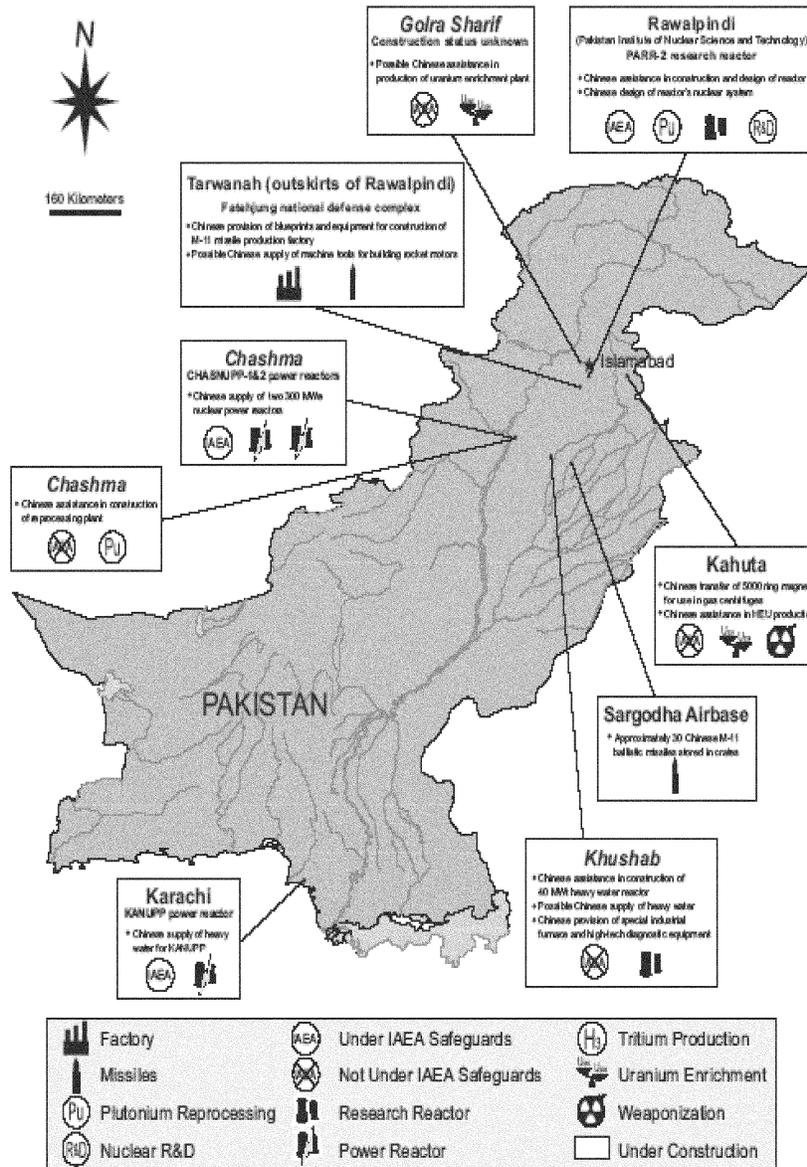
**Appendix A Current U.S. Sanctions on the PRC—Continued**

ACT	SANCTIONED PARTY(IES)	SANCTION	REASON FOR SANCTION	DATE OF SANCTION	DATE SANCTION WAIVED
Executive Order (12938)	<ul style="list-style-type: none"> <li>• CPMIEC</li> </ul>	<ul style="list-style-type: none"> <li>• Prohibition of the importation into the United States of any goods, technology, or services produced or provided by this entity. Prohibition of U.S. government procurement of goods and services from the sanctioned entity. Prohibition of U.S. government assistance to the entities. No new licenses shall be granted for the transfer to these foreign entities of controlled items.</li> </ul>	<ul style="list-style-type: none"> <li>• Missile technology to publicly unnamed country</li> </ul>	<ul style="list-style-type: none"> <li>• July 2003</li> </ul>	<ul style="list-style-type: none"> <li>• In effect</li> </ul>
Arms Export Control Act	<ul style="list-style-type: none"> <li>• NORINCO</li> </ul>	<ul style="list-style-type: none"> <li>• Prohibition of the importation of products produced by the entity. Prohibition of U.S. government procurement of goods and services from the sanctioned entity. Prohibition of U.S. government assistance to the entities. No new individual licenses shall be granted for the transfer to these foreign entities of controlled items.</li> </ul>	<ul style="list-style-type: none"> <li>• Engaged in missile technology proliferation activities</li> </ul>	<ul style="list-style-type: none"> <li>• September 2003 (2 years)</li> </ul>	<ul style="list-style-type: none"> <li>• Waiver for 1 year on import ban for non-NORINCO products</li> </ul>

Sources: *Federal Register* and Shirley Kan, Congressional Research Service (CRS) Report: RL31555, "China's Proliferation of Weapons of Mass Destruction."

**Appendix B Chinese Assistance to Pakistani Nuclear and Missile Facilities**

**CHINESE ASSISTANCE TO PAKISTANI NUCLEAR AND MISSILE FACILITIES**



Source: East Asia Nonproliferation Project, Center for Nonproliferation Studies, Monterey Institute of International Studies

**Appendix C China's Nuclear Technology Exports: 1980–2004**

COUNTRY	TYPE OF ASSISTANCE
<b>ALGERIA</b>	<p><b>Research Reactor</b></p> <ul style="list-style-type: none"> <li>• 15 MWt pressurized heavy water research reactor; possible provisions of heavy water for the reactor; construction began around 1988; placed under IAEA safeguards in 1992</li> <li>• Designs for construction of third stage of Algeria's Center for Nuclear Energy Research</li> </ul>
<b>ARGENTINA</b>	<p><b>Low Enriched Uranium</b></p> <ul style="list-style-type: none"> <li>• 20 percent enriched, sold in 1980s, no safeguards</li> </ul> <p><b>Heavy Water</b></p> <ul style="list-style-type: none"> <li>• 50–60 metric tons (1981–1985); no safeguards</li> </ul> <p><b>Uranium Concentrate (U3O8)</b></p> <ul style="list-style-type: none"> <li>• 1981–1985, no safeguards</li> </ul> <p><b>Uranium Hexafluoride Gas (UF6)</b></p> <ul style="list-style-type: none"> <li>• Early 1980s, 30 metric tons; no safeguards</li> </ul> <p><b>Highly Enriched Uranium</b></p> <ul style="list-style-type: none"> <li>• 12 kg, no safeguards, (1981–1985)</li> </ul>
<b>BRAZIL</b>	<p><b>Enriched Uranium</b></p> <ul style="list-style-type: none"> <li>• 3 percent, 7 percent, 20 percent enriched; 200 kg total</li> <li>• 1984, no safeguards</li> </ul>
<b>CHILE</b>	<p><b>Enriched Uranium</b></p> <ul style="list-style-type: none"> <li>• 3, 7, 20 percent enriched, no safeguards (1984)</li> <li>• Uranium mining and processing</li> </ul>
<b>INDIA</b>	<p><b>Heavy water</b></p> <ul style="list-style-type: none"> <li>• 1982–1987; 130–150 metric tons</li> <li>• No IAEA safeguards</li> </ul> <p><b>Low-Enriched Uranium</b></p> <ul style="list-style-type: none"> <li>• 1995, for India's Tarapur reactors</li> <li>• Supplied under IAEA safeguards</li> </ul>
<b>IRAN</b>	<p><b>Research Reactors</b></p> <ul style="list-style-type: none"> <li>• 27kW subcritical, neutron source reactor; provided in 1985; currently under IAEA safeguards</li> <li>• Zero-power reactor; commercial contract signed in 1991; currently under IAEA safeguards</li> <li>• HT-6B Tokamak nuclear fusion reactor, located at Azan University</li> <li>• 20 MWt reactor; contract signed in 1992 but the deal was canceled due to U.S. pressure</li> </ul> <p><b>Power Reactors: two 300 MWe reactors</b></p> <ul style="list-style-type: none"> <li>• Deal suspended in 1995 and canceled in 1997</li> <li>• CIA verified project cancellation</li> </ul> <p><b>Calutrons (electromagnetic isotope separators, EMIS)</b></p> <ul style="list-style-type: none"> <li>• For Karaj and Isfahan facilities; commercial contract signed in 1989; under safeguards</li> </ul> <p><b>Uranium Hexafluoride (UF6) Production Facility</b></p> <ul style="list-style-type: none"> <li>• Project canceled in October 1997</li> <li>• CIA verified cancellation of deal</li> <li>• China possibly provided blueprints for facility</li> </ul> <p><b>Zirconium Tube Production Facility</b></p> <ul style="list-style-type: none"> <li>• Assistance continuing</li> </ul> <p><b>Uranium Mining Assistance</b></p> <p><b>Tributylphosphate (for reprocessing)</b></p>
<b>IRAQ</b>	<p><b>Ring Magnets</b></p> <ul style="list-style-type: none"> <li>• Exports of samarium-cobalt magnets for gas centrifuges, 1989–1990</li> </ul> <p><b>Lithium hydride</b></p> <ul style="list-style-type: none"> <li>• 7 tons exported by the China Wanbao Engineering Company for \$15 million</li> </ul> <p><b>Weapons Grade Uranium</b></p> <ul style="list-style-type: none"> <li>• 1980</li> </ul>
<b>LIBYA</b>	<p><b>Nuclear Weapons Designs</b></p> <ul style="list-style-type: none"> <li>• In 2004, Chinese nuclear weapons designs were reportedly discovered at Libyan facilities, probably the result of Pakistani proliferation</li> </ul>
<b>JAPAN</b>	<p><b>Uranium Concentrate</b></p> <ul style="list-style-type: none"> <li>• 250 Short Tons to Tokyo Electric Power (1992)</li> </ul>

### Appendix C—Continued China's Nuclear Technology Exports: 1980–2004

COUNTRY	TYPE OF ASSISTANCE
<b>PAKISTAN</b>	<p><b>NUCLEAR WEAPON-RELATED ASSISTANCE</b></p> <p><b>Nuclear Weapon Design</b></p> <ul style="list-style-type: none"> <li>• Basic, Hiroshima-sized weapon</li> </ul> <p><b>Nuclear Weapon Testing</b></p> <ul style="list-style-type: none"> <li>• Possible inclusion of Pakistani observers at China's Lop Nur test facility (1989)</li> </ul> <p><b>Possible Provision of Tritium Gas</b></p> <ul style="list-style-type: none"> <li>• 1986, no safeguards</li> </ul> <p><b>Uranium Enrichment</b></p> <ul style="list-style-type: none"> <li>• Assistance to unsafeguarded Kahuta enrichment facility</li> <li>• This assistance was mutually beneficial</li> </ul> <p><b>Ring Magnets</b></p> <ul style="list-style-type: none"> <li>• About 5,000 to unsafeguarded A.Q. Khan Research Laboratory in Kahuta (1995)</li> </ul> <p><b>Weapons-Grade Uranium for Two Devices</b></p> <ul style="list-style-type: none"> <li>• Early 1980s, supplied without safeguards</li> </ul> <p><b>Plutonium Production Reactor at Khushab</b></p> <ul style="list-style-type: none"> <li>• 50–70 MW heavy water reactor (unsafeguarded)</li> <li>• Construction assistance</li> <li>• Provided special industrial furnace and high-tech diagnostic equipment (1994–1995)</li> </ul> <p><b>Reprocessing Facility at Chashma</b></p> <ul style="list-style-type: none"> <li>• Possible assistance constructing unsafeguarded facility</li> </ul> <p><b>CIVILIAN NUCLEAR ASSISTANCE</b></p> <p><b>Power Reactor: Chashma-1 (CHASNUPP), 300 MWe</b></p> <ul style="list-style-type: none"> <li>• Build by CNNC, deal signed in late 1995</li> <li>• Began operating in November 1999</li> <li>• Under IAEA safeguards (INFCIRC/418)</li> </ul> <p><b>Research Reactors</b></p> <ul style="list-style-type: none"> <li>• Miniature Neutron Source Reactor (MNSR); supplied under IAEA safeguards (INFCIRC/393) in 1991</li> <li>• Helped construct PARR-2 research reactor, safeguarded</li> </ul> <p><b>Heavy water (D2O)</b></p> <ul style="list-style-type: none"> <li>• Up to 5 MT/year for safeguarded PHWR [Kanupp] research reactor</li> <li>• Possibly diverted by Pakistan to the Khushab research reactor against Chinese wishes</li> </ul> <p><b>Fuel Fabrication Services</b></p>
<b>NORTH KOREA</b>	<b>Provided Nuclear Expertise until 1987</b>
<b>SYRIA</b>	<p><b>Neutron Source Reactor</b></p> <ul style="list-style-type: none"> <li>• 30kwt miniature neutron source research reactor</li> </ul> <p><b>Highly Enriched Uranium</b></p> <ul style="list-style-type: none"> <li>• Supplied under IAEA safeguards (1992)</li> </ul>

Source: Monterey Institute of International Studies.

### China's Missile Technology Exports: 1980–Today

COUNTRY	TYPE OF ASSISTANCE
<b>ALBANIA</b>	<p><b>Cruise Missiles</b></p> <ul style="list-style-type: none"> <li>• HY-1, HY-2</li> </ul> <p><b>Surface-to-air missiles (SAMs)</b></p> <ul style="list-style-type: none"> <li>• HQ-2</li> </ul>
<b>ARGENTINA</b>	<ul style="list-style-type: none"> <li>• Missile Fuel (1995)</li> </ul>
<b>BANGLADESH</b>	<p><b>Cruise Missiles</b></p> <ul style="list-style-type: none"> <li>• HY-2</li> </ul>
<b>BRAZIL</b>	<p><b>Missile Technology</b></p> <ul style="list-style-type: none"> <li>• SS-300</li> </ul> <p><b>Space Launch</b></p> <ul style="list-style-type: none"> <li>• Joint Satellite Program</li> <li>• Launcher and satellite manufacturing technology</li> <li>• VLS-SLV space launch vehicle</li> </ul>

**Appendix C—Continued China's Missile Technology Exports: 1980–Today**

COUNTRY	TYPE OF ASSISTANCE
<i>EGYPT</i>	<b>Cruise Missiles</b> <ul style="list-style-type: none"> <li>• 72 HY-2 antiship missiles (1990s)</li> </ul>
<i>IRAN</i>	<b>Antimissile systems</b> <ul style="list-style-type: none"> <li>• Modified SA-10 and SA-12 SAMs</li> </ul> <b>Anti-tank missiles</b> <ul style="list-style-type: none"> <li>• HJ-73</li> </ul> <b>Ballistic Missiles</b> <ul style="list-style-type: none"> <li>• M-7/8610/CSS-8</li> <li>• M-9/DF-15 (China cancelled the sale under U.S. pressure)</li> </ul> <b>Cruise Missiles</b> <ul style="list-style-type: none"> <li>• HY-1</li> <li>• 100 HY-2 (Silkworm)</li> <li>• HY-4/C-201</li> <li>• C-601</li> <li>• YJ-1/C-801 (sales halted in October 1997)</li> <li>• YJ-2/C-802 (sales halted in October 1997)</li> </ul> <b>Assistance to Iran's Indigenous Missile Programs</b> <ul style="list-style-type: none"> <li>• Extensive production assistance for the 8610/CSS-8 missile</li> <li>• Extensive production infrastructure for HY-2, C-801 and C-802 missiles (production assistance halted in 1997)</li> <li>• Possible assistance to the Shahab-3 ballistic missile</li> <li>• FL-10 air-launched cruise missile</li> <li>• Assistance in converting SAMs to surface-to-surface missiles</li> <li>• Iran-130 ballistic missile</li> <li>• Tondar-68 (modified M-11) ballistic missile</li> <li>• Oghab/Ugab (Eagle) ballistic missile</li> </ul> <b>Missile Fuel</b> <ul style="list-style-type: none"> <li>• Various propellant ingredients</li> <li>• Ammonium perchlorate</li> </ul> <b>Missile Guidance and Control Technology</b> <ul style="list-style-type: none"> <li>• Guidance kits (mid-1990s)</li> <li>• Gyroscopes (mid-1990s)</li> <li>• Accelerometers (mid-1990s)</li> <li>• Test equipment for ballistic missiles (mid-1990s)</li> </ul> <b>Surface-to-air missiles (SAMs)</b> <ul style="list-style-type: none"> <li>• HQ-2J, HN-5, NN-5 (shoulder-fired)</li> </ul>
<i>IRAQ</i>	<b>Cruise Missiles (1980s–1990s)</b> <ul style="list-style-type: none"> <li>• HY-2 (Silkworm)</li> <li>• C-601</li> <li>• YJ-1/C-801</li> </ul> <b>Missile Engine Testing Facility/Project 3209</b> <ul style="list-style-type: none"> <li>• Supply of standard parts for liquid propellant engine, late 1980s</li> </ul> <b>Missile Fuel</b> <ul style="list-style-type: none"> <li>• 10 tons of UDMH, late 1980s</li> <li>• 7 tons of lithium hydride; 1989–1990; exported by the China Wanbao Engineering Company (CWEC)</li> <li>• Ammonium perchlorate, 1994</li> </ul>
<i>LIBYA</i>	<b>Missile Fuel</b> <ul style="list-style-type: none"> <li>• Lithium hydride</li> </ul>
<i>NORTH KOREA</i>	<b>Cruise Missiles</b> <ul style="list-style-type: none"> <li>• HY-1, HY-2</li> </ul> <b>Expertise/training</b> <ul style="list-style-type: none"> <li>• Scud reverse engineering</li> <li>• Long-range missile project</li> <li>• Rocket engine design</li> <li>• Metallurgy</li> <li>• Airframe expertise</li> <li>• Small warhead design</li> </ul> <b>Missile Technology</b> <ul style="list-style-type: none"> <li>• Rocket design and production</li> <li>• Fiber Optic Gyroscopes</li> <li>• Accelerometers</li> </ul> <b>Surface-to-air missiles (SAMs)</b> <ul style="list-style-type: none"> <li>• HQ-2</li> </ul>

**Appendix C—Continued China's Missile Technology Exports: 1980–Today**

COUNTRY	TYPE OF ASSISTANCE
<b>PAKISTAN</b>	<p><b>Ballistic Missiles and Launchers</b></p> <ul style="list-style-type: none"> <li>• 34 M–11/DF–11 missiles; stored at Pakistan's Sargodha Air Force Base near Lahore; delivered in November 1992</li> <li>• M–11 transporter-erector-launchers (TEs)</li> </ul> <p><b>Possible Assistance to Indigenous Missile Programs</b></p> <ul style="list-style-type: none"> <li>• Hatf–1, Hatf–2 and Hatf–3 ballistic missiles</li> <li>• Anza surface-to-air missiles</li> </ul> <p><b>Missile Fuel</b></p> <ul style="list-style-type: none"> <li>• Ammonium perchlorate, 10 tons seized in Hong Kong in 1996; Pakistan's SUPARCO was caught attempting to import the ammonium perchlorate from a company in Xian, China</li> </ul> <p><b>Missile Guidance</b></p> <ul style="list-style-type: none"> <li>• Gyroscopes</li> <li>• Accelerometers</li> <li>• On-board computers</li> </ul> <p><b>Assistance to Missile Production Factory</b></p> <ul style="list-style-type: none"> <li>• Rawalpindi, 40 km west of Islamabad</li> <li>• Likely producing Pakistani version of M–11 missile</li> <li>• Blueprints and construction equipment, possibly ongoing</li> </ul> <p><b>Cruise Missiles</b></p> <ul style="list-style-type: none"> <li>• HY–1, HY–2, FL–1, FL–2</li> </ul> <p><b>Missile technology</b></p> <ul style="list-style-type: none"> <li>• M–11 components (1991–1997)</li> </ul> <p><b>Surface-to-air missiles (SAMs)</b></p> <ul style="list-style-type: none"> <li>• HQ–2</li> </ul> <p><b>Anti-tank missiles</b></p> <ul style="list-style-type: none"> <li>• Alleged shipment of special metals and electronics for use in production (1998)</li> </ul>
<b>SAUDI ARABIA</b>	<p><b>Ballistic Missiles</b></p> <ul style="list-style-type: none"> <li>• 30+ DF–3 (CSS–2) missiles; deliveries began in 1988; and included construction of launch complex, training, and post-sale systems maintenance</li> <li>• In 1997, Saudi Arabia requested from China possible replacements for the aging DF–3 missiles; China did not provide any replacements</li> </ul>
<b>SYRIA</b>	<p><b>Ballistic Missiles</b></p> <ul style="list-style-type: none"> <li>• DF–15/M–9 missiles, Syria provided advance payments</li> <li>• Cancelled under U.S. pressure in 1991; Syria possibly received test missile</li> </ul> <p><b>Assistance with Indigenous Programs</b></p> <ul style="list-style-type: none"> <li>• 30 tons of ammonium perchlorate in 1992</li> <li>• Technical exchanges</li> </ul>
<b>THAILAND</b>	<p><b>Cruise Missiles</b></p> <ul style="list-style-type: none"> <li>• 50 YJ–1/C–801 missiles</li> </ul>
<b>TURKEY</b>	<ul style="list-style-type: none"> <li>• Short- and long-range missile technology (1995)</li> <li>• Joint production of WS–1 artillery rocket (1997–)</li> </ul>
<b>UNITED ARAB EMIRATES</b>	<p><b>Ballistic Missiles</b></p> <ul style="list-style-type: none"> <li>• Scud-B missile launchers</li> </ul> <p><b>Cruise Missiles</b></p> <ul style="list-style-type: none"> <li>• HY–2</li> </ul>

*Legend:*

MWt = megawatts thermal

MWe = megawatts electric

MT = metric tons

Kg = kilogram

Kw = kilowatt

KWt = kilowatt thermal

Source: Monterey Institute of International Studies, East Asian Nonproliferation/Center for Nonproliferation Studies (EANP/CNS), 2004.

#### **Appendix D Third World Ballistic Missile Cooperation Between or Among China and North Korea**

- **Iran.** In 1983, Iran signed a long-term financing agreement with North Korea for its Scud-B development program and offered its assistance in acquiring critical western technologies.<sup>77</sup> By 1987, North Korea sold Iran approximately 90 to 100 missiles and associated transporter erector launchers. By 1988, Iran had established a Scud-B production plant. In a follow-on to its Scud-B program, Iran negotiated for the purchase of the North Korean Nodong-1 intermediate-range ballistic missiles.<sup>78</sup> By 1989, Iran's domestically manufactured version of the Nodong the Shabab-3 missiles was undergoing flight-testing.<sup>79</sup> Between 1989 and 1990, Iran-China cooperation resulted in the purchase of approximately 150–200 M-7/8610 ballistic missiles and associated production technology.<sup>80</sup> By 1997, Iran was jointly developing with China the NP-110 short-range solid-fuel missile.<sup>81</sup> China has also assisted Iranian efforts to upgrade its North Korean Scud missile arsenal and North Korea has assisted Iranian efforts to improve the accuracy of the C-802, anti-ship cruise missiles Iran bought from China.<sup>82</sup>
- **Egypt.** Both China and North Korea have a long history of supporting Egypt's ballistic missile development efforts. Egypt-North Korea missile cooperation began in 1981,<sup>83</sup> and by the mid-1980s Egypt had provided North Korea an initial shipment of missiles. These were the stock from which North Korea established its domestic ballistic missile program. North Korea then assisted Egypt to produce an extended-range Scud-B.<sup>84</sup> Egypt has the additional goal of producing its own version of North Korea's SCUD-C.<sup>85</sup> This joint cooperation has been ongoing since. Documents seized in a raid on a North Korean front company in Bratislava, Slovakia in 2003, show that North Korea attempted to acquire missile technology for Egypt.<sup>86</sup> China's involvement with Egypt dates to June 1990, when it signed a protocol to help Egypt modernize its Sakr missile factory to produce a new version of the Scud-B.<sup>87</sup>
- **Pakistan.** Pakistan has both liquid-fuel and solid-fuel ballistic missile programs. It continues to receive extensive assistance from China for its solid-fuel ballistic missile and from North Korea for its liquid-fuel missiles. China-Pakistan cooperation began in the early 1990s, when China sold Pakistan M-11 SRBMs. This transfer also included production and manufacturing capability.<sup>88</sup> China has sold Pakistan more than thirty of the 180-mile range M-11 ballistic missiles and the means to build the 450-mile-range Shaheen-1 and 1200-mile-range Shaheen-II missiles.<sup>89</sup> In the late 1990s Pakistan reportedly purchased twelve to twenty-five North Korean Nodong missiles and by 1998 had conducted a Ghauri missile test flight. The Ghauri and the Nodong are probably the same missile.<sup>90</sup>
- **Syria.** Syrian-North Korean cooperation in ballistic missiles probably began in early 1989, when Syria sought North Korean assistance to establish a domestic missile production capability.<sup>91</sup> In 1991, Syria had purchased Scud-Cs from North Korea and by 2000 had upgraded its missile force with the purchase of the Nodong.<sup>92</sup> Chinese cooperation has been in the area of technology

vice the export of actual missiles. In 1999, Chinese-origin aluminum powder was delivered to Syria's missile program and it is not known if this was with Chinese complicity. China may have also assisted Syria with production technologies and materials and may have helped Syria to upgrade its North Korean missiles.

- **Libya.** In the early 1990s, North Korea assisted Libya in establishing its Scud production facility near Tripoli. This has been a long-term effort, and in 1999 missile components were interdicted at Gatwick Airport in England. This confirmed reports that North Korea has sold Scud and Nodong missiles to Libya.<sup>93</sup> Additionally, it has been reported that by June 1998, Chinese technicians were connected to the Al-Fatah missile program and that China continued to transfer missile technology at least until early 2000.<sup>94</sup>

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