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Nuclear Threat Reduction Measures for India and Pakistan

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Sharon Squassoni
Specialist in National Defense
Foreign Affairs, Defense, and Trade Division

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Summary

Since India and Pakistan tested nuclear weapons in 1998, there has been a debate on whether the United States should provide assistance in making those weapons safer and more secure. In the wake of September 11, 2001, interest in this kind of assistance has grown for several reasons: the possibility of terrorists gaining access to Pakistan's nuclear weapons seems higher, the U.S. military is forging new relationships with both Pakistan and India in the war on terrorism, and heightened tension in Kashmir in 2002 threatened to push both states closer to the brink of nuclear war. In October 2001, media reported that the United States was providing assistance to Pakistan to keep its weapons safe, although those reports have not been confirmed. Revelations in 2004 that Pakistani scientist A.Q. Khan was selling nuclear technology (and reportedly a nuclear bomb design) to Iran, Libya, and North Korea also helped to renew interest in making, in particular, Pakistan's nuclear weapons program more secure from exploitation. The report of the 9/11 Commission also called for continued support for threat reduction assistance to keep weapons of mass destruction (WMD) away from terrorist groups.

In the 108th Congress, the Nunn-Lugar Expansion Act (Section 1308 of FY2004 Defense Authorization Act, PL 108-136) allowed the Department of Defense to spend up to \$50 million in unobligated funds on cooperative threat reduction (CTR) measures outside the former Soviet Union. In the 109th Congress, it is likely that similar legislation will be introduced again. The Bush administration used \$20 million of CTR funds to dismantle chemical weapons-related items in Albania, but proponents of expanding CTR have mentioned many other countries as possible recipients: India, Pakistan, China, North Korea, Iraq, and Libya, to name a few.

This paper describes why Cooperative Threat Reduction (CTR) programs developed for the former Soviet Union are considered models for assistance elsewhere and their potential application in India and Pakistan. The paper considers the types of assistance provided under CTR and potential constraints on U.S. assistance in this area, including domestic and international legal and political restrictions on cooperation with states outside the Nuclear Nonproliferation Treaty (NPT); the low level of cooperation and transparency exhibited by India and Pakistan; lack of incentives for India and Pakistan to pursue threat reduction measures; and potentially competing objectives of threat reduction and nuclear deterrence.

This report, which will be updated as events warrant, complements CRS Report RL32359, *Globalizing Cooperative Threat Reduction: A Survey of Options*, and CRS Report RS21840, *Expanding Threat Reduction and Nonproliferation Programs: Concepts and Definitions*.

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Nuclear Threat Reduction Measures for India and Pakistan

Introduction

The September 11, 2001 attacks reinforced the importance of efforts to stop the proliferation of weapons of mass destruction. In particular, many analysts agree that some countries need greater protection against terrorist access to weapons of mass destruction (WMD) on their territories. The report of the 9/11 Commission called for continued support for threat reduction assistance to keep WMD away from terrorist groups.

Pakistan, because of its location, the nature of its relationship to the Taliban and Al Qaeda, and its weapons of mass destruction programs, has generated particular concern. Repeated assassination attempts on President Musharraf, AQ Khan's nuclear sales to North Korea, Iran, and Libya, and a continuous battle with terrorist elements within the country, have made Pakistan the most crucial node of the nexus of terrorism and WMD proliferation. Moreover, a combination of doctrinal preference (for first use of nuclear weapons) and conventional force inferiority has given Pakistan strong incentives to forward-deploy its nuclear forces, leading many observers to conclude that assistance to secure Pakistan's nuclear warheads could be critical. Analysts inside and outside government have raised the possibility of U.S. assistance to help reduce the threat of nuclear weapons losses in India and Pakistan.¹ Suggested measures have ranged from "guards and gates" around nuclear sites to permissive action links (which act as locks) on nuclear weapons to prevent unauthorized use.

In a speech in December of 2001, Senator Lugar noted that concerns had been raised immediately following September 11, 2001 about the security of Pakistan's nuclear weapons program and that "similar questions will be raised about India's." He then noted uncertainties about the WMD programs of Iraq, Iran, Syria, Libya and North Korea.² In contrast to those five countries, four of which are on the State Department's list of state sponsors of terrorism, Senator Lugar noted that "the closer

¹ See, in particular, two papers written on this subject: Gottemoeller, Rose, with Longworth, Rebecca, "Enhancing Nuclear Security in the Counter-terrorism Struggle: India and Pakistan as a New Region for Cooperation, Carnegie Endowment Non-Proliferation Project Working Paper Number 29, August 2002. See also Lee Feinstein, James Clad, Lewis Dunn, David Albright, "A New Equation: US Policy toward India and Pakistan After September 11," Carnegie Endowment Non-Proliferation Project Working Paper Number 27, May 2002.

² Sen. Lugar, Richard, "The Lugar Doctrine," December 6, 2001, available on [http://lugar.senate.gov/lugar_doctrine.html]

ties that have developed since September 11th with India and Pakistan offer new opportunities to discuss nuclear security with both countries, including safe storage and accountability. We must attempt to establish programs that respect their sovereignty and go far to help insure their security.” Lugar also suggested that cooperative programs with Iran, Syria, or Libya should not be ruled out.

In an article published in July 2002, Senator Lugar explained that

The precise replication of the Nunn-Lugar program will not be possible everywhere, but the experience of Nunn-Lugar in Russia has demonstrated that the threat of weapons of mass destruction can lead to extraordinary outcomes based on mutual interest...Nations cooperating on securing instruments of mass destruction might also pledge to work cooperatively on measures to retrieve weapons or materials that are in danger of falling into the wrong hands, and to come to the aid of any victim of nuclear, chemical, or biological terrorism³

In the specific case of India and Pakistan, there may be key differences from the FSU that limit the program’s applicability. Many of those differences stem from the fact that India and Pakistan are not “legal” nuclear weapon states under the Nuclear Nonproliferation Treaty (NPT), as Russia was. The United States is currently prohibited from providing many kinds of assistance to non-nuclear weapon states, particularly those without full-scope nuclear safeguards.⁴ Most types of assistance the United States can feasibly provide would probably focus on helping secure nuclear materials and providing employment for personnel, rather than on security of nuclear weapons. Extreme sensitivity in India and Pakistan about their nuclear weapons and programs will also likely restrict access to facilities, which in turn will limit how well assistance can be tailored to potential problems. Also, technical measures to make weapons safer from unauthorized use may make those weapons more deployable or usable and thus inadvertently undermine the goal of reducing the nuclear threat. Nonetheless, some measures may be useful.

This paper takes CTR programs as a starting point and analyzes their potential application to India and Pakistan. In providing context for assessing U.S. policy options, the paper outlines the proliferation threat in South Asia and U.S. nonproliferation policy. The paper distinguishes between assistance oriented toward making nuclear weapons more secure, and assistance oriented toward making nuclear material more secure. Given the existing framework of nonproliferation-related laws and policies, measures focused on nuclear material and personnel may be more feasible in the short term.

³ Sen. Lugar, Richard. “The U.S.-Russian Front Against Terrorism and Weapons Proliferation” in *U.S. Foreign Policy Agenda*, p. 4. Available at [<http://usinfo.state.gov/journals/itps/0702/ijpe/lugar.htm>].

⁴ Non-nuclear-weapon states party to the NPT are obligated to place all nuclear material on their territory under International Atomic Energy Agency (IAEA) safeguards, known as full-scope safeguards. See CRS Report RL31559, *Proliferation Control Regimes: Background and Status*.

Congressional Action

Congressional action on expanding the application of CTR began in the 107th Congress, when Senator Lugar introduced a bill (S. 206) to allow DoD to use up to \$50M in unspent CTR funds in countries outside the former Soviet Union (FSU). The provision would have allowed DoD to “respond to emergency proliferation risks and less urgent cooperative opportunities to further nonproliferation goals.” The House bill prohibited such uses of CTR funds, and in conference, both sides agreed to drop the provisions.

The 107th Congress also specifically addressed Indian and Pakistani nonproliferation issues in the Foreign Relations Authorization Act Fiscal Year 2003 (P.L. 107-228), which contained a provision on nuclear and missile proliferation in South Asia . That provision stated that it will be the policy of the United States to encourage India and Pakistan to “establish a modern, effective system to protect and secure nuclear devices and materiel from unauthorized use, accidental employment, or theft.” P.L. 107-228 stipulated that any assistance must be consistent with U.S. obligations under the Nuclear Nonproliferation Treaty (NPT). Section 1601 in Title XVI states that it shall be the policy of the United States, consistent with its obligations under the Treaty on the Non-Proliferation of Nuclear Weapons, to encourage and work with India and Pakistan to achieve the following by September 2003:

- nuclear test moratorium
- commitment not to deploy nuclear weapons or ballistic missiles that could carry nuclear weapons and to restrain the ranges and types of missiles developed or deployed
- agreement by both countries to align their export controls with international nonproliferation regimes
- establishment of export control system for sensitive dual-use items, technology, technical information and material used in the design, development, or production of WMD and ballistic missiles
- bilateral meetings between senior Indian and Pakistani officials to discuss security issues and establish confidence-building measures with respect to nuclear policies and programs.

A separate subsection stated that it shall be the policy of the United States, consistent with its NPT obligations, to encourage, and where appropriate, work with the governments of India and Pakistan to achieve not later than September 30, 2003, the establishment of “modern, effective systems to protect and secure nuclear devices and materiel from unauthorized use, accidental employment, or theft.” The conferees noted that “any such dialogue with India or Pakistan would not be represented or considered, nor would it be intended, as granting any recognition to India or Pakistan, as appropriate, as a nuclear weapon state.”⁵ The section required the President to submit a report to Congress no later than March 1, 2003 on U.S. efforts to achieve the objectives and likelihood of success by September 2003.

⁵ See Conference Report 107-671.

In the 108th Congress, the FY2004 National Defense Authorization Act (P.L. 108-16, Sec. 1308) authorized the Bush Administration to spend \$50 million of unobligated funds from the Cooperative Threat Reduction Program in states outside the former Soviet Union. As of January 2005, the Administration had spent such \$20 million only in Albania for the purpose of eliminating chemical weapons stockpiles. On November 16, 2004, Senator Lugar introduced S. 2980, which sought to remove some restrictions associated with using CTR funds outside of the FSU. In brief, the bill would remove CTR program-wide restrictions on spending the money (including certifications), remove the \$50-million cap, remove restrictions on spending money for chemical weapons destruction, and provide “notwithstanding” authority. Although the legislation remained in the Senate Foreign Relations Committee, it is likely to be introduced again in the 109th Congress.

In the 109th Congress, Senator Biden introduced S. 12, the Targeting Terrorists More Effectively Act of 2005, on January 24, 2005. The bill identifies proliferation of nuclear weapons and promotion of democracy as two of several issues that threaten the United States’ relationship with Pakistan and would authorize \$10M in the Nonproliferation, Anti-Terrorism, Demining and Related Programs account (State) to be spent in Pakistan. However, the bill would bar any military or economic assistance appropriated for the fiscal year unless the President certifies that such assistance is not going to individuals that oppose or undermine U.S. nonproliferation efforts.

Cooperative Threat Reduction

Congress enacted the Nunn-Lugar Cooperative Threat Reduction (CTR) program in 1991, addressing, in Senator Lugar’s words, “the dominant international proliferation danger: the massive nuclear, chemical and biological weapons infrastructure of the former Soviet Union.”⁶ The CTR program had four key objectives:

- Destroy nuclear, chemical, and other weapons of mass destruction;
- Transport, store, disable, and safeguard these weapons in connection with their destruction;
- Establish verifiable safeguards against the proliferation of these weapons, their components, and weapons-usable materials; and
- Prevent the diversion of scientific expertise that could contribute to weapons programs in other nations.

According to Senator Lugar, the CTR program to date has separated 6,564 Russian nuclear warheads from their missiles and stored fissile material from those weapons. Over 30,000 tactical nuclear weapons have been stored, and non-weapons employment provided for thousands of Russian nuclear scientists.⁷

⁶ Sen. Lugar, Richard, “The Lugar Doctrine,” [http://lugar.senate.gov/lugar_doctrine.html]

⁷ See CRS Report 97-1027, *Nunn-Lugar Cooperative Threat Reduction Programs: Issues for Congress*, and CRS Issue Brief IB98038, *Nuclear Weapons in Russia: Safety, Security and Control Issues*.

CTR programs have encompassed three areas of effort: destruction and dismantlement; chain of custody; and demilitarization. Destruction and dismantlement activities included removing warheads, deactivating missiles and eliminating launch facilities for strategic weapons under the START I agreement. Efforts to improve the safety, security, and control over nuclear weapons and fissile materials have included providing storage containers, bullet-proof blankets, secure rail cars, and building a plutonium storage facility at Mayak. Demilitarization projects have included defense conversion projects and International Science and Technology Center projects to help WMD scientists pursue work with peaceful objectives and military-to-military contacts.

CTR programs have evolved and expanded over time, adjusting to Russian, NIS, and U.S. priorities, as well as to changing perceptions about which threats posed the greatest risk. The programs have also bowed to bureaucratic intransigence and practical considerations upon occasion. In one notable incident, the Department of Energy provided blankets to facility guards, because DoE officials discovered that they were leaving their posts to collect wood to build fires. As the economy worsened in Russia in the mid-1990s, CTR projects were developed to provide alternative employment and sources of income for unpaid or out-of-work WMD scientists. At the same time, more frequent reports of theft of nuclear material highlighted the need to allocate CTR resources to material protection, control and accounting (MPCA) measures for nuclear material, consolidation of nuclear weapons and material; and secure transportation. The United States developed a practical approach: “quick-fixes,” like bars on windows, blast-proof doors, fences, followed by a second stage that included more sophisticated security measures like sensors, cameras, and personnel access measures.⁸

CTR as Precedent

The Cooperative Threat Reduction Program, at its inception, was a novel approach to a novel problem. The idea that two former adversaries could cooperate on such sensitive matters as nuclear weapons and material security was radical, but so too was the prospect of Russia’s WMD infrastructure unraveling. Although some of the kinds of assistance and measures undertaken in the CTR program are clearly applicable to India and Pakistan, the circumstances that have led to the development of a similar nuclear terrorist threat are quite different. Among the many factors that have made CTR successful, one of the key factors was a basic level of agreement about the threat and a willingness to cooperate. Russia had already agreed to strategic nuclear reductions under START I — the only question was how to implement those reductions quickly and who would pay for them. The fact that Soviet nuclear weapons had been targeted at the United States for so many years presented a compelling reason for the United States to help.

⁸ See remarks by Rose Gottemoeller, former Deputy UnderSecretary for Defense and Nonproliferation in the Department of Energy, in a transcript of Carnegie Endowment for International Peace Nonproliferation Roundtable, held on September 23, 2001, entitled “Pakistan’s Nuclear Dilemma.” [<http://www.ceip.org/files/events/Paktranscript.asp>]

Obviously, there is no similar agreement between India and Pakistan or with the United States. Moreover, India has long maintained that it will disarm when the other nuclear weapon states reduce their stockpiles to a similar level. Thus, destruction and dismantlement activities are not now applicable. CTR chain of custody programs applied to the weapons and material that were taken out of service and thus did not raise questions about enhancing safety, security and control over Russia's active nuclear weapons stockpile. Doing similar things for India and Pakistan might be desirable from a security standpoint, but questionable politically.

Establishing verifiable safeguards against the proliferation of existing nuclear weapons, components, and materials is the most applicable of all the CTR objectives for India and Pakistan. However, the situation of Pakistan and India is different from that in Russia and offers one major complication: threat reduction measures aimed at an outside/terrorist threat may conflict with nuclear deterrence. For example, making materials and weapons safe from theft or espionage may logically lead to consolidating material and weapons at as few sites as possible. However, that consolidation could increase one's vulnerability to a preemptive strike by an adversary. In the case of Russia and the NIS, the risk of a preemptive strike did not weigh into calculations of risk; any obstacles to consolidation have been primarily those of cost and effort in constructing adequate facilities (like the Mayak plutonium storage facility). For India and Pakistan, however, the fear of a preemptive strike is prominent. Rumors of an Indian or even Israeli preemptive attack on Pakistani nuclear weapons capabilities have erupted in Pakistan predictably during crises.⁹

The last objective — that of preventing diversion of scientific expertise — is also applicable to India and Pakistan. However, the underlying causes for concern are different, and therefore may call for different solutions. In the Russian case, the lack of financial security has been a documented incentive for scientists to offer their services abroad;¹⁰ in Pakistan, the incentive is more likely to be associated with sympathy for terrorist aims. "Brain drain" projects in the NIS have been predicated on the assumption that there are more scientists than can be paid or are needed, but there are no indications that Pakistani and Indian scientists are superfluous to their nuclear weapons programs. Both India and Pakistan are probably interested in retaining their nuclear experts. Although it has been politically acceptable to fund former WMD scientists in Russia and the NIS to do non-weapons-related work, it might be politically unacceptable to fund current WMD scientists in India and Pakistan at higher levels simply to keep them "in the program." Brain-drain projects in India and Pakistan, if such projects were implemented, would likely focus on personnel reliability testing and psychological profiling.

⁹ According to George Perkovich, this occurred in the 1982 and 1990 crises, and the period in 1998 before Pakistan tested its nuclear devices. See Perkovich's remarks at September 23, 2001 Carnegie Endowment roundtable on "Pakistan's nuclear dilemma."

¹⁰ See study by Tikhonov, Valentin, *Russia's Nuclear and Missile Complex: The Human Factor in Proliferation*, Study for Carnegie Endowment for International Peace, 2001.

CTR's Critics

Some arguments against expanding CTR challenge its effectiveness. Opponents have suggested that assisting Russia has simply created opportunities for the Russians to spend their money in other defense-related areas. Some supporters, in contrast, argue that CTR has not done enough quickly enough. Those that argue that CTR has not done enough have suggested that the programs have focused misguidedly on nuclear weapons rather than nuclear material security, wherein the greatest threat lies.¹¹

Some analysts believe that any assistance at all sends the wrong message to India and Pakistan (e.g., acceptance of their possession of nuclear weapons), that assistance could be misused or misappropriated and that, in the end, U.S. assistance may wind up improving Indian and Pakistani nuclear capabilities in ways we had not foreseen. Proponents of the CTR program in the NIS have argued that the program was implemented with a key principle — that cooperation would serve the objective of enhancing physical security and protection of nuclear assets and not enhance any operational capabilities.¹² Some argue that this principle, particularly since India and Pakistan have not joined the NPT and are *de jure* non-nuclear-weapons states (NNWS), must also be adhered to in the case of any assistance to those states.

South Asia Context

Simply put, there are two basic nuclear risks in South Asia: first, that terrorists will acquire nuclear material or nuclear weapons, and second, that nuclear war will erupt through miscalculation, through preemption, or through sudden escalation. The threat of terrorism calls primarily for greater physical security at weapons sites and sites where nuclear material is produced or stored, particularly weapons-grade material (highly enriched uranium or separated plutonium). The threat of accidental nuclear war calls for safer nuclear weapons, whereas reducing the risk of preemptive or sudden war would require enhancing command and control and possibly transparency between the two states. Some observers have suggested that making nuclear weapons safer (through insensitive high explosives or shaping the cores so that they will not give a nuclear yield if improperly detonated) also makes them more deployable and thus increases the risk of their use. Given the questionable desirability of measures to enhance Indian and Pakistani nuclear weapons capabilities, this paper will assume that any nuclear threat reduction measures will focus on physical security measures, rather than safety measures.

¹¹ GAO study — WMD: Reducing the Threat from the Former Soviet Union: An Update. GAO/NSIAD-95-165 June 1995.

¹² Gottemoeller, Rose, with Longworth, Rebecca, “Enhancing Nuclear Security in the Counter-terrorism Struggle: India and Pakistan as a New Region for Cooperation, Carnegie Endowment Non-Proliferation Project Working Paper Number 29, August 2002.

Nuclear Material Security

Nuclear material security is a concern for all states in the context of a terrorist threat. Physical security has long been considered a subset of international safeguards, but it has never been a prerequisite for placing nuclear material under international safeguards. It can be a requirement of bilateral nuclear trade, however, and the United States requires physical security measures on some of the nuclear material it exports, mostly in conjunction with military programs. Often, physical security measures are implemented as a matter of course in implementing safeguards, since states have to account for missing material in their physical inventories.

India and Pakistan may provide particularly attractive targets because they have weapons-grade material on their soil, but terrorists' interest in a radiological dispersal device may make any or all radioactive sources potentially attractive to steal. India and Pakistan became parties to the Convention on the Physical Protection of Nuclear Material in 2002 and 2000, respectively. This Convention, which entered into force in 1987, was designed to protect nuclear material in transit between countries. The CPPNM defines a range of nuclear terrorist activities and requires parties to criminalize those activities. It does not cover physical protection of domestic nuclear material in storage or use, nor does it cover byproduct material.¹³ The United States and other members of the Convention have been working for several years to expand the scope of the agreement, and agreed in September 2002 to extend physical protection to domestic use and storage. The IAEA has circulated proposed amendments to the convention, which may be considered in 2005. Both India and Pakistan have been active in discussions on expanding the Convention.

Since 1995, the International Atomic Energy Agency has conducted (although mostly outside of the regular budget) physical protection assessment programs, called International Physical Protection Advisory Service missions. States must request assistance, and then an international team conducts a confidential vulnerability assessment and recommends measures to address physical protection shortfalls. Neither India nor Pakistan has requested such a mission, and in the opinion of some observers, they are unlikely to do so because of the sensitivity of their facilities. However, in May 2002, the IAEA conducted a joint safety and security workshop in Islamabad. While Pakistan has participated in IAEA technical cooperation programs, India has not participated since the 1980s. In 2002, India requested a regional workshop on physical protection focused on security awareness and culture. India was among several states in which the IAEA conducted physical protection-related seminars in 2003.

Nuclear Material Safeguards: IAEA Safeguards

Most of the material and facilities in India and Pakistan is not subject to international safeguards. In India, there are safeguards on 6 reactors (Tarapur 1 & 2, LEU-fueled power reactors; Rajasthan RAPS-1 and -2, which use natural uranium;

¹³ Many concerns about radioactive "orphan" sources would not be addressed under the convention, because that material is considered to be byproduct material — that is material that is produced as a byproduct of irradiating special nuclear material.

and Koodankulam-1 and -2, LEU-fueled power reactors). In addition, the Tarapur plutonium reprocessing facility (Prefre) is safeguarded when safeguarded fuel is used in the facility and the Tarapur MOX fuel fabrication plant has safeguards when it runs safeguarded material through it. The Hyderabad fuel fabrication plant has partial safeguards.

Key nuclear weapons-related facilities in India that are not subject to IAEA inspections include the Bhabha Atomic Research Center (BARC) in Trombay, which houses the Cirus and Dhruva research reactors for plutonium production, plutonium reprocessing plants and a pilot-scale uranium enrichment plant.¹⁴ These sites, as well as storage sites for weapons-grade material or for weapons themselves could be highly attractive to terrorists because they may contain weapons-usable nuclear material.

Pakistan has IAEA safeguards on a few facilities. The KANUPP power reactor, which uses natural uranium, Chasma-1, LEU-fueled power reactor, and two research reactors at Rawalpindi that have used HEU in the past are under international safeguards. The following facilities are not under safeguards: the Khan Research Laboratories at Kahuta, which include a uranium enrichment plant and facilities for fabricating HEU into weapons; centrifuge enrichment plants at Sihala, Golra and Wah/Gadwal, the Chasma reprocessing plant, and PINSTECH and SPINSTECH facilities related to reprocessing at Rawalpindi.¹⁵ These nuclear material production sites, as well as weaponization, storage and assembly sites (if separate facilities exist), could be high-value targets for terrorists.

Nuclear Weapons Security

Since the 1998 nuclear tests, India and Pakistan appear to have accelerated nuclear weapons development and, possibly, deployments. Most observers still believe that neither Pakistan nor India has deployed warheads mated with delivery systems. Fissile material components (pits) are thought to be kept separately from the rest of the warhead. Such a physical separation helps deter unauthorized use and complicates theft. In the early years of the U.S. nuclear weapons program, fissile material components of warheads were physically separated; in the earliest bombs, the two were mated in the bomb-bay of the aircraft. When nuclear missiles entered the U.S. inventory, the warheads were physically separated from the missiles. In addition to physical separation, however, there need to be rules and procedures for authorized use; it is not clear what those are for India or Pakistan. India and Pakistan have been moving towards more structured nuclear command and control authority, organization, and strategic planning. However, there is no information on whether they have implemented two-man rules (a requirement for the concurrent involvement

¹⁴ See Cirincione, Joseph, with Wolfsthal, Jon B. and Rajkumar, Miriam, *Deadly Arsenals: Tracking Weapons of Mass Destruction* (Washington DC: Carnegie Endowment) 2002, pp. 201-205 for listings and maps of Indian nuclear facilities, both safeguarded and unsafeguarded. (Referred to hereafter as *Deadly Arsenals*)

¹⁵ See Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, pp. 217-219 for listings and maps of Pakistani nuclear facilities, both safeguarded and unsafeguarded.

of at least two people to be able to fire a weapon) or other procedures for ensuring no unauthorized use.

There is no reliable information on where fissile material is shaped or machined into components for weapons, or where fissile cores are kept if they are separated from other weapon components and delivery systems for India and Pakistan. Some observers believe that nuclear weapons parts are “probably distributed in a number of tightly secured facilities at different locations throughout Pakistan.”¹⁶ Physical security in the case of Pakistan is provided by the military. India has kept strong civilian oversight of the weapons program, with the military kept predominantly at arm’s length. However, the details of security in both cases are unknown. In April 2000, the Indian government ended independent safety oversight at BARC, the “nerve center” of the Indian nuclear weapons program. Some analysts have interpreted this change as an indication of accelerated nuclear weapons work at BARC.¹⁷

On October 2, 2001, Pakistan’s Foreign Ministry issued a statement that “Our nuclear assets are 100% secure, under multiple custody.” Media reported that Pakistan had moved nuclear weapons components to several undisclosed locations. Subsequently, President Musharraf reorganized elements of the Pakistan Atomic Energy Commission (PAEC) and investigated several nuclear weapons scientists who reportedly had ties to Islamic extremists.

Personnel Security

In terms of personnel security, concerns have focused mostly on Pakistan, and most recently, on the activities of Pakistani nuclear freelancer Dr. A.Q. Khan.¹⁸ At the end of 2003, evidence from Libya revealed that Khan had sold a variety of nuclear materials, technology, equipment, and even a bomb design, to Libya, Iran, and North Korea over two decades. Although there were reports that President Musharraf knew of improprieties regarding Khan in 1999, Musharraf took no steps to rein in Khan until 2001. At that time, Khan was “forced” to retire as director of Khan Research Laboratories and given a job as special advisor to President Musharraf.¹⁹ Before that, however, he had amassed millions of dollars in selling nuclear technology to rogue states. Pakistani officials claimed that they tightened controls on their nuclear weapons program with the creation of the National Command Authority (NCA) in February 2000. One of the features of those controls is the screening of key people in the Pakistani nuclear weapons program every two

¹⁶ Kampani, Guarav, “Safety Concerns About the Command and Control of Pakistan’s Strategic Forces, Fissile Material, and Nuclear Installations,” Center for Nonproliferation Studies, Monterey Institute of International Affairs. [<http://cns.miis.edu/research/wtc01/spna.htm>]

¹⁷ Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, p. 195.

¹⁸ See CRS Report RL32745, *Pakistan’s Nuclear Proliferation Activities and the Recommendations of the 9/11 Commission: U.S. Policy Constraints and Options*.

¹⁹ See Sharon Squassoni, “Closing Pandora’s Box: Pakistan’s role in Nuclear Proliferation,” *Arms Control Today*, April 2004.

years by the Inter Services Intelligence Agency, Military Intelligence, the Intelligence Bureau, and the Strategic Plan Division of the NCA. However, “top-level people (including scientists) are controlled by their organizations and not psychologically screened.”²⁰ Much less is known about Indian personnel security. Although India set up a Nuclear Command Authority similar to Pakistan’s in January 2003, there is little information on whether associated personnel screening measures have been implemented.

Nonproliferation Context

Until North Korea’s February 2005 declaration of a nuclear weapons capability, India and Pakistan were the only states outside the Treaty on the Nonproliferation of Nuclear Weapons (NPT) to declare, openly, their nuclear weapons status.²¹ When India and Pakistan tested nuclear weapons in 1998, a curious dilemma emerged for the international community — was it possible to acknowledge a nuclear weapons capability without conferring nuclear weapons status? Several months after the test, then Deputy Secretary of State Strobe Talbott stated in *Foreign Affairs* that the United States “cannot concede, even by implication, that India and Pakistan have by their tests established themselves as nuclear-weapons states... To relent would break faith with those states that have forsworn a capability they could have acquired. Moreover, it might inadvertently provide an incentive for other countries to blast their way into the ranks of the nuclear-weapons states.”²² The international community so far has sidestepped questions of nuclear weapons status, but some have suggested that India and Pakistan have become a model for new nuclear weapon states.²³

On the question of nuclear assistance to non-nuclear weapon states, however, consensus in the international community is strong, well-established, and embodied in the NPT. Before the Nuclear Nonproliferation Treaty entered into force in 1970, views on sharing nuclear technology and even nuclear weapons swung wildly between sharing everything and sharing nothing. According to one source, the United States contemplated giving India some nuclear weapons to counter the Chinese nuclear arsenal, shortly after China’s first nuclear test in 1964.²⁴ Nuclear

²⁰ Report from a visit to Pakistan conducted by Paolo Cotta-Ramusino and Maurizio Martellini in 2001 and published in “Nuclear safety, nuclear stability and nuclear strategy in Pakistan: A Concise report of a visit by Landau Network-Centro Volta.”

²¹ Other states that have made declarations about either nuclear weapons (e.g., South Africa) or nuclear weapons programs, have done so in the context of relinquishing those programs or weapons and thus relinquishing such status. North Korea withdrew from the NPT on April 10, 2003 and declared it had a nuclear weapon on February 10, 2005.

²² Talbott, Strobe, “Dealing with the Bomb in South Asia,” *Foreign Affairs*, January/February 1999, Volume 78, No. 2. p.119.

²³ One Chinese official publicly stated that North Korea wants to become the next India or Pakistan. Proceedings from a conference in Beijing author attended, February 2, 2005.

²⁴ Perkovich, George, *India’s Nuclear Bomb*, (CA: University of California Press, 1999), p. (continued...)

weapon states have voluntarily shared technology among themselves and some have spied on each other. China initially advocated nuclear proliferation as an inevitable and possibly stabilizing factor in world relations (although it joined the NPT in 1992). Nuclear weapon states have also shared technology with those states outside the NPT, the most notable example being China's reported sharing of nuclear weapons blueprints with Pakistan. And, reportedly, Pakistan shared that design with Libya.²⁵

Negotiators of the Nuclear Nonproliferation Treaty (NPT) in the mid-1960s realized that almost any kind of international nuclear assistance is potentially useful to a nuclear weapons program.²⁶ Nuclear weapons — more than biological or chemical weapons, or missiles — require such precision in design and construction that any assistance, from technical information, to hints about solving technical problems (for example, how to shape the fissile core), to equipment or components — can be valuable to an aspiring nuclear weapons state. Therefore, nuclear weapon states, under Article I of the NPT, commit “not to transfer to any recipient whatsoever nuclear weapons or nuclear explosive devices or control over such weapons or devices, directly or indirectly; and not in any way to assist, encourage or induce any non-nuclear weapon state to manufacture or otherwise acquire nuclear weapons or nuclear explosive devices.”²⁷ In contrast to the obligation of the non-nuclear-weapon states under Article II not to receive nuclear weapons or related assistance, this commitment incurred no verification measures. In part, this omission may have rested on the assumption that holders of nuclear weapons technology would not impart the most sophisticated and directly weapons-relevant information to non-nuclear weapons states. Clearly, however, negotiators felt comfortable with focusing verification on the recipient states. All states are obliged under Article III, paragraph 2 of the treaty not to provide source or special fissionable material or equipment to any non-nuclear-weapon state unless the material is subject to IAEA safeguards.

Nuclear safeguards are the primary means “to establish and clarify the peaceful purpose of most international nuclear assistance.”²⁸ Not simply an invention of the NPT, safeguards existed in bilateral arrangements since the earliest nuclear trade as a way of preventing the misuse of material with obvious military applications. Beyond their technical importance in ensuring that states cannot develop nuclear

²⁴ (...continued)

116. The author cites State Department Study S/P-66-34-UNNC4.

²⁵ See CRS Report RL32745, *Pakistan's Nuclear Proliferation Activities and the Recommendations of the 9/11 Commission: U.S. Policy Constraints and Options*.

²⁶ Willrich, Mason, *Non-Proliferation Treaty: Framework for Nuclear Arms Control* (VA: The Michie Company, 1969), p. 94. Willrich was assistant general counsel at the US Arms Control and Disarmament Agency from 1962 to 1965.

²⁷ For more information on the obligations of nuclear weapon states under Article I and those of non-nuclear weapon states under Article III, see Shaker, Mohamed I., *The Nuclear Nonproliferation Treaty: Origin and Implementation, 1959-1979*, (NY: Oceana Publications, Inc., 1980) and Willrich, Mason, *Non-Proliferation Treaty*.

²⁸ Willrich, Mason, *Non-Proliferation Treaty*, p. 94.

weapons “the quick way,” safeguards have become the acid test for a state’s nonproliferation-worthiness. U.S. export control laws, arms export control laws and nonproliferation policies have incorporated the distinction between those states with full-scope safeguards (on all material in their state) and those without. Moreover, the international nuclear nonproliferation regime has taken its cues from laws and policies developed by the United States. When, for example, the Nuclear Suppliers’ Group adopted full-scope safeguards as a prerequisite for nuclear supply, it was adopting a policy that the United States had implemented a decade earlier. Since the discovery of the Khan network, efforts have accelerated to make the new nonproliferation acid test the adoption of the Additional Protocol.

At the same time, efforts to prevent proliferation have not blinded states to concerns about the safety and security of proliferant states’ nuclear weapons. To some observers, however, proposals to provide security and safety measures seem to be tainted by a certain hubris — that is, nuclear weapon states have considered themselves to be responsible with their nuclear weapons, whereas lesser industrialized states could not be as responsible.²⁹ Until China’s nuclear test, the only nuclear weapon states were those with large, industrial economies. To some extent, global concern about terrorism might lessen sensitivities about whether or not India or Pakistan “need” help. Nonetheless, repeated Pakistani officials’ statements to the press about the security of their arsenal appear to reflect a “hands-off” attitude, implying that Pakistan is quite able to protect and secure its own weapons.³⁰ India, for its part, has remained silent on the subject. More importantly, however, the sensitivity surrounding nuclear weapons is such that even between the closest of allies — for example, the United States and the United Kingdom — proposals to share permissive action links (PALs, which only allow authorized parties to arm the warhead) reportedly have been met with disinterest.³¹

U.S. Nonproliferation Laws

In the years following the first Indian nuclear test in 1974, it became clear that Pakistan was seeking to attain a nuclear weapons capability to counter what it perceived as the Indian threat. A 1976 cooperation agreement with China and nuclear shopping expeditions in Western Europe in the 1980s helped Pakistan’s program to forge ahead. Congress enacted the Glenn-Symington amendments in 1977 (amendments to the Foreign Assistance Act of 1961, Sec 669 and 670), which cut off aid to countries that imported enrichment or reprocessing capabilities. The Carter, Reagan and Bush (George Herbert Walker) administrations waived sanctions required by sections 669 and 670 because of Pakistan’s support to Afghan refugees

²⁹ Congressional hearings related to the Atomic Energy Act of 1954 reveal that the United States even had concerns about France and its drive for nuclear weapons.

³⁰ Pakistan’s Foreign Ministry issued the following statement: “Our nuclear assets are 100% secure, under multiple custody.” Kyoto News Service, October 2, 2001.

³¹ Stein, Peter and Feaver, Peter, *Assuring Control of Nuclear Weapons: The Evolution of Permissive Action Links*, Center for Science and International Affairs, CSIA Occasional Paper No. 2, Harvard University, 1987, p. 86. Stein and Feaver wrote that the United States attempted to describe PAL technology to the British, but they did not show a great deal of interest.

and guerillas. In 1985, Congress passed the Pressler amendment (Section 620(e)), which conditioned aid to Pakistan on a Presidential determination that Pakistan did not “possess a nuclear explosive device and that the proposed U.S. assistance program will reduce significantly the risk that Pakistan will possess a nuclear explosive device.” In 1990, shortly after the Soviets pulled out of Afghanistan, President Bush did not make that certification and aid to Pakistan was terminated.

Between 1990 and 1995, Pakistan and India were subject to the following restrictions: no U.S. assistance other than humanitarian or food aid, no military sales or financing, no US-government-backed credit or financial assistance, no U.S. support for international financial institutions’ loans, no U.S.-backed loans, no licenses for exports, and no assistance from the Export-Import Bank. In 1995, the Pressler amendment was modified to apply just to military assistance.

In 1998, with the nuclear tests, however, sanctions were tightened. President Clinton was required by law (Section 102b of Arms Export Control Act, or Glenn-Symington and Pressler amendments) to place sanctions on India and Pakistan as a direct result of their 1998 nuclear tests. Other countries also responded to the tests by imposing economic sanctions. Many of those states, including the United States, lifted sanctions quickly thereafter. Nonetheless, prohibitions regarding nuclear trade with countries are still in place.³² These prohibitions can be grouped into three categories: those related to cooperation on nuclear weapons themselves; those related to nuclear trade cooperation (for peaceful uses); and, those related to dual-use trade. These are discussed in detail in the section below on Constraints on U.S. Assistance.

Current U.S. Nonproliferation Policy

U.S. policy on South Asian nuclear proliferation presently is in limbo. The five nonproliferation benchmarks of behavior that were promulgated after the 1998 tests have not been articulated publicly since the end of 2000. These benchmarks, briefly, included

1. halting further nuclear testing and signing and ratifying the Comprehensive Test Ban;
2. halting fissile material production and engaging in negotiations in Geneva on a multilateral treaty to stop fissile material production for use in nuclear weapons;
3. refraining from deploying or testing missiles or nuclear weapons;
4. maintaining and formalizing export controls;
5. reducing bilateral tensions, including Kashmir.³³

Although India and Pakistan have not tested nuclear weapons since 1998, they are unlikely to sign and ratify the CTBT, particularly in the absence of U.S. ratification of the treaty. The Bush Administration will not pursue a Comprehensive Test Ban Treaty and although it has stated that it supports a fissile material production cutoff treaty, which has been on and off the Conference on

³² See CRS Report 97-343, *Proliferation Control Regimes*, and CRS Report RS20995, *India and Pakistan: Current U.S. Economic Sanctions*.

³³ See CRS Issue Brief IB94041, *Pakistan-U.S. Relations*.

Disarmament's agenda since 1993, statements in the summer of 2004 that such a treaty is inherently unverifiable are unlikely to move the process forward in Geneva. According to Assistant Secretary of State Christine Rocca, the administration is "working to prevent an open ended nuclear and missile arms race in the region, discourage nuclear testing, and prevent onward proliferation to other countries."³⁴

Currently, there may be more opportunities for the United States to exert leverage than in the past. New military cooperation and sharing of information on terrorism and in other areas may build trust between the United States and Pakistan and between the United States and India. However, it is not clear that that trust will extend to issues related to nuclear weapons, given the long U.S. history of trying to keep India and Pakistan from acquiring such weapons. On the other hand, Bush administration statements have tended toward a certain fatalism in the case of India's and Pakistan's nuclear weapons. For example, Assistant Secretary of State for Nonproliferation John Wolf remarked in 2002:

South Asia is a special case. They have weapons. We won't be successful in pressing them to beat them into plowshares, but we need to be more inventive in getting them to understand much better how to manage the dangers that the weapons pose. There are a variety of confidence building measures they could take bilaterally and unilaterally.³⁵

Constraints on U.S. Assistance

Constraints on U.S. assistance can be grouped into three categories. The first category encompasses legal prohibitions, embodied in international treaties and U.S. domestic law. While domestic laws can be changed, or provisions can be waived, international treaties are more difficult to amend. The second category includes technical limitations, given what little we know about Indian and Pakistani nuclear weapons and their secret nuclear facilities. In addition, assistance should be guided by the impact it would have on the technical capabilities of the Indian and Pakistani nuclear arsenals — that is, assistance should not advance the nuclear weapon programs of India and Pakistan, nor should it encourage testing, deployment or increased operational readiness. The third category covers political limitations, including Indian and Pakistani willingness to engage in cooperation and the impact of assistance on the nonproliferation regimes.

International Legal Constraints

The primary treaty constraint on the United States is found in Article I of the NPT. Article I requires nuclear weapon states to commit:

³⁴ Testimony of Christine B. Rocca before House International Relations Committee, "U.S. Interests and Foreign Policy Priorities in South Asia," June 22, 2004.

³⁵ John S. Wolf, "U.S. Approaches to Nonproliferation," Monterey Institute meeting, Stockholm, Sweden, September 6, 2002. See [<http://www.state.gov/t/np/rls/rm/13449.htm>]

not to transfer to any recipient whatsoever nuclear weapons or nuclear explosive devices or control over such weapons or devices, directly or indirectly; and not in any way to assist, encourage or induce any non-nuclear weapon state to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

Under Article I, the United States is prohibited from transferring to any state (nuclear weapon state, non-nuclear weapon state, party or non-party to the Treaty) nuclear weapons, nuclear explosive devices or control over such weapons or devices, directly or indirectly. It is not readily apparent what is meant by “control” over such weapons; a narrow interpretation would focus on the ability of another state to use such a weapon. The history of NPT negotiations reveals that concerns over transferring “control” over such weapons focused primarily on allies (e.g. NATO) being able to make command and control decisions for U.S. nuclear weapons deployed in Europe.³⁶

The second part of the obligation lies in not assisting, encouraging or inducing non-nuclear weapon states to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices. The negotiating history reveals that negotiators intended to interpret “manufacture” broadly, from the beginning of the acquisition cycle to the end.³⁷ Non-nuclear-weapon states party to the NPT are obligated not to seek or receive any assistance in the manufacture of such weapons under Article II.³⁸ Presumably, this would cover assistance that enhanced command and control of weapons, including permissive action link (PAL) technology. However, India and Pakistan, while they are legally non-nuclear weapon states, are not party to the NPT, and so are not bound by such an obligation.

As defined by paragraph 3, Article IX of the NPT, India and Pakistan are considered to be non-nuclear weapon states because they did not explode a nuclear device before 1967.³⁹ In the case of providing assistance to Russia, there was no parallel concern because Russia is a nuclear weapon state under the NPT.

It is difficult to interpret what might constitute a violation of Article I under the NPT. In the ratification hearings before Congress in 1968, U.S. administration

³⁶ See Willrich, *Nonproliferation Treaty*, p. 71 ff. Stein and Feaver argue that Permissive Action Links were introduced as a result of Congressional concern about loose command and control of U.S. nuclear weapons in Europe. See also Feaver, Peter Douglas, *Guarding the Guardians*, (NY: Cornell University Press, 1992), pp. 199ff.

³⁷ Willrich, *Nonproliferation Treaty*, pp. 91-93.

³⁸ “Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.” Article II of the Treaty on the Non-Proliferation of Nuclear Weapons.

³⁹ “For the purposes of this Treaty, a nuclear-weapon State is one which has manufactured or exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967.”

officials noted that the treaty does not specify what can be done, but rather what cannot be done. There is no currently publicly available legal view from the State Department on what might constitute a violation of Article I, but legal advisors have considered this question by examining precedents in the application of U.S. domestic law. In general, the closer assistance is attached to the nuclear weapons programs, the more likely that it could run afoul of U.S. legal obligations, both under international treaty obligations and domestic law. Thus, some kinds of aid (e.g., food or humanitarian aid) could be considered, in the extreme, to be assisting or encouraging a nuclear weapons program because they free up resources that the target government can put towards a nuclear weapons program but are permitted in practice because they do not have a close association with a nuclear weapons program. If assistance took the form of transferrable funds, however, the possibility of linkage to a nuclear weapons program might be considered to be greater.

Domestic Legal Constraints

As noted earlier, U.S. domestic law covers restrictions in the following areas: nuclear weapons cooperation, nuclear material trade, and dual-use exports. U.S. domestic laws have incorporated significant nonproliferation requirements over the years, which complicate cooperation with India and Pakistan.

The Atomic Energy Act. (as amended; 42 U.S.C. 2011 and following) governs the military and civil uses of nuclear energy, including those related to international cooperation. Prior to the development of international safeguards, U.S. law required that states receiving U.S.-origin nuclear material or equipment not retransfer it and place it under adequate physical security. The 1978 Nuclear Nonproliferation Act amended the AEA to require that significant cooperation, regardless of the purpose, requires an Agreement for Cooperation. The United States does not currently have an Agreement for Cooperation with India or with Pakistan.

Releasing Sensitive Information. Section 144 of the AEA covers the release of sensitive nuclear information. The Secretary of Energy may release Restricted Data on various aspects of the nuclear fuel cycle except those related to the design or fabrication of atomic weapons. The Secretary of Defense may exchange Restricted Data if it is necessary to a) develop defense plans; b) train personnel in employing and defending against nuclear weapons; c) evaluate the capabilities of potential enemies in employing nuclear weapons; d) develop compatible delivery systems for nuclear weapons. It is unlikely that any of these circumstances would develop in the case of cooperation with India or Pakistan.

The President can authorize the Secretary of Energy, with the assistance of the Department of Defense, to exchange Restricted Data on atomic weapons with another country provided that a) communication of Restricted Data is necessary to improve that nation's nuclear weapon design, development, or fabrication capability; AND b) that nation has made "substantial progress in the development of atomic weapons." When the language on "substantial progress" was added in 1954, the only nation that met the qualification was the United Kingdom. In general, most weapons-related data, including some on safety, security, fuze and firing, are classified as restricted data or formerly restricted data. Since it is not in the U.S. interest to improve India or Pakistan's nuclear weapons capability, and neither could be

considered to have made “substantial progress in the development of atomic weapons” according to the intent of the Atomic Energy Act, it is unlikely that the President would authorize such an exchange of Restricted Data under this provision of the Atomic Energy Act.

Agreements for Cooperation. The Atomic Energy Act was amended in 1978 by the Nuclear Nonproliferation Act (NNPA). Section 123 of the NNPA requires states with which the United States conducts significant nuclear trade to sign an Agreement for Cooperation. Examples of significant nuclear trade include provision of nuclear reactors, nuclear material or major reactor components.⁴⁰ The Nuclear Regulatory Commission regulates significant nuclear trade; the Department of Energy regulates the transfer of know-how, technology and technical services.

Section 123 of the NNPA requires recipient states that are “non-nuclear-weapon states” to maintain IAEA safeguards on “all nuclear materials in all peaceful nuclear activities on their territory.” Unless cooperation falls under the category of sale, lease or loan of non-nuclear parts of atomic weapons (which would require that the recipient nation has made “substantial progress in the development of atomic weapons” and that the transfer would not contribute significantly to that nation’s atomic weapon design, development, or fabrication capability), the recipient state must guarantee that “no nuclear materials and equipment or sensitive nuclear technology transferred under the agreement will be used for any nuclear explosive device, or for research on or development of any nuclear explosive device or for any other military purpose. In addition, the Secretary of State, who negotiates the Agreements for Cooperation, must provide a nuclear proliferation assessment statement (NPAS) to the President. The NPAS must analyze whether the proposed agreement is consistent with each of the criteria contained in Section 123 of the AEA and whether safeguards and other control mechanisms and the peaceful use assurances in the agreement for cooperation are adequate to ensure that any assistance furnished will not be used to further any military or nuclear explosive purpose.

The President may exempt a proposed agreement for cooperation from any of the specified requirements if he determines that including such requirements would be seriously prejudicial to achieving U.S. nonproliferation objectives or otherwise “jeopardize the common defense and security.” There is no precedent for exempting an agreement from the full-scope safeguards requirement.

Section 128 of the NNPA describes the conditions for terminating U.S. cooperation. It states that

No nuclear material and equipment or sensitive nuclear technology shall be exported to: (1) any non-nuclear-weapon state that is found by the President to have, at any time after March 10, 1978 a) detonated a nuclear explosive device; or b) terminated or abrogated IAEA safeguards; or c) materially violated an IAEA safeguards agreement; or d) engaged in activities involving source or special nuclear material and having direct significance for the manufacture or

⁴⁰ Major reactor components include primary coolant pumps, pressure vessels, control rod drive systems, and on-line fuel charging and discharging equipment for CANDU reactors.

acquisition of nuclear explosive devices, and has failed to take steps which, in the President's judgment, represent sufficient progress toward terminating such activities...

Export Regulations. Transfers of nuclear-related equipment or nuclear material that do not meet the requirement for an agreement of cooperation could possibly still require full-scope safeguards as a condition of supply under the Nuclear Suppliers' Group (NSG) guidelines. Since 1992, NSG member states have required full-scope safeguards as a condition for supplying items on the NSG "trigger list."⁴¹ In addition, the Department of Commerce requires a license for exporting items on the NSG's dual-use list (those with nuclear and other applications) to states outside the NSG. Neither India nor Pakistan is a member of the NSG.

U.S. export regulations function in several tiers. The Commerce Control List specifies what items are regulated and why, but an equally important consideration is the question of the end-user. One technique for streamlining the export control system and making it more understandable for exporters was the development of the entities lists. The Department of Commerce maintains a list of entities subject to license requirements (see Supplement 4 to Part 744 of the Export Administration Regulations). At present, the entities of proliferation concern are located in China, India, Israel, Pakistan, and Russia.

In response to the sanctions imposed on India and Pakistan after the 1998 nuclear tests, the number of Indian and Pakistani organizations listed on the entities list grew dramatically. At the time, the Department of Commerce policy was to deny licenses for exports to India and Pakistan of items controlled for nuclear nonproliferation or missile technology reasons, and presume to deny items on the Commodity Control List to Indian and Pakistani military entities. In 2001, these restrictions were lifted when the President determined that sanctions were not in the national security interest of the United States.⁴² Exports of items controlled for nuclear proliferation and missile technology reasons are reviewed on a case-by-case basis.

Currently, Indian nuclear-related facilities on the entities list include:

- Bhabha Atomic Research Center (BARC)
- Indira Gandhi Atomic Research Center
- Indian Rare Earths

⁴¹ The "trigger list" governs the "export of items that are especially designed or prepared for nuclear use. These include (i) nuclear material; (ii) nuclear reactors and equipment therefor; (iii) non-nuclear material for reactors; (iv) plant and equipment for the reprocessing, enrichment and conversion of nuclear material and for fuel fabrication and heavy water production; and (v) technology associated with each of the above items." The "dual-use" list governs the export of nuclear related dual-use items and technologies, that is, items that can make a major contribution to an unsafeguarded nuclear fuel cycle or nuclear explosive activity, but which have non-nuclear uses as well, for example in industry. See [<http://www.nsg-online.org/guide.htm>].

⁴² *Federal Register*, Vol. 66 No. 190, October 1, 2001, p. 50090.

- Nuclear reactors, fuel reprocessing and enrichment plants, heavy water production facilities and their co-located ammonia plants

The Pakistani nuclear-related facilities that currently appear on the entities list include:

- AQ Khan Research Laboratories
- Pakistan Atomic Energy Commission (PAEC) and subordinate entities, including National Development Complex, nuclear reactors, fuel reprocessing and enrichment facilities, all uranium processing, conversion and enrichment facilities, heavy water production facilities and any co-located ammonia plants, Pakistan Institute for Nuclear Science and Technology (PINSTECH)

It appears that equipment, material or information exported for the purposes of cooperative nuclear threat reduction would need to be licensed if it was destined for the facilities listed above. All of the facilities are unsafeguarded and all are sensitive sites. On the other hand, such sites may have good security already, since they are associated with the nuclear weapons programs.

A potentially greater concern is how the United States' unwritten policy of not supplying any items to unsafeguarded nuclear facilities would fit with exports to India and Pakistan under a CTR-like program. Under the 1990 Enhanced Proliferation Control Initiative (EPCI), the Department of Commerce can impose licensing requirements on exports and reexports of goods and technology that would normally be uncontrolled where there is an unacceptable risk of diversion to activities related to nuclear, chemical or biological weapons or missile proliferation. U.S. exporters are required to apply for a license if they have knowledge of or have reason to know that such exports will be used directly or indirectly in any one of the following activities: nuclear explosive activities, unsafeguarded nuclear activities, or safeguarded and unsafeguarded activities to produce special nuclear material (through reprocessing or enrichment), produce heavy water or fabricate nuclear fuel that uses plutonium. Section 744.2 of the Export Administration Regulations provides eight criteria for assessing license applications. Potentially, the most significant of these criteria is the nonproliferation credentials of the importing country, which include whether the state adheres to the NPT, has full-scope safeguards, and has an agreement for cooperation with the United States and whether the actions, statements, and policies of the state support nuclear nonproliferation.⁴³

⁴³ Paragraph 744.2 (d) License Review Standards for Restrictions on Certain Nuclear End-Uses, Part 744 of Export Administration Regulations. Factors used by the United States to determine whether to grant or deny license applications include (paraphrased here): 1) whether the items/software/technology are appropriate for stated end-use and end-user; 2) significance for nuclear purposes of items; 3) whether the items will be used in connection with reprocessing or enrichment; 4) types of assurances against nuclear explosive purposes or proliferation; 5) whether end-user has been involved in clandestine/illegal procurement; 6) whether previous applications have been denied or diversions have taken place; 7) whether the export would present an unacceptable risk of diversion to a nuclear explosive activity or unsafeguarded nuclear fuel-cycle activity; and 8) nonproliferation credentials, (continued...)

Technical Constraints

Descriptions of the Indian and Pakistani nuclear weapons programs are incomplete and their accuracy is not reliable. Although the two states have exchanged lists of nuclear facilities since 1991 as part of a confidence-building effort, critics charged that the lists initially were incomplete. More is known about fissile material production sites than weapons machining or assembly sites, but overall there is a high level of secrecy attached to both nuclear weapons programs. Without knowledge of where vulnerabilities lie, it will be difficult to target even the most rudimentary assistance. In the case of Russia and the NIS, U.S. government officials have complained for years that Russia has not provided the kinds of access necessary for the United States to ensure that its goals are being met. With respect to the material protection, control and accounting programs, most of the material, according to one report, remains outside of the program because the United States cannot gain access to sensitive facilities.⁴⁴

A significant concern is whether U.S. assistance, if it is targeted at making nuclear weapons more secure from unauthorized use, would improve Indian or Pakistani nuclear weapon capabilities. Permissive action links, which were developed by the United States in the 1960s, were designed so that unauthorized users would not be able to produce a nuclear yield from the weapon. As one observer has remarked, however, another intended consequence is that weapons with PALs on them are more deployable. One of the goals of U.S. nonproliferation policy presently is to keep India and Pakistan from deploying their weapons.

Political Constraints

U.S. assistance is likely to be a sensitive issue for the Indian and Pakistani governments. Neither state will want to be seen as needing assistance. India has refused to participate in technical cooperation programs with the IAEA except on a regional basis precisely for this reason. On the other hand, India has welcomed talks with the United States on reactor safety and a U.S. delegation traveled to India in 2003 for meetings on that topic. It may be possible to make such assistance less sensitive if it is focused on physical security of the nuclear fuel cycle and not linked to nuclear weapon capabilities. Pakistani officials have been quite vocal in insisting that their nuclear assets are safe and secure and that U.S. assistance is not required. However, one Indian report noted that the Pakistani Foreign Office spokesperson Aziz Ahmed Khan admitted that the U.S. had offered to train Pakistani personnel on

⁴³ (...continued)

based on a) adherence to NPT or international nuclear nonproliferation agreement; b) full-scope safeguards or equivalent; c) agreement for cooperation with US; d) whether state supports nuclear nonproliferation; e) degree to which state cooperates in nonproliferation policy; and f) intelligence data on state's nuclear intentions and activities.

⁴⁴ U.S. General Accounting Office, *WMD: Reducing the Threat from the Former Soviet Union: An Update*. GAO/NSIAD-95-165, June 1995.

safety and security of nuclear assets.⁴⁵ A Pakistani report in early February 2003 stated that “General Musharraf’s decision to assume control of the Nuclear Command Authority has prompted the Bush Administration to ask Islamabad for installation of U.S. nuclear weapon command and control.”⁴⁶ According to some government officials, U.S. assistance needs to have a low profile in order to succeed.

Another constraint is the current level of cooperation between the United States and India and Pakistan. Although Pakistan has been cooperating closely with the United States in the war on terrorism, the United States has been pushing for both nations to give up their nuclear programs for almost thirty years. Perceptions of mistrust may be difficult to overcome, impeding the level of cooperation that may be needed. Following Operation Enduring Freedom in Iraq, some in Pakistan apparently are wondering whether Pakistan could be the next target of U.S. counterproliferation efforts. Qazi Hussain Ahmed, leader of Pakistan’s largest Islamist party, told Reuters in April 2003 that “Thinking that our turn will not come is like closing your eyes to the truth.”⁴⁷ On the other hand, the Bush Administration did not impose sanctions on Pakistan for aiding North Korea’s clandestine uranium enrichment program, and has not pressed the Pakistani government for direct access to A.Q. Khan, both of which could be interpreted by Pakistan as reluctance by the Bush Administration to upset relations.⁴⁸ In addition, the designation of Pakistan in 2004 as a major non-NATO ally has probably also bolstered Pakistan’s confidence in the United States.

On the whole, despite some progress in Kashmir, there are still few indications that India or Pakistan would want to enhance transparency to build confidence, either with each other or with the United States. Between the two states, there appears to be more interest in threat enhancement than threat reduction. In addition, Pakistan’s reliance on foreign procurement sources could also make transparency measures difficult. A culture of secrecy for India and Pakistan, not easily overcome in the case of Russia, may be difficult to transcend. On the other hand, professional pride in their accomplishments may provide some leverage for scientists’ or military officials’ cooperation.

Policy Options

The legal, technical, and political constraints described above appear to foreclose assistance that would directly involve a) access to nuclear weapons; b) measures that would enhance operational capabilities of nuclear weapons; c) direct access to sensitive nuclear facilities. Senator Lugar suggested in November 2004 that “We can promote exchanges between Pakistani and Indian security experts, and offer assistance on export controls, border security, and the protection, control and

⁴⁵ “Pak. ‘No’ to Joint Nuke Command with U.S.,” *The Hindu*, February 22, 2003.

⁴⁶ Ibid, quoting the February 6-12, 2003 Pakistan English weekly *Independent*.

⁴⁷ “Pakistanis wonder — will they face Iraq’s fate?” *Reuters*, April 21, 2003.

⁴⁸ “Nuclear proliferation: North Korea and Pakistan,” *International Herald Tribune*, April 21, 2003.

accounting of nuclear arsenals. This will require some diplomatic and administrative skill to stay within our NPT obligations.”⁴⁹ The measures outlined below are limited but feasible and could help mitigate some aspects of the nuclear threat in India and Pakistan.

Site Security

Improving site security would help guard against the threat of weapons or materials or components leaving a sensitive site either through theft by someone within the facility (a worker) or from outside theft. Perimeter security measures, such as gates and other barriers like barbed wire and personnel identification systems, can help minimize the threat of unauthorized entry. Sensors to detect unauthorized actions (movement, tampering) can help against both insider and outsider threats. Measures to protect against inside theft include checks on personnel leaving facilities (typically onerous without technical detection measures for material or components), cameras in sensitive areas and accounting and access procedures. Armed guards could help, as would operational and administrative controls.

In the Russian case, U.S. officials toured sites and conducted vulnerability assessments. Even perimeter visits would likely be viewed as too sensitive by India and Pakistan. However, the United States could offer information or briefings on how security is conducted at sensitive (not necessarily nuclear) facilities in the United States. Ideally, assistance could cover types of requirements for personnel vetting and training and development of a security culture. As noted above, assistance of this kind has been provided under IAEA auspices. If materials, such as cameras or sensors, were intended to be installed at unsafeguarded facilities, they would likely require licenses. It is likely, however, that commercial versions of security systems would be cheaper and more palatable for India and Pakistan to install themselves if they are not already present.

Material Security

Measures to enhance material security generally fall into the category of material protection, control and accounting (MPC&A). In some cases, securing material in a storage site with tamper-proof seals, cameras, and other monitoring techniques is adequate, but most often the material is intended to be used in processes (like enrichment or reprocessing, or fuel fabrication). This requires a system of accounting and control that can follow material flows. International safeguards rely heavily on state systems of accounting and control (SSACs) in measuring physical inventories of materials. Some technical exchanges in these areas may be possible. Some new techniques for securing material in place could be shared (one innovative approach used in Russia was placing heavy cement blocks over plutonium containers). Pakistan’s and India’s participation in multilateral programs on physical protection of material could be encouraged as well as their participation in experts’ training sessions conducted by Sandia National Laboratory on physical protection (Indian experts attended one in May 2002). It is also possible to provide equipment for physical protection (cameras, seals, locks, or barriers) under license.

⁴⁹ See [<http://www.lugar.senate.gov/nunnlugar.html>]

Nuclear Weapons Security

Assistance on nuclear weapons security would be extremely limited if it were considered desirable. The objective of such measures would be to ensure that weapons could not be stolen or detonated by an unauthorized person. Again, the simplest measures are armed guards; undoubtedly both India and Pakistan are aware of the advantages of protecting their nuclear weapons. Advice or equipment to ensure no unauthorized use of nuclear weapons, such as PALs, would require access to nuclear weapons. General information on permissive action links, such as concepts or approaches, is publicly available and would not require access to weapons. In all likelihood, however, both India and Pakistan have probably exhausted public sources of information on that topic. Beyond the warheads themselves, measures to ensure that command and control systems work would also help ensure no unauthorized use, but could possibly enhance operational capabilities.

Personnel Security

The types of measures for personnel security that could be implemented absent Pakistani and Indian disarmament are limited. Obviously, if there are ongoing nuclear weapons programs, the two governments are unlikely to welcome proposals to divert their scientific expertise into civilian enterprises. However, there are clearly training programs in physical security and personnel vetting that could provide more security to those nuclear programs without enhancing their nuclear deterrents in a way that would contravene the NPT. Strictly civilian cooperation could have a positive spillover effect. On January 12, 2004, President Bush announced a new strategic partnership with India, to cooperate in three areas: civilian nuclear technology, space technology and high-technology trade.⁵⁰ U.S. officials reportedly stated that any civilian nuclear technology must not be used in India's nuclear weapons program, although it is unclear how that would be achieved.⁵¹ Reportedly, cooperation has allowed for exports to safeguarded nuclear facilities.⁵² This program might have the potential to develop relationships with Indian scientists that would benefit any future, more intrusive cooperative threat reduction program.

With respect to Pakistan, assistance may be more difficult. Pakistan has denied U.S. officials direct access to AQ Khan, and although this might be an exception because of Khan's unique status, it could also become the rule. Pakistani officials, both with respect to the nuclear arsenal and nuclear scientists, appear to have taken a "hands-off" attitude.⁵³

⁵⁰ See [<http://www.whitehouse.gov/news/releases/2004/01/20040112-1.html>] for press release.

⁵¹ "U.S. to Send India Nuclear, Space Technology," *Washington Post*, January 13, 2004.

⁵² See [<http://www.state.gov/r/pa/prs/ps/2004/36290.htm>].

⁵³ Pakistan's Foreign Ministry issued the following statement: "Our nuclear assets are 100% secure, under multiple custody." *Kyoto News Service*, October 2, 2001.

Issues for Congress

Costs

India's and Pakistan's nuclear programs are far smaller than Russia's and unlikely to incur the kinds of costs that the CTR program has thus far incurred. On the other hand, data are scarce on the state of nuclear materials in India and Pakistan, so it is difficult to determine the scope and time frame of any such program. At a minimum, however, such a program is likely to be incrementally implemented. Costs could be minimal if a quick-fix, low-technology, information-oriented approach is taken or they could be more substantial if a sophisticated, high-technology approach is taken that would incorporate cameras, encryption, remote monitoring, and other means.

Certifications

In 1991, the legislation that created the Nunn-Lugar program stipulated that U.S. assistance in destroying nuclear and other weapons may not be provided to the Soviet Union, any of its republics or successor entities unless the President certifies to the Congress that the proposed recipient is committed to:

- making a substantial investment of its resources for dismantling or destroying such weapons;
- forgo any military modernization that exceeds legitimate defense requirements or is designed to replace destroyed WMD;
- forgo the use of fissile materials and other components from destroyed nuclear weapons in new nuclear weapons;
- facilitate U.S. verification of weapons destruction that uses U.S. money;
- comply with all relevant arms control agreements; and
- observe internationally recognized human rights, including the protection of minorities.

Initially, Presidents George H. W. Bush and Clinton certified that the recipient nations — Russia, Ukraine, Belarus, and Kazakhstan — met those conditions. The Clinton Administration withdrew its certification of Belarus for human rights abuses in FY1998 and the George W. Bush administration withdrew its certification of Russia in 2002 for its failure to comply with arms control agreements, namely, the Chemical Weapons Convention and the Biological Weapons Convention. The Bush Administration subsequently requested a waiver from Congress for the certification.

It is not clear whether Congress would opt to apply the same certification requirements to recipient states outside the former Soviet Union. However, S. 2980, which was introduced by Senator Lugar in the 108th Congress, sought to remove the need for certifications, as well as other restrictions. The 109th Congress may consider this issue more fully if legislation is once more introduced.

Other Considerations

U.S. nonproliferation laws have been strengthened over the years, first to account for states that were not parties to the NPT, then to target critical capabilities like enrichment and reprocessing, and finally, to target the transfer of nuclear weapons or actual detonation of a nuclear explosive device. Once a state has exceeded the maximum prohibition (i.e., possession or detonation of a nuclear device), a logical question to ask is whether lesser restraints (for example, in providing nuclear technology not directly related to nuclear weapons) are necessary or useful. Applied more broadly to overall nonproliferation policy, some observers have argued that the nuclear weapons “cat” is out of the bag and U.S. policy should reorient itself to “manage” the nuclear situation in South Asia. At its extreme, this approach would include accepting the nuclear weapons status of India and Pakistan and relaxing all restrictions. Other observers have argued that the purpose of restraints was to inhibit proliferation and that relaxing the rules for “successful” states would set a bad precedent and result in the collapse of the nonproliferation regime.

A broader issue is whether the United States should strive for consistency in the treatment of states’ WMD programs. Although India, Pakistan, and Israel are not parties to the NPT and therefore have not violated any treaties, their nuclear weapons programs conflict with U.S. nonproliferation objectives and policies. Assistance to countries outside the NPT may be viewed as a “wink and a nod” to nuclear weapons development. At the same time, the use of military force to disarm Iraq of its weapons of mass destruction provides a strong counterpoint to such assistance. As such, this could threaten international consensus to combat nuclear proliferation. Should the United States move in the direction of accepting Indian and Pakistani nuclear weapons status, say some observers, would there be pressure to do the same for Israel? If so, such action could have a significant impact on security and stability in the Middle East.

Other considerations include tradeoffs between nonproliferation policy and counterterrorism cooperation, as well as the promotion of democracy. On January 24, 2005, Senator Biden introduced S. 12, the Targeting Terrorists More Effectively Act of 2005. The bill identifies proliferation of nuclear weapons and promotion of democracy as two of several issues that threaten the United States’ relationship with Pakistan. The bill would authorize \$10M in the Nonproliferation, Anti-Terrorism, Demining and Related Programs account (State) to be spent in Pakistan, but would bar any military or economic assistance appropriated for the fiscal year “unless the President submits to Congress for such fiscal year a certification that no military or economic assistance provided by the United States to the Government of Pakistan will be provided, either directly or indirectly, to a person that is opposing or undermining the efforts of the United States Government to halt the proliferation of nuclear weapons.”

S. 12 does not contain similar prohibitions for the lack of progress in the promotion of democracy. Although the National Intelligence Reform Act of 2004 (PL 108-458), signed on December 17, 2004, extended the President’s authority to waive coup-related sanctions for Pakistan through FY2006, it may be necessary for the 109th Congress to revisit this issue for FY2007. On the same day PL 108-458 was

signed, President Musharraf announced he would remain chief of the army beyond the end of 2004. Although the 9/11 Commission Report specifically noted that keeping nuclear capabilities out of the hands of terrorists depends critically on supporting Musharraf's vision of a moderate, modernizing Islamic state, President Musharraf has done very little to move his country toward more democratic rule.