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## **Nuclear Nonproliferation Issues**

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## Nuclear Nonproliferation Issues

### SUMMARY

The United States has been a leader of worldwide efforts to prevent the spread of nuclear weapons. To this end, the international community and many individual states have agreed to a range of treaties, laws, and agreements known collectively as the nuclear nonproliferation regime, aimed at keeping nations that do not have nuclear weapons from acquiring them.

The nonproliferation regime has also been concerned with preventing terrorists from obtaining nuclear weapons or the materials to craft them. The attacks on New York and Washington of September 11, 2001, added a new level of reality to the threat that terrorists might acquire a nuclear weapon and explode it in a populated area.

Other nonproliferation concerns include a number of regional focal points. North Korea's claim that it possesses nuclear weapons and is pursuing more has led to a diplomatic crisis. In the Middle East, Iran's nuclear weapons development remains a threat. Libya's voluntary revelation of its covert nuclear weapons program reinforced the fear that nations may develop weapons without being discovered. The continuing confrontation between India and Pakistan is made more dangerous by their possession of nuclear explosives. There is concern about Chinese and Russian activities that may encourage proliferation in the other regions.

Disposing of plutonium and highly enriched uranium from dismantled Russian

nuclear weapons, while preventing it from falling into the hands of terrorists or other proliferators, is another current focus of nonproliferation activities. In the longer term, the major question is fulfilling the pledge in the Nuclear Nonproliferation Treaty (NPT) by the nuclear weapons states, including the United States, to pursue complete nuclear disarmament, in the face of skepticism about the possibility, or even the wisdom, of achieving that goal.

The terrorist attacks of September 11 added the suddenly more realistic threat of an even more unimaginable assault with a nuclear explosive. While terrorists had not been ignored in nonproliferation efforts, particularly with regard to Russian nuclear materials, the major focus before the attacks had been on preventing nation-states from developing weapons capabilities. While many features of the nonproliferation regime, such as export controls and monitoring, are applicable to the terrorist threat, some shift in focus has been necessary.

Numerous U.S. agencies have programs related to nuclear nonproliferation, but the major activities are carried out by the Departments of State, Defense, and Energy. DOE's program is part of the National Nuclear Security Administration, which is responsible for the management of the U.S. nuclear weapons program.

## **MOST RECENT DEVELOPMENTS**

In December 2003 Libyan leader Moammar Gadhafi announced that Libya was ending a heretofore clandestine nuclear weapons program and invited IAEA inspectors to view the sites of activity. (See “Nuclear Program in Libya Revealed.”)

On February 11, 2004, President Bush urged a number of new initiatives in response to the revelation that Pakistan’s nuclear weapons technology and equipment had been sold to Iran, Libya, and North Korea. One of his recommendations was ratification of the “Additional Protocol” regarding the inspection agreement with the IAEA, which the Senate agreed to on March 31. Secretary of Energy Spencer Abraham followed up in May with the announcement of a U.S. Global Threat Reduction Initiative aimed at repatriating highly enriched uranium from foreign nuclear research reactors. (See “Presidential Nonproliferation Policy.”)

On June 18 the IAEA Board adopted a resolution noting progress with Iran in answering questions about its nuclear program but deploring Iran’s lack of full cooperation and urging resolution of the issue within a few months. (See “Iran’s Nuclear Program.”)

## **BACKGROUND AND ANALYSIS**

### **Nuclear Nonproliferation Policy**

One of the enduring nightmares of the post-Cold War world has been that terrorists might obtain a nuclear weapon, or the materials to craft one. For many, this nuclear nightmare was tempered by disbelief that terrorist organizations would be capable of exploding a nuclear device in a populated area, and merciless enough to carry out such an assault. The attacks on the World Trade Center and the Pentagon cast serious doubt on such reassuring assumptions.

While attention may have been redirected to the terrorist threat, other concerns about the proliferation of nuclear weapons have not been diminished. The United States has long been a leader of worldwide efforts to prevent the spread of nuclear weapons to additional nations, as well as to nongovernmental entities. Since the 1950s these nonproliferation efforts have built up a broad international structure, including treaties, international organizations with inspection mechanisms, and other agreements, complemented by wide-ranging domestic legislation.

The centerpiece of this structure is the Nuclear Nonproliferation Treaty (NPT). Under the terms of the NPT, the five declared nuclear weapons states — the United States, the United Kingdom, Russia, France and China — agreed “not in any way to assist” any non-weapons state to acquire nuclear weapons. They also agreed to reduce and eventually eliminate their own nuclear arsenals. Non-weapons states agreed not to develop nuclear weapons and to allow the International Atomic Energy Agency to inspect their nuclear facilities and materials to ensure that peaceful nuclear technology is not diverted to military purposes. The NPT also guarantees non-weapons states access to peaceful nuclear technology. Since the end of the Cold War, participation in the NPT has been almost

universal. Except for India and Pakistan, whose pursuit of nuclear weapons capabilities and 1998 tests of nuclear explosives are a principal nonproliferation concern, only Israel has not signed the NPT.

Beyond the NPT, the United States relies on various positive and negative incentives to persuade countries that may be interested in nuclear weapons not to acquire them. For countries facing security threats, the United States has provided security guarantees in the form of alliances that address the underlying motivation to acquire nuclear weapons. Both Japan and Germany, for example, had nuclear weapons programs during the Second World War and might have continued to pursue nuclear weapons after the war if the United States had not included them as allies. After the Cold War, Ukraine, Belarus, and Kazakhstan relinquished their nuclear capabilities to ensure good relations with the West.

Another important nonproliferation tool is technology denial. The United States and other suppliers of nuclear technology try to prevent countries that are trying to develop nuclear weapons from buying the equipment they need to produce nuclear weapons. This activity is particularly focused on Russia and former Soviet republics, where loose controls on nuclear technology, materials, and expertise could result in their being purchased or stolen by those seeking nuclear weapons. The United States has obligated over \$3 billion since the end of the Cold War helping those countries improve security for nuclear assets, and current programs among three Federal agencies now total almost \$1 billion per year.

Sanctions are another way the United States has tried to deter and punish proliferators. Sanctions can cut off U.S. aid, economic assistance, military cooperation, and technology access to countries that violate nonproliferation agreements or take steps, such as testing nuclear weapons, that threaten U.S. national security objectives. However, sanctions are sometimes controversial. The executive branch sometimes prefers not to impose sanctions to avoid damaging relations with other countries, and Congress has sometimes relaxed sanctions, such as those imposed on India and Pakistan after they tested nuclear weapons.

Finally, the Department of Defense tries to deter acquisition and use of nuclear weapons by maintaining a strong military force. If nonproliferation and deterrence fail, the Defense Department could be ordered to use military force to destroy weapons of mass destruction. The military component of nonproliferation policy is often called counterproliferation.

Nonproliferation efforts have been concerned with three major types of problems. In the short term they focus on a number of regional crisis points: the India-Pakistan arms race, North Korea, and the Middle East, primarily Iraq, Iran, and Israel. There is concern also about China's actions in expanding its nuclear force, and of Chinese and Russian activities that may encourage proliferation in the other regions. A second problem is the disposal of plutonium and highly enriched uranium from dismantled Russian nuclear weapons, while preventing it from falling into the hands of terrorists or other proliferators. In the longer term, the major problem is fulfilling the pledge in the NPT by the nuclear weapons states, including the United States, to pursue complete nuclear disarmament, in the face of skepticism about the possibility, or even the wisdom, of achieving that goal.

To these concerns was added a suddenly more realistic threat that terrorists, having achieved such shocking devastation in the destruction of the World Trade Towers in New York, may be tempted to carry out an even more unimaginable assault with a nuclear

explosive. While terrorists had not been ignored in nonproliferation efforts, particularly with regard to Russian nuclear materials, the major focus was on preventing nation-states from developing weapons capabilities. While many features of the nonproliferation regime, such as export controls and monitoring, are applicable to the terrorist threat, some shift in focus has been necessary.

## **International Nonproliferation Structures and Organizations**

### **The International Nuclear Nonproliferation Regime**

The nuclear nonproliferation regime to deter further spread of nuclear weapons consists of treaties, international organizations, and multilateral and bilateral agreements, augmented by various unilateral actions intended to prevent further proliferation.

Major components of the regime include:

- The Nuclear Nonproliferation Treaty (NPT), which entered into force in 1970. It commits non-nuclear weapons members not to acquire nuclear weapons, and to allow international inspection of all their nuclear activities to verify this commitment. It commits nuclear weapons states not to assist non-weapons states to develop nuclear weapons, and to pursue the goal of an end to the nuclear arms race and eventually to nuclear disarmament.
- The International Atomic Energy Agency (IAEA), an international organization of the United Nations, established in Vienna, whose safeguards system verifies NPT compliance. Non-weapons NPT parties negotiate inspection agreements with the IAEA to verify the peaceful use of their nuclear materials.
- Informal international groups, including the Nuclear Suppliers Group (NSG), a committee of nuclear supplier nations that maintains multilateral guidelines for nuclear exports, and the Zangger Committee, an NPT affiliate that maintains a “trigger list” of nuclear items requiring safeguards. The NSG and Zangger guidelines were strengthened in 1992, after the Gulf War and the crisis with Iraq’s nuclear weapons program. The Missile Technology Control Regime (MTCR), which restricts exports of nuclear-capable missiles, is another component of the nonproliferation structure. (For more details on these entities, see CRS Report RL31559, *Proliferation Control Regimes: Background and Status*.)
- The Convention on Physical Security for Nuclear Materials (1987) sets international security standards for storing, using, and transporting nuclear materials.

## The Nonproliferation Treaty and the IAEA

The NPT provides the legal and institutional basis for international nonproliferation policy. Like all international agreements, it depends for its success on the good will of its participants, and does not guarantee that countries will not violate their commitments. However, to reinforce the good intentions of the signatories, the NPT set up an inspection system called safeguards, based on agreements between non-weapons states and the IAEA that permit routine inspections. The IAEA has no enforcement power; it can only report discrepancies to the U.N. By presenting the prospect that clandestine proliferation activities will be detected and exposed, the inspection system is designed to deter proliferation through international pressure, disapproval, and possible sanctions and countermeasures.

In order to prevent proliferation, IAEA inspections must be effective, and the prospect of international disapproval strong enough to deter a non-weapons NPT member from pursuing nuclear weapons development. Since the Gulf War, efforts to strengthen IAEA inspection powers have been underway, culminating in May 1997 with the adoption of a “model protocol” agreement intended to give inspectors more access to a wider array of activities, information, and facilities.

**IAEA Inspections.** In the aftermath of the 1991 Persian Gulf War, U.N. inspectors were surprised at the scope of Iraq’s nuclear weapons program and the progress Iraq had made toward obtaining nuclear weapons despite regular IAEA inspections. A major weakness in the existing system was that inspectors only inspected sites and facilities listed in the safeguards agreements with the agency. The Strengthened Safeguards System adopted at the May 1995 NPT extension and review conference gives inspectors strengthened ability to detect clandestine nuclear activities. Strengthened safeguards include taking environmental samples, no-notice inspections of nuclear facilities, complete access to records to confirm that all nuclear materials have been declared, and remote and unattended monitoring. A new modification to IAEA safeguards agreements with member states requires an “expanded declaration” by all NPT members of nuclear-related activities such as uranium mining. It also authorizes IAEA access to any place. Implementation of the strengthened safeguards system has been slow, but by October 2002, 67 countries had signed the additional protocol and in 28 the system had gone into effect. In dealing with Iran’s suspected nuclear weapons program, the IAEA has been pressing for Iran to accept the enhanced inspections included in the Additional Protocol. (See Iran’s Nuclear Program.)

**Enforcement.** Even if IAEA inspectors detect clandestine nuclear weapons activity, the NPT contains no formal provisions for forcing a country to abandon the activity. Iraq’s nuclear program was dismantled because U.N. forces militarily defeated Iraq after driving it out of Kuwait in 1991. In the absence of such military force a defiant NPT signatory could presumably continue its activities if it were willing to resist nonmilitary international pressures and disapproval. North Korea, in the inspection crisis prior to the Agreed Framework that was reached in 1994, violated its obligations and announced that it was withdrawing from NPT. The Security Council did not take decisive action to enforce the NPT. North Korea reversed its decision only after being promised two nuclear power reactors and shipments of fuel oil. That agreement is now in limbo following North Korea’s resumption of its nuclear weapons program. (See Proliferation Crisis in North Korea, below.)

The efforts of the nonproliferation regime to prevent the spread of nuclear weapons have not been without critics. Some view IAEA activities as ineffectual and toothless, easy to evade by an entity determined to develop nuclear weapons capability. Nor is the NPT system without its critics among non-nuclear-weapons nations.

## **NPT “Discrimination”**

Despite the successful recruitment of almost all nations into the NPT, and the agreement in 1995 to make it permanent, a current of discontent exists about the difference in treatment of the five declared nuclear weapons states — who get to keep their weapons — compared with all the rest.

**The Nuclear Bargain: Atoms for Peace.** Part of the discontent derives from the changed prospects of commercial nuclear power. When the NPT was negotiated, peaceful nuclear power was viewed as a technology with great economic potential for all countries, both industrialized and developing. Joining the NPT was a quid pro quo under which non-weapons states renounced nuclear weapons in return for obtaining access to the technology and materials necessary to exploit commercial nuclear power — a concept that goes back to President Eisenhower’s 1954 “Atoms for Peace” initiative. However, the economic advantage of nuclear power has declined significantly since then. Nuclear power is important in many countries, but is under strong competition from other energy sources. The high capital cost of nuclear powerplants, and the technical skills required to operate them safely and economically, have been major barriers to use of nuclear energy by developing countries, even where the main alternatives are coal and imported fossil fuels. This part of the NPT bargain has thus not been very rewarding for many non-weapons states, although they continue to receive assistance in the uses of nuclear technology in medicine, agriculture, and scientific research.

**The Nuclear Bargain: Disarmament.** Another part of the original NPT bargain was a promise by all signatories, including the weapons states, to “pursue negotiations in good faith” for the “cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control” (Article VI). At the time the NPT was negotiated, the first goal, an early end to the arms race between the United States and the Soviet Union, must have seemed unlikely, nuclear disarmament unattainable in the foreseeable future, and “general and complete disarmament” altogether utopian.

The nuclear powers did pursue negotiations over strategic arms limitations in the 1970s and 1980s, and the abrupt end of the Cold War and the collapse of the Soviet Union made deep reductions in nuclear armaments possible. However, some non-weapon NPT states want more progress toward the goal of nuclear disarmament.

The major vehicle for efforts in this direction in the 1990s was a treaty banning nuclear tests. The treaty would essentially confirm the moratorium on nuclear testing that all the weapons states, including the United States, were observing. However, when the Comprehensive Test Ban Treaty (CTBT) was finally negotiated and signed, and submitted to the Senate by President Clinton in September 1997, it was controversial (see CRS Issue Brief IB92099, *Nuclear Weapons: Comprehensive Test Ban Treaty*). The Senate declined to ratify the CTBT on October 13, 1999, by a vote of 48-51.

Despite the uncertainty introduced by rejection of the CTBT, steps toward ending the nuclear arms race and nuclear disarmament have continued, as called for in Article VI of the NPT. In January 2002 the Bush Administration released the results of its “Nuclear Posture Review,” announcing that nuclear planning would no longer address the “Russian threat,” as left over from the Cold War, but would develop capabilities to meet a range of threats from unspecified countries. The redirection would be accompanied by a large, unilateral reduction in deployed nuclear weapons. However, the new policy also included development of a controversial missile defense capability, and improving the nuclear weapons “infrastructure” to allow resumption of testing and possible development of new weapons more rapidly. Although the Administration statement did not indicate that such activities were contemplated or necessary, the suggestion that they might be in the future caused dismay in some nonproliferation circles. (For details, see CRS Report RS21133, *The Nuclear Posture Review: Overview and Emerging Issues.*)

## **Proliferation Motives**

Peaceful nuclear power may have lost its glitter, and the prospect of complete nuclear disarmament may be dim. On the other hand, the motives for pursuing nuclear weapons remain unchanged. A few states facing urgent security threats might view nuclear weapons as the best way to deter attack. Noting that all five of the permanent members of the United Nations Security Council are nuclear weapons states, some might view them as important for prestige. Still others might view them as effective battlefield weapons that can be used to defeat enemies and conquer territory.

Despite these motivations, many countries have abandoned nuclear weapons and have sought other ways to ensure their security. Germany and Japan, both major powers, are non-weapons states. In 1991, South Africa, having made the transition to majority rule, revealed and dismantled its clandestine program and renounced nuclear weapons. Argentina and Brazil, both of which had secret nuclear weapons programs under military governments, abandoned them under civilian rule and joined the NPT. Former Soviet republics Ukraine, Belarus, and Kazakhstan returned the Soviet weapons left on their territory and joined the NPT. In these countries, nuclear weapons were seen as creating more problems than they solved.

Interest in nuclear weapons, however, did not disappear. India and Pakistan, having tested nuclear devices, continue in confrontation over Kashmir. Tension between Israel and its Arab neighbors persist, Iran’s pursuit of nuclear weapons technology remains a threat, and Iraq’s nuclear potential was a chief target of U.S. action against the regime of Saddam Hussein. China and Russia remain proliferation concerns as potential sources of nuclear technology. North Korea is a serious and current proliferation threat.

## **U.S. Nonproliferation Policy**

The United States has been and continues to be a leading proponent of the international nonproliferation regime. At the domestic level is a system of export control and licensing laws (and regulations) covering transfers of nuclear technology or materials, including dual-use technology that can contribute to nuclear weapons development. There are also

laws requiring sanctions for violations of nonproliferation commitments, and sanctions against non-weapons states that obtain or test nuclear weapons. These sanctions were invoked in the case of India and Pakistan, but some were gradually suspended, and on September 22, 2001, President Bush lifted all sanctions imposed because of the 1998 tests.

## **Nuclear Cooperation and Export Controls**

In order to engage in international trade in nuclear technology or materials (such as nuclear fuel), U.S. companies must obtain export licenses from the Nuclear Regulatory Commission (NRC). Before an export license can be applied for, there must be in force a bilateral agreement for peaceful nuclear cooperation between the U.S. government and the government of the importing nation. The conditions necessary for drawing up and approving an agreement for cooperation, laid out in Section 123 of the Atomic Energy Act, include a 90-day review by Congress. In several cases, congressional review of an agreement for cooperation has been controversial; most recently, Congress allowed an agreement with China to take effect in 1997, but only after extended debate. (See section on China, below.) Others have attracted less attention. A single agreement is in force between the United States and the members of the European Atomic Energy Community (EURATOM).

In addition to NRC's licensing and regulation role, the Department of Energy (DOE) also participates in export controls. DOE authorizes the transfer of nuclear technology to countries having agreements for nuclear cooperation with the United States via "subsequent arrangements," the details of which are spelled out in Section 131 of the Atomic Energy Act of 1954. In general, NRC deals largely with licensing hardware, while DOE licenses information and knowledge, under regulations defined in 10 CFR Part 810.

Finally, the Department of Commerce also is involved in regulating exports of dual-use, nuclear-related commodities under the provisions of the Export Administration Act of 1979. That law expired and successive Congresses have not passed new legislation, although there have been several attempts to do so. Commerce continues to play a role in export regulation, however.

## **Presidential Nonproliferation Policy**

Responding to Pakistani nuclear expert Abdul Qadeer Kahn's revelation that he had headed a network that spread nuclear weapons technology and equipment to Iran, North Korea, and Libya, President Bush on February 11, 2004, urged more and stricter controls on nuclear exports. Among his recommendations was that non-nuclear weapons states renounce developing capacity to enrich uranium and reprocess plutonium as part of commercial nuclear power programs, while nuclear supplier nations ensure adequate fuel for nuclear plants at reasonable prices. He also argued that IAEA's Additional Protocol for inspections regimes be required of all NPT signatories, and urged the Senate to consent to it on the part of the United States. On March 31 the Senate ratified the protocol (Treaty Doc. 107-7, Senate Executive Report 108-12.) As a nuclear weapons state, the United States in agreeing to IAEA inspections has the right to exclude any activities or sites that it declares are of "direct national security significance."

On May 27 DOE Secretary Spencer Abraham, meeting with the IAEA in Vienna, announced a Global Threat Reduction Initiative aimed at repatriating fresh and spent fuel

containing HEU from research reactors around the world supplied by the United States and Russia, and converting reactors that use HEU fuel to operate on low-enriched uranium. These activities, which already exist in DOE, would be consolidated in a single organization within the Department's National Nuclear Security Administration (NNSA). Abraham said that the target for completion of the program was 2010, and that it would be funded at about \$450 million.

## Nonproliferation Statutes

The Atomic Energy Act of 1954 (P.L. 88-703, as amended) established rules for nuclear commerce that have become the international norm. The Atomic Energy Act requires that a bilateral nuclear cooperation agreement be negotiated between the United States and any foreign country before major nuclear technology can be exported to that country. The Nuclear Nonproliferation Act of 1978 (P.L. 95-242) strengthened those earlier rules and established the requirement of full scope safeguards as a condition of supply. This means that any country, except the five NPT weapons states, that wants to import nuclear technology from the United States must accept IAEA safeguards on all its nuclear facilities. Similar requirements have been adopted by all major nuclear suppliers except China.

**Sanctions.** In order to deter or punish proliferators, Congress has passed many laws imposing sanctions on countries that proliferate and those who assist them. The Arms Export Control Act and the Foreign Assistance Act contain provisions that cut off U.S. assistance to countries that illegally acquire nuclear weapons or the means to make them. These sanctions were imposed on Pakistan in the 1970s and 1980s when it was found to be obtaining uranium enrichment equipment from Europe and the United States. However, the Pakistan sanctions were waived by Presidents Carter, Reagan, and Bush to allow continued U.S. aid to Pakistan during the Soviet invasion of Afghanistan. Aid was finally cut off in 1990 when President Bush did not provide the required certification that Pakistan did not possess nuclear weapons.

Critics of sanctions argue that they mainly punish U.S. firms and are often undercut by foreign countries that continue to trade with proliferators. Supporters of sanctions argue that they send a strong signal to proliferators and to other countries that proliferation has negative consequences and will disrupt "business as usual."

## Federal Organization for Nonproliferation

The Departments of State, Energy, Defense, and Commerce; the intelligence community; and the U.S. Nuclear Regulatory Commission (NRC) are all involved in the formulation and implementation of nonproliferation policy.

- The National Security Council is the hub of nonproliferation policy, with the primary task of reconciling nonproliferation policy with foreign, trade, and national security policies.
- The State Department, in consultation with the Energy Department, negotiates U.S. agreements for nuclear cooperation and represents U.S. nonproliferation interests with other states and international organizations such as the IAEA.

- The Department of Defense is responsible for counterproliferation strategy and policy, and also administers programs to help Russia guard and control its nuclear weapons complex.
- The Department of Energy provides expertise in nuclear weapons to support nonproliferation policy and diplomacy, largely through its national laboratories. It issues permits for the export of nuclear information and knowledge under so-called Part 810 (10 CFR Part 810) regulations. DOE also administers some programs to control fissile materials in the former Soviet Union.
- The Nuclear Regulatory Commission licenses nuclear exports subject to concurrence by the Department of State.
- The Department of Commerce oversees licensing of dual-use exports as mandated by Section 309(c) of the Nuclear Nonproliferation Act, which requires controls on “all export items, other than those licensed by the NRC, which could be, if used for purposes other than those for which the export is intended, of significance for nuclear explosive purposes.”
- The Central Intelligence Agency has a Nonproliferation Center that coordinates intelligence aspects of nonproliferation policy.

Several interagency working groups coordinate the various responsibilities for nonproliferation policy.

## Funding Nonproliferation Programs

As indicated above, the major nonproliferation activities are carried out by the Departments of State, Defense and Energy. The tables below represent current funding for those three agencies.

**Table 1. State Department Nonproliferation, Anti-Terrorism, Demining, and Related (NADR) Programs**

(\$ million)

	FY2004	FY2005 Request	FY2005 House	FY2005 Senate
Nonproliferation and Disarmament Fund	29.8	34.5		
Export Control Assistance	35.8	38.0		
Science Centers	50.2	—		
Nonproliferation of WMD Expertise	—	50.5		
IAEA Voluntary Contribution	52.7	53.0		
International Monitoring System (CTBT)	18.8	19.0		
Antiterrorism Assistance	96.4	128.3		
Terrorist Interdiction Program	5.0	5.0		
Other	107.7	86.9		
Total, NADR Program	396.4	415.2		

Not all the activities of the NADR program are concerned with nuclear nonproliferation. Of those that are:

- The Nonproliferation and Disarmament Fund provides funding for quick response to unanticipated or unusually difficult nonproliferation needs.
- The Export Control Assistance program helps countries in the former Soviet Union, in the Middle East, the Mediterranean and other areas develop their ability to control exports of materials involved in proliferation of weapons of mass destruction (WMD);
- The Science Centers program, renamed “Nonproliferation of WMD Expertise” in the FY2005 budget request, supports two facilities in Moscow and Kiev to redirect activities of former Soviet Union experts in WMD;
- The International Monitoring System, for detecting nuclear explosions, was originally set up as part of the Comprehensive Nuclear Test Ban Treaty (CTBT) Preparatory Commission;
- The IAEA Voluntary Contribution supports activities, particularly nuclear inspections, that are vulnerable to the agency’s chronic funding crisis;
- Anti-Terrorism Assistance is largely a training program in Europe, the former Soviet Union, Near East Asia and other areas;

**Table 2. Defense Department Former Soviet Union Threat Reduction Programs**

(\$ million)

	FY2004	FY2005 Request
Strategic Offensive Arms Elimination — Russia	66.6	58.5
Weapons Storage Security — Russia	48.0	48.7
Weapons Transportation Security — Russia	23.2	26.3
Strategic Nuclear Arms Elimination — Ukraine	4.9	—
WMD Proliferation Prevention — Former Soviet Union	29.4	40.0
Other (Including Biological & Chemical Weapons programs)	276.5	235.7
<b>Total, FSU Threat Reduction</b>	<b>448.6</b>	<b>409.2</b>

As in the State Department, not all CTR activities are directed to nuclear nonproliferation objectives. The program Weapons of Mass Destruction Proliferation Prevention — FSU, is aimed at enhancing the capability of non-Russian FSU countries to combat illicit trafficking in WMD materials across borders. For a detailed discussion of CTR programs, see CRS Report RL31957, *Nonproliferation and Threat Reduction Assistance: U.S. Programs in the Former Soviet Union*, by Amy F. Woolf.

Proliferation R&D activities are aimed at techniques to monitor nuclear explosions, remotely detect the early stages of a nuclear weapons program, improve detection of foreign nuclear materials, and develop expertise in the areas of chemical and biological weapons.

Nonproliferation and International Security programs, formerly called “Arms Control,” are concerned with international safeguards, export controls, treaties and agreements.

The MPC&A program is concerned with reducing the threat posed by unsecured Russian weapons and weapons-usable material. The Russian transition initiative includes two programs dealing with the problem of employing former Soviet nuclear weapons experts. The Initiatives for Proliferation Prevention (IPP) program is a cooperative arrangement between DOE laboratories and science and engineering institutes in Russia, Ukraine, Kazakhstan and Belarus. The Nuclear Cities Initiative (NCI) involves efforts to develop commercial activities in 10 formerly secret cities in Russia where nuclear weapons activities were carried out. The Highly Enriched Uranium (HEU) Transparency Implementation program, also described below, finances the agreement with Russia to use HEU from dismantled Soviet weapons for fuel for nuclear power reactors.

**Table 3. DOE Defense Nuclear Nonproliferation Programs**

(\$ million)

Program	FY2004	FY2005 Request	FY2005 House	FY2005 Senate
Nonproliferation and Verification R&D	232.0	220.0		
Nonproliferation and International Security	114.1	124.0		
International Materials Protection, Control and Accounting (MPC&A)	258.5	238.0		
Russian Transition Initiative	39.8	41.0		
Elimination of Weapons-Grade Plutonium Production	65.0	50.1		
HEU Transparency Implementation	17.9	21.0		
Fissile Materials Disposition	652.8	649.0		
Adjustments	-48.0			
<b>Total, Defense Nuclear Nonproliferation</b>	<b>1,334.1</b>	<b>1,348.6</b>		

The program to eliminate production of plutonium in Russia was transferred from the Defense Department to DOE in FY2003. Three plutonium-producing reactors at two sites in Russia also produce power for civilian consumption, and U.S. efforts have been aimed at redesigning the plants so that any plutonium produced could remain unseparated. The program has been redirected to replacing the plants with fossil-fueled generating capacity and shutting down the reactors by 2006 and 2007.

The mission of the fissile material disposal program is to dispose of plutonium from dismantled weapons both in the United States and in Russia. Most of the funding is for construction of conversion facilities for U.S. plutonium.

## Nuclear Proliferation in Specific Regions

### India and Pakistan

The undeclared nuclear arms competition between India, Pakistan, and China reached a turning point on May 11, 1998, when India announced an underground test of three nuclear

explosive devices, and followed it two days later with claims of two more. Declaring that China, with whom India had a border war in 1962, was “encircling” India militarily, in part by providing its bitter rival Pakistan with nuclear weapons capability and missile weaponry, Indian Prime Minister Atal Bihari Vajpayee defended the test as necessary to correct the “deteriorating security environment, especially the nuclear environment, faced by India for some years past.” India has refused to sign the NPT, and has been a bitter critic of what it calls discrimination between the five weapons states and non-weapons states.

Pakistan said after the Indian tests that it was being dragged into a nuclear arms race, and two weeks later claimed to have set off five nuclear blasts of its own. The United States responded by imposing sanctions on both countries and by engaging in intensive diplomacy over the next several years. (President Bush lifted all sanctions on both countries relating to the nuclear tests, following the terrorist attacks of September 11.) Neither India nor Pakistan has resumed testing, but relations between them have remained tense, fed by the volatile armed confrontation in the border state of Kashmir. (For details, see CRS Issue Brief IB93097, *India-U.S. Relations*, and CRS Issue Brief IB94041, *Pakistan-U.S. Relations*.)

A further concern has been that Pakistan has been the source of aid to other proliferating countries, such as Iran and North Korea. These suspicions were confirmed on February 4, 2004, when Pakistan’s chief nuclear scientist, Abdul Qadeer Khan, acknowledged that he had been responsible prior to 2000 for sending nuclear weapons technology and equipment to Iran, North Korea, and Libya. Khan said the activity took place without the knowledge of the Pakistani government.

## The Middle East and Israel

The ongoing confrontation between Islamic Middle East countries and Israel has long had a nuclear undercurrent. Israel has not signed the NPT, and has made no official acknowledgment of a weapons program. It is widely considered to have developed nuclear weapons capability, although it is not known to have conducted a nuclear explosion. Israel’s nuclear program stimulated calls for an “Islamic bomb.” Among Israel’s neighbors, Iraq and Iran have been the focus of nuclear activity. Iraq, before its defeat in the Gulf War in 1991, actively pursued nuclear weapons development, despite having signed the NPT. Iran declares it has no nuclear weapons program, but the United States claims that it does.

**Iraq’s Nuclear Weapons Program.** Before the 1991 Gulf War, Iraq had an extensive covert nuclear weapons program that was built under the guise of legitimate nuclear research and development. As a member of the NPT, Iraq had allowed inspections of declared facilities by the IAEA, but successfully concealed the true nature of its nuclear program. After the war, U.N. Resolution 687 established a Special Commission and gave it authority to locate and remove Iraq’s weapons of mass destruction. The U.N. Special Commission on Iraq (UNSCOM) conducted extensive investigations of Iraq’s nuclear program that revealed a multi-billion dollar effort to build nuclear weapons. UNSCOM and the IAEA then dismantled Iraq’s nuclear infrastructure. However, UNSCOM’s inspectors left Iraq in 1998 and IAEA’s limited inspection powers under the NPT agreement were feared inadequate to detect a renewal of nuclear weapons activities.

On May 22, 2003, the U.N. lifted the sanctions imposed under Resolution 687 but left undetermined the mandate of the inspectors to resume activities in Iraq. IAEA inspectors

were invited to inspect the nuclear storage site at Tuwaitha, where incidents of looting had been reported, under the provisions of the Nuclear Nonproliferation Treaty, but not as part of Resolution 687 activity. (For details see CRS Issue Brief IB92117, *Iraq: Weapons Programs, U.N. Requirements, and U.S. Policy.*)

**Iran's Nuclear Program.** Top U.S. officials have warned repeatedly that Iran has a program to acquire nuclear weapons. A point of concern has been Russia's efforts to complete a nuclear power plant at Bushehr, which had been started by Germany in the 1970s under the former Shah of Iran. The revolutionary government that overthrew the Shah in 1979 abandoned the project, then unsuccessfully tried to get Germany to revive it. Russia's MINATOM agency contracted to finish the plant with one of its own reactor designs. Progress has been slow, but the Russian builders have announced plans to start the reactor in 2004.

Iran is a member of the NPT and has allowed inspections of its nuclear program. Nevertheless, many observers suspected that Iran, which possesses substantial reserves of oil and natural gas, was using its civilian nuclear program as a pretense to establish the technical basis for a nuclear weapons option.

These suspicions were bolstered in December 2002 with the revelation that two facilities under construction near the cities of Natanz and Arak, could be for the purpose of enriching uranium, and for producing heavy water, which is used primarily in reactors designed to produce weapons plutonium. The Bushehr reactor, like most commercial power reactors, does not use heavy water. In February 2003, prior to scheduled IAEA inspections of the facilities, Iranian President Mohammed Khatami said Iran planned to mine and enrich its own uranium, and would reprocess the spent fuel from the reactor. This was contrary to the previous understanding that it would be fueled by Russian uranium which would be returned to Russia when removed from the reactor. Reprocessing would put separated plutonium, which could be used for weapons, under Iranian control. Khatami said the complete nuclear fuel cycle would be used only for peaceful civilian power generation, and invited the IAEA to inspect the facilities. But the United States said the plan "only makes sense if it's in support of a nuclear weapons program."

In June 2003 IAEA head Mohamed ElBaradei noted questions about the enrichment and heavy water projects, and called on Iran to agree to more stringent safeguards measures to reassure other nations that it was not pursuing a hidden weapons program. In October, after a meeting with Iranian government officials, ElBaradei said that they had promised that Iran would agree to the additional protocol, and had also "temporarily suspended" enrichment activities. (See IAEA Inspections, above. For more details see CRS Report RS21592, *Iran's Nuclear Program: Recent Developments.*)

In a report issued in late November, ElBaradei said Iran acknowledged that it had been developing a uranium centrifuge enrichment program for 18 years. "It is clear," the report said, "that Iran has failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement" with IAEA. A further report in June 2004 noted some cooperation from Iran in answering questions about its enrichment activities but noted remaining issues. The IAEA board voted a resolution deploring Iran's lack of complete cooperation and noting that it had not yet ratified the additional protocol.

**Nuclear Program in Libya Revealed.** In December 2004 Libyan leader Moammar Gadhafi announced that Libya was abandoning its pursuit of nuclear weapons, and invited IAEA director ElBaradi to inspect four previously clandestine sites in Tripoli. The facilities reportedly contained equipment to produce highly enriched uranium. (For details, see CRS Issue Brief IB93109, *Libya*, by Clyde Mark.) Press reports have suggested that both Iran and Libya have obtained nuclear technology from Pakistan, and they were confirmed February 4, 2004, when Pakistan's chief nuclear scientist, Abdul Qadeer Khan, acknowledged aiding those two countries and North Korea as well.

## China

China has long been a proliferation concern. Until 1992 it refused to join the NPT, even as one of the privileged five nuclear weapons states. It was widely viewed as the major supplier of Pakistan's nuclear weapons program in the 1980s and early 1990s, and also as a supplier of aid and technology to Iran, although Chinese officials continue to deny helping either country's weapons program. India, in justifying its own nuclear weapons tests, cited China's help to Pakistan as a major motive in developing nuclear weapons capability.

China gradually took steps to join the international nonproliferation community, and by 1998 President Clinton and the Congress agreed to validate an agreement for nuclear cooperation signed a decade earlier. Concern about China's full support of nonproliferation aims continued, but in a move that drew praise from some nonproliferation circles, China in December 2003 issued a White Paper on Nonproliferation emphasizing the importance of international cooperation on export controls. This was followed in January 2004 by an agreement between the United States and China that established training programs and information exchanges to help strengthen export controls, international nuclear safeguards, and physical protection of nuclear materials and facilities.

## Proliferation Crisis in North Korea

North Korea joined the NPT in 1985, but delayed inspections until 1992. In February 1993, North Korea denied access by IAEA inspectors to two sites that IAEA (and U.S. intelligence) believed held evidence of clandestine nuclear work. In March 1993, North Korea notified the United Nations Security Council that it was withdrawing from the NPT, which permits withdrawal after three months notice. It subsequently suspended its withdrawal, but claimed to have "unique status" under the NPT, and continued to block inspections. Former CIA Director James Woolsey and Secretary of Defense William Perry warned that North Korea probably had enough plutonium for two bombs and that the fuel unloaded from its 25 megawatt (thermal) reactor could contain enough plutonium for several more bombs.

In October 1994, the United States signed an agreement with North Korea under which North Korea would shut down, but not dismantle, its existing reactor and reprocessing plant (needed to extract plutonium from irradiated nuclear fuel), and halt construction on other weapons-potential facilities, in return for provision of light water reactors less suited for producing plutonium for bombs. North Korea also received shipments of heavy oil to compensate for energy that theoretically might have been generated from the reactors it agreed to shut down. The deal required North Korea to eventually resolve outstanding safeguards violations, including its undeclared plutonium, before completion of the new

reactors. An international consortium called the Korean Peninsula Energy Development Organization (KEDO) was established in March 1995 to coordinate the reactor construction project.

On October 16, 2002, the U.S. State Department announced that North Korean officials acknowledged continued nuclear weapons activity, in violation of the agreement. In contrast to its earlier efforts, which consisted of obtaining plutonium reprocessed from spent nuclear reactor fuel, the current activity involves “a program to enrich uranium for nuclear weapons” which the State Department announcement said North Korea “had been embarked on ... for several years.” Enriching uranium to the level required for nuclear explosives requires construction of a major facility with technologically sophisticated components. Administration officials did not say how far advanced the North Korea activity was.

In response the United States suspended further monthly shipments of oil to North Korea and the other members of KEDO — South Korea, Japan, and the European Union — followed suit. North Korea announced that it was restarting the small plutonium-production reactor it had shut down as part of the Agreed Framework. In April 2003 at a trilateral meeting with China and the United States, North Korea claimed it had nuclear weapons and was reprocessing spent fuel that had been stored under IAEA surveillance before the agency was expelled. In early August North Korea agreed to multilateral talks including China, Russia, Japan, South Korea and the United States, but the first meeting late in that month had little results. In October, President Bush offered a written guarantee of security that would probably be signed by the other nations involved in the talks, in return for giving up its nuclear weapons program and surrendering its weapons and stockpiles. North Korea considered the proposal, but later rejected it. In December China and the United States temporarily suspended plans for further six-nation talks. (For details on the North Korean nuclear situation, see CRS Issue Brief IB91141, *North Korea's Nuclear Weapons Program*).

## **Russian Nuclear Weapons and Weapons Material**

Russia and the United States do not have in force an agreement for peaceful nuclear cooperation. However, U.S. aid is being extended to Russia to help maintain safety and safeguards of the vast nuclear arsenal inherited from the former Soviet Union. (For details on Russia's nuclear weapons complex, see CRS Issue Brief IB98038, *Nuclear Weapons in Russia: Safety, Security, and Control Issues*.)

Disposal of Russian nuclear materials from dismantled weapons is also a nonproliferation issue. In February 1993 the United States and Russia agreed that highly enriched uranium from weapons would be diluted to a low enrichment level suitable for use in commercial nuclear power reactors, and that the U.S. Enrichment Corporation (USEC) would buy the uranium to supply to its customers.

Disposal of plutonium from weapons is more of a problem, since the use of plutonium in power reactors is not widespread. Eventually the large stocks of both U.S. and Russian weapons plutonium will have to be dealt with. The Clinton Administration proposed, as a means of disposing of U.S. surplus weapons plutonium, a “dual track” strategy of mixing plutonium with uranium as mixed oxide (MOX) fuel for commercial power reactors, and vitrification (dissolving in glass) and disposal of the plutonium unsuited for fuel and the resulting fission products. In July 1998 the Department of Energy issued a draft

Environmental Impact Statement on the program. An agreement with Russia signed in September 2000 set up a similar program for Russian plutonium disposal.

However, in submitting its FY2003 budget request, DOE declared that it was eliminating the immobilization part of the two-track program for U.S. plutonium and instead would add an “enhanced purification” stage to the MOX fuel fabrication facility so that most of the plutonium originally destined for immobilization would instead be consumed as MOX fuel. The original plan called for 27.6 metric tons (MT) of plutonium to be converted to MOX and 8.4 MT of impure plutonium to be immobilized. The revision would purify 6.4 MT and convert it to MOX, and send the remaining 2.0 MT of highly impure plutonium directly to a waste disposal site.

The plan to use weapons plutonium as fuel for nuclear power reactors raised opposition from some nonproliferation interest groups, who argued that immobilization and disposal is safer and less expensive than the MOX fuel option. The Russian MOX option is particularly troubled, because Russia does not have enough power reactors in which MOX can be used to dispose of significant amounts of plutonium, and has been asking for help to build new ones or to use the MOX in reactors in Germany or other countries, as well as aid in constructing a MOX fuel conversion facility. Further, Russia has declared that its ultimate goal is to recycle plutonium from commercial power reactors, raising concerns that aiding the disposal of weapons plutonium would encourage Russia to develop a “plutonium economy” in its power industry.

There is less concern about the security of U.S. weapons plutonium. As part of the U.S. program, construction of a plant to convert plutonium into MOX fuel was planned for DOE’s Savannah River Site (SRS) in South Carolina. The first part of this program was achieved in August 2003, when DOE announced that all of the weapons-grade plutonium formerly at the former plutonium processing facility at Rocky Flats in Colorado had been shipped to SRS.