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Nuclear Weapons in Russia: Safety, Security, and Control Issues

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Nuclear Weapons in Russia: Safety, Security, and Control Issues

SUMMARY

When the Soviet Union collapsed in late 1991, it reportedly possessed more than 27,000 nuclear weapons, and these weapons were deployed on the territories of several of the former Soviet republics. All of the nuclear warheads have now been moved to Russia, but Russia still has around 6,000 strategic nuclear weapons and perhaps as many as 12,000 warheads for nonstrategic nuclear weapons.

Many analysts in the United States and Russia have expressed concerns about the safety, security, and control over these weapons. Some of these concerns focus on Russia's nuclear command and control structure. Financial constraints have slowed the modernization and replacement of many aging satellites and communications links, raising the possibility that Russia might not be able to identify a potential attack or communicate with troops in the field if an attack were underway. Some fear that the misinterpretation of an ambiguous event might lead to the launch of nuclear weapons. Some also expressed concern that the year 2000 computer bug could affect Russia's command and control system, but it did not.

Some concerns are also focused on the safety and security of nuclear warheads in storage facilities in Russia. Press reports and statements by Russian officials about possible missing warheads have added to these concerns. However, General Eugene Habiger, former Commander-in-Chief of the U.S. Strategic Command, stated that he had no major concerns about security at Russian nuclear storage facilities after he visited several storage sites in October 1997 and June 1998.

Reports of Russian nuclear materials for sale on the black market, when combined with evidence of weaknesses in the security systems have raised concerns about the possible theft or diversion of nuclear materials from these facilities.

The United States and Russia are cooperating in many fora to improve the safety, security, and control over Russia's nuclear weapons and materials. Through the Nunn-Lugar Cooperative Threat Reduction Program, the U.S. Department of Defense has provided assistance worth nearly $2 billion to help Russia, Ukraine, Kazakhstan, and Belarus safely transport and store weapons and eliminate launchers under the START Treaties. The Department of Energy's Materials Protection, Control and Accounting Program is helping Russia and other former Soviet republics secure nuclear materials at research and other facilities in the former Soviet Union. The nations have also held bilateral meetings to identify ways in which they might cooperate to improve security and resolve concerns.

Some have proposed that the United States and Russia negotiate arms control agreements to reduce their stockpiles of nonstrategic nuclear weapons and to improve transparency and confidence in the elimination of those weapons. Others have proposed that the two sides agree to "de-alert" their strategic nuclear weapons to reduce the pressures and relieve concerns about Russia's nuclear command and control system.

MOST RECENT DEVELOPMENTS

The House and Senate both approved the Administration's request for $403 million for the Nunn-Lugar Cooperative Threat Reduction Program. Their bills varied in several ways, though. The House mandated a report on the rationale for continued funding and implementation of the CTR program through the Department of Defense; the Senate stated that the programs should remain in DOD. The House also approved the Administration's plan to merge the Department of Energy Nuclear Cities Initiative (NCI) with its Initiatives for Proliferation Prevention (IPP). The Senate left NCI as a separate program, but limited it to 3 of Russia's nuclear cities.

In the Energy and Water Appropriations Bill for FY2002, Congress restored much of the funding that the Bush Administration had removed from the DOE nonproliferation programs in Russia, but, in spite of wide-spread support for increased efforts, it did not add funding to these programs beyond their FY2001 spending levels.

BACKGROUND AND ANALYSIS

Nuclear Weapons After the Demise of the Soviet Union

After the demise of the Soviet Union in 1991many analysts expressed concerns about the possibility that nuclear weapons might be lost or stolen, or that some might be launched by accident or without authorization by responsible officials. Many of these weapons were located outside Russia. Both the first Bush and Clinton Administrations received assurances that the weapons remained under secure, central control. The United States has also offered these nations assistance, through efforts such as the Nunn-Lugar Cooperative Threat Reduction Program, to encourage the return of all nuclear warheads to Russia and to enhance safety and security at nuclear facilities in Russia.

By the late 1990s, many of the early concerns about the potential for loss of control have eased, but concerns about the long-term effects of economic hardship and the increasing age of Soviet-era systems continue to prompt questions about the disposition of Russia's nuclear weapons. This issue brief highlights the continuing concerns that many have about the safety and security of these weapons and ongoing U.S. assistance programs.

Location of Nuclear Weapons in the Former Soviet Union

When the Soviet Union collapsed in late 1991, it possessed, according to most estimates, more than 27,000 nuclear weapons. These included more than 11,000 strategic nuclear weapons — warheads on land-based intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and in bombers with the range needed to attack the continental United States — and over 15,000 warheads for nonstrategic tactical nuclear weapons (such as artillery shells, short-range missiles, nuclear air-defense and ballistic missile defense interceptors, nuclear torpedoes and sea-launched cruise missiles, and nuclear weapons for shorter-range aircraft). In early 1998, Russia reportedly retained approximately 6,000 warheads on its strategic nuclear weapons and, according to some reports, between 7,000 and 12,000 warheads for nonstrategic nuclear weapons.

In 1991, more than 80% of Soviet strategic nuclear weapons, including all ballistic missile submarines, were deployed at bases in Russia. The remaining strategic nuclear weapons were deployed in Ukraine, Belarus, and Kazakhstan. By the end of 1996, these states had all returned their nuclear warheads to Russia and each had begun to eliminate the launchers for strategic nuclear weapons under the terms of the START I Treaty. By the end of 1998, only Ukraine still had Soviet-era strategic missiles in silos on its territory, and it continued its efforts to eliminate these missiles and their silos. The last SS-19 ICBM was eliminated at the end of February 1999, and all SS-24 silos were eliminated by October, 2001. After lengthy and unsuccessful negotiations with Russia, Ukraine began to dismantle the Soviet-era bombers that remained on its territory. However, in August 1999, Ukraine and Russia announced that Russia would take 8 of these aircraft as partial payment for Ukraine's debt for natural gas deliveries from Russia. In October, the two nations completed the details of the transaction and noted that Russia would buy 11 of the strategic bombers from Ukraine. Table 1 depicts the number of nuclear weapons deployed in these states in late 1991 and their status today.

Table 1. Strategic Nuclear Weapons in the Non-Russian Republics

State	Strategic Nuclear Weapons in 1991	Strategic Nuclear Weapons Today
Belarus	81 SS-25 single-warhead mobile ICBMs	All SS-25 single-warhead mobile ICBMs, with warheads and launchers, were removed in November 1996
Kazakhstan	104 SS-18 10-warhead silo-based ICBMs (1,040 warheads) 40 Bear H bombers	All SS-18s removed from silos; all silos destroyed; all warheads returned to Russia. All bombers and cruise missiles returned to Russia
Ukraine	130 SS-19 6-warhead silo-based ICBMs 46 SS-24 10-warhead silo-based ICBMs About 40 strategic bombers More than 500 air-launched cruise missiles	All SS-19 silos and SS-24 silos have been destroyed. Ukraine has completed dismantling of bombers, after transferring 11 to Russia, and transferred or dismantled all cruise missiles.

Source: U.S. Department of Defense.

Many of the Soviet Union's tactical nuclear weapons were also stationed outside Russia, in Eastern Europe or in republics that were closer to prospective theaters of operation. The weapons in Eastern Europe had reportedly been returned to Russia by 1989. In late 1991, the majority of weapons outside Russia reportedly were in Belarus, Ukraine, and Kazakhstan, with perhaps less than 5% in Georgia and the Central Asian states (Kirghizia, Tajikistan, Turkmenistan, and Uzbekistan.) According to officials in Russia and these other states, all the weapons had been moved to storage areas in Russia by the end of 1992.

According to American and Russian sources, the command and control system for all Soviet strategic and tactical nuclear weapons is centered in Moscow. This central command

would have to authorize the use of any nuclear weapons. As the Soviet Union dissolved in December 1991, Russian President Boris Yeltsin replaced Soviet President Gorbachev at the top of the command authority, but the rest of the system remained the same.

Continuing Concerns about Command, Control, Safety, and Security

Many in the United States and Russia remain concerned about safety, security, and control over nuclear weapons in Russia. These concerns center on three general areas — concerns about the possibility for an accidental or unintended launch of nuclear weapons due to weaknesses in Russia's command and control system; concerns about the possible theft or loss of nuclear warheads due to lax security or accounting at nuclear weapons facilities; and concerns that nuclear materials from the former Soviet Union's nuclear weapons facilities might be lost or sold to nations seeking their own nuclear weapons.

Russia's Nuclear Command and Control System

Russia's nuclear command and control system consists, generally speaking, of early warning satellites and sensors that would warn of an imminent attack on Russian territory; the senior political and military leaders who would assess the nature of the attack and, if necessary, authorize a response using Russia's nuclear weapons; and the communications links that these commanders would use to consult with each other and to transmit messages authorizing the use of nuclear weapons to commanders in the field. These messages would contain the authorizing and enabling codes needed to "unlock" the permissive action links (PALs) and other technologies used to make sure that nuclear weapons could not be armed and launched without authorization from the central command authority. (For a more detailed description of this command and control system, see CRS Report 97-586, *Russia's Nuclear Forces: Doctrine and Force Structure Issues*.)

Analysts in the United States and Russia have pointed to the degradation of Russia's early warning network of satellites and radars to note that Russia may soon lack the ability to monitor and react to strategic threats to its own territory. In early 1997, Russia's Defense Minister Rodionov stated that he feared a loss of control over Russian strategic nuclear forces in the future if additional funding were not available to maintain and modernize the communications links in the nuclear command and control structure. Furthermore, in June and July 1998, both of Russia's geostationary early warning satellites failed; this leaves Russia relying on its older satellites and ground radar stations for early warning of ballistic missile attacks. These systems cannot provide continuous coverage of U.S. missile launch sites. At the end of August, Russia lost another early warning asset when Latvia shut down the Skrunda radar, which provided Russia with early warning of ballistic missile attacks. Russia had hoped that Latvia would allow this radar to continue operating until a new radar in Belarus was completed.

The U.S. Defense Department has downplayed concerns about a loss of control over Russia's nuclear weapons, noting that the central command structure remains in place. But some analysts fear that Russia could respond to the degradation of the system by disseminating codes needed to launch nuclear weapons to commanders in the field to make

sure that these commanders had the ability to launch missiles in a conflict. This might raise the possibility of an accidental or unauthorized use of these weapons.

Reports in the Russian press have also noted that some strategic rocket forces personnel have faced serious financial hardship. Reports of inadequate funding for training and maintenance, along with low morale among the troops, have raised concerns about an eventual breakdown of authority among strategic rocket troops. Recent reports of shooting incidents at facilities that house nuclear weapons or materials and onboard a nuclear-powered attack submarines have raised further concerns about the reliability of Russia's military personnel. Although problems with the troops probably would not lead to the unauthorized use of nuclear weapons, they could make it difficult for Russia to remain confident in the reliability and effectiveness of its nuclear deterrent.

In early 1999, officials in the Russian government acknowledged that the Y2K bug could pose problems for Russia's military systems and some stated it could cost Russia $2-3 billion to solve the problems. A team from the U.S. Defense Department that traveled to Moscow in mid-February 1999 to assess the problem and proposed that the two nations man a joint early warning center in Colorado Springs at the end of December 1999 and early January 2000. In mid-September, Secretary of Defense Cohen and Russia's Defense Minister Sergeyev established the Y2K Center for Strategic Stability. This facility, which was based at Peterson Air Force Base in Colorado, monitored ballistic missile launches world-wide from December 30, 1999 through January 15, 2000. Russian officers manned the center and had access to data from U.S. early warning assets. The New Year passed with no apparent or reported missile warning problems.

Safety and Security of Stored Nuclear Warheads

In October 1991 and January 1992, Soviet President Gorbachev and Russian President Yeltsin pledged to withdraw most nonstrategic nuclear weapons from deployment and to place them in secure storage areas. All the warheads for nonstrategic nuclear weapons based outside Russia had been moved to storage facilities in Russia by the middle of 1992 and Russia has consolidated the remaining weapons, reducing the number of storage facilities from several hundred to, perhaps, less than one hundred. Russian officials also contend that they have begun to dismantle these warheads at a rate of around 2,000 per year. The United States does not have independent confirmation of this number, and some analysts suspect that Russia could still have 12,000 warheads for nonstrategic nuclear weapons in its storage facilities. Many in the United States remain concerned about the level of security at these storage facilities and some fear that, as a result of poor security and inadequate record-keeping, Russia may not be able to keep track of all the warheads in these facilities.

In March 1992, reports suggested that a few nuclear warheads from Kazakhstan might have been sold to Iran. These reports stated that Iran did not have codes needed to detonate the weapons but that it might use them to gain design information it needs for its own nuclear weapons programs. At the time, Russian and Kazakh officials denied that nuclear weapons were missing, and U.S. officials stated that the United States has no evidence of such a transfer. Nevertheless, these reports resurfaced in April 1998 — the Jerusalem Post newspaper reported that an Israeli politician had received Iranian documents showing that Iran had received these weapons. Russia repeated its denials and U.S. officials repeated that the United States had no evidence that any nuclear warheads were missing from Russia. The

1998 reports surfaced amidst concerns about Russia construction of nuclear power reactor in Iran and reports that Russian firms were assisting Iran's missile development program. Some believe the timing was intended to apply added pressure on Russia to cease its cooperation with Iran and on the U.S. Congress to impose sanctions on Russia.

In September 1997, former Russian Security Council head and national security advisor Alexander Lebed alleged that Russian authorities were uncertain of the whereabouts of 100 out of 250 small portable nuclear demolition munitions. The Russian Defense Ministry responded by noting that "the Russian system of nuclear weapons safety keeps nuclear weapons under full control and makes any unauthorized transport of them impossible." It also stressed that all nuclear weapons had been withdrawn to Russia from the former Soviet republics. Other Russian observers also discounted Lebed's allegations. In early October 1997, Lebed appeared to withdraw his allegation, stating that he had investigated the matter and had found no evidence of missing nuclear weapons. Nevertheless, the debate in Russia continued, with some alleging that Russia never had such small munitions and others confirming that the munitions existed but denying that any are unaccounted for. The White House stressed that the United States had "no credible information that any [Russian] nuclear weapon ... has ever been available on the black market."

In late 1997, George Tenet, the Director of Central Intelligence reportedly stated that the United States remained concerned about the possible loss or theft of nuclear weapons and materials in Russia due to declining social and economic conditions. He did not, however, offer any evidence that such losses had already occurred. But conditions have continued to deteriorate, and some wages have gone unpaid for several months during the financial crisis that began in mid-1998. As a result, many analysts have continued to express concerns about the "human factor" and the possibility that low morale and poor living conditions may combine to weaken security and controls over nuclear weapons.

In contrast, General Eugene Habiger, the former Commander-in-Chief of the U.S. Strategic Command, expressed confidence in Russia's ability to safeguard its weapons. He visited nuclear weapons storage facilities in Russia to observe safety and security procedures on two occasions, in October 1997 and June 1998. He reportedly came away impressed with what he saw, although he acknowledged that his tour only focused on strategic nuclear weapons and provided no information or insights into the security procedures at storage facilities for nonstrategic nuclear weapons. He also noted that Russia lacked many of the high-tech devices the United States used to maintain security at nuclear bases and that it seemed to rely more heavily on added manpower to protect its weapons. But he stated that he did not have any serious concerns about the security of Russia's nuclear weapons.

Some in Congress remain concerned about Russia's stockpile of nonstrategic nuclear weapons. The Senate added an amendment to the FY1999 Defense Authorization Act (P.L. 105-261) and the FY2000 Defense Authorization Bill (S. 1059) calling on the President to press Russia to reduce these weapons in accordance with its pledges from 1991 and 1992. The amendment also requires that the Secretary of Defense submit a report detailing the numbers, types, strategic implications, and proliferation risks associated with Russia's nonstrategic nuclear weapons. A request for this report remains in the House and Senate versions of the FY2001 Defense Authorization Bill

Former Soviet Nuclear Facilities and Materials

Concerns about the loss or theft of nuclear materials from Russia have grown since the September 11 attacks on the World Trade Center and Pentagon. Analysts and government officials have noted that Osama bin Laden may have sought to acquire nuclear materials, possibly to construct a nuclear explosive device, but, more likely, to construct a "dirty bomb." With this type of weapon, nuclear waste or other radioactive materials would be combined with conventional explosives and would be dispersed over a wide area when the bomb exploded.

There have been numerous reports of nuclear materials from facilities in the former Soviet Union appearing on the black market in Europe. In most cases, the materials lacked the purity to be used to manufacture nuclear weapons. However, in several of the reported cases, the materials could have been useful to a nation seeking to develop nuclear weapons. In May 1999, the National Research Council, an arm of the U.S. National Academy of Sciences, issued a report stating that security at Russia's nuclear materials facilities was worse than previously reported. The report argued for sustained cooperation between the United States and Russia to improve security and prevent the diversion of these materials. Officials from the Russian Atomic Energy Ministry disputed these reports and argued that some safeguards are Russian facilities were more stringent than those at U.S. facilities.

The U.S. Department of Energy (DOE) estimates that there may be enough weapons-usable nuclear materials to produce 40,000 nuclear weapons at facilities in 8 countries that were once a part of the Soviet Union. The Soviet Union secured most of these facilities by placing them in closed cities or by using with gates and armed guards. But, according to DOE, budget cuts and political upheavals have undercut this system. Many facilities lacked fences, monitors, alarms, and comprehensive accounting systems to keep track of materials. Reports indicate that even those facilities with security and monitoring systems often disconnected them to save money on electric bills and to reduce false alarms. They also have been unable to pay the guards and officers charged with maintaining security at the facilities.

Deterioration of economic conditions and the decline in military spending has also displaced many scientists and engineers who worked in Soviet nuclear programs. Although reports of scientists moving to other countries have waned, the economic problems continue. For example, on July 23, 1998, several thousand staff members at Arzamas-16, one of Russia's premier nuclear research facilities, stopped work during a three-hour strike. They sought back payment for wages and budget allocations for 1997 and a pay increase for 1998. Nuclear workers from several of the closed cities participated in a strike in mid-September 1998, with many traveling to Moscow for protests at the Atomic Ministry (MINATOM).

Cooperative Programs For Nuclear Threat Reduction

The Nunn-Lugar Cooperative Threat Reduction (CTR) Program

Program Objectives and Funding. In November 1991, Congress allocated $400 million in Department of Defense funds to help the former Soviet republics secure their nuclear weapons. The funds were to provide Russia, Ukraine, Belarus, and Kazakhstan assistance in 1) the transportation, storage, safeguarding and destruction of nuclear, chemical

and biological weapons and the dismantlement of missiles and launchers; 2) the prevention of the proliferation of weapons of mass destruction; and, 3) the prevention of diversion of weapons-related scientific expertise. (For details on the CTR program, see CRS Report 97-1027, *Nunn-Lugar Cooperative Threat Reduction Programs: Issues For Congress*.)

Although some Members have questioned the benefits and administration of the Nunn-Lugar Cooperative Threat Reduction (CTR) Program, Congress has consistently supported the central objectives of the program, allocating $400 million each year in FY1993, 1994, and 1995 and an additional $300 million in FY1996. In FY1997, the Senate passed a new amendment sponsored by Senators Nunn, Lugar and Domenici that added $94 million to DOD and DOE budgets to expand U.S. efforts to contain and control nuclear, chemical and biological weapons in the former Soviet Union. These funds were included in the House-Senate Conference Report, which provided $364.9 million to DOD for CTR, in addition to the funds for DOE, in the FY1997 Defense Authorization Act (P.L. 104-201). Congress also approved $382.2 million for CTR in FY1998 (P.L. 105-85, H.Rept. 105-340), and $440.4 million in FY1999 (P.L. 105-261, H.Rept. 105-736). In FY1999, the House sought to eliminate funding for chemical weapons destruction, but the Senate restored the funding and prevailed in conference.

The Clinton Administration requested $475.5 million for CTR in FY2000. The Senate (S. 1059) approved the full request, but it expressed concerns about Russia's financial commitment to the CTR programs and about other areas of Russia's nuclear weapons programs. The House approved $444.1 million for CTR and again eliminated funding for the construction of a chemical weapons destruction facility. It mandated, instead, that U.S. assistance seek to improve security at existing chemical weapons storage facilities. The Conference Committee (H.Rept 106-301) approved the Administration's request for $475.5 million for CTR programs, but it also approved House position precluding funding for the construction of a chemical weapons destruction facility.

The Clinton Administration requested $458.4 million for CTR in FY2001. The Senate Armed Services Committee approved the full amount, but limited the use of funds for the construction of the chemical weapons destruction facility until the Secretary of Defense could certify that Russia was committed to providing at least $25 million per year to help construct and operate the facility; that Russia was committed to destroying all its remaining nerve agent; that other nations were committed to providing funding for the social infrastructure around this facility; and that Russia was committed to destroying its chemical weapons production facilities. The House, in contrast, again eliminated all funding for the chemical weapons destruction facility. In its version of the Defense Authorization Bill (H.R. 4205), it provided only $433.4 million for CTR. The House prevailed in the Conference Committee, and the Conference Report (H.Rept. 106-945) authorizes the appropriation of only $433.4 million for CTR and precludes any expenditures on the construction of a chemical weapons destruction facility in Russia. Instead, it expresses the sense of Congress that the international community should do more to help Russia eliminate its chemical weapons in accordance with its obligations under the Chemical Weapons convention.

The Bush Administration requested $403 million for CTR programs, a reduction of $40 million from the amount authorized in FY2001. This reduction results primarily from the absence of funding for the Mayak plutonium storage facility. The Administration has stated that Russia does not require any additional assistance with this project. The Administration

has, however, requested $50 million to resume construction at the chemical weapons destruction facility in Russia. Congress had denied funding for this project in FY2000 and FY2001, but both the House Armed Services Committee and Senate Armed Services Committee approved the request for FY2002. The Administration has reportedly completed its review of the CTR program, and has concluded that it should continue with most of the programs currently underway. It concluded that these programs were "effectively managed" and did serve U.S. interests. The Administration will, however, expect Russia to make a greater contribution to the efforts itself, and it may expect Russia to alter its behavior in other areas, such as nuclear cooperation with Iran. The House and Senate both approved the Administration's request for CTR funding in their versions of the FY2002 Defense Authorizaiton bills (H.R. 2586 and S. 1438). The House, however, requested a report on the rationale for the continuation of CTR funding and implementation through the Department of Defense.

Implementing the Programs. The United States government signed Memoranda of Understanding, known as "umbrella agreements" with each of the nations receiving assistance under the CTR program. These agreements, which form the legal framework for CTR and lay out the rights and responsibilities of each of the parties. The original agreement between the United States and Russia was set to expire in mid-June 1999, and many observers expected that it would not be renewed in time to continue implementing CTR programs because the two nations had held few high-level meetings on the issue. Russia had been reluctant to hold these meetings after NATO forces began their attacks against Serbian forces in Kosovo and Serbia. However, the United States and Russia concluded and signed a 7-year extension for the U.S.-Russian umbrella agreement on June 17, 1999.

By February 2001, the Department of Defense had obligated over $2.6 billion for CTR projects and had spent nearly than $2 billion implementing those efforts. Early CTR projects focused on transportation of nuclear warheads; the United States provided secure rail cars, storage containers, and kevlar blankets to protect nuclear warheads moving to storage areas inside Russia. The United States is also helping Russia with nuclear weapons control and accounting systems at storage facilities. CTR projects have also helped Belarus, Ukraine, and Kazakhstan eliminate Soviet-era strategic nuclear weapons and facilities on their territories. Russia will also receive CTR funds to help it dismantle nuclear weapons slated for elimination under START II. In addition, in FY1999, DOD requested funds to begin helping Russia with a warhead dismantling project. The two sides are also building a storage facility at Mayak for plutonium removed from Russia's nuclear weapons. The facility's design has been completed and construction is underway. However delays have occurred because Russia has been unable to fund its portion of the project and the two sides have been unable to agree on transparency measures that will ensure that materials stored in the facility are not removed and returned to nuclear weapons uses.

The CTR program also funded projects that addressed a particular proliferation concern. In November 1997, the United States purchased 21 nuclear-capable MIG-29 aircraft from the Republic of Moldova. The United States feared that Moldova might sell these aircraft to a nation seeking nuclear delivery capabilities. In April 1998, the United States and Great Britain moved 8.8 pounds of highly enriched uranium and 17.6 pounds of highly radioactive spent fuel from a nuclear reactor outside Tbilisi, Georgia to Dounreay, Scotland. According to officials in the U.S. State Department, Georgia had first requested assistance in securing these materials in 1996. The U.S. Department of Energy worked to improve security at the

facility, with both physical improvements and changes in security procedures. But the U.S., U.K. and Georgia eventually agreed that the only way to be sure the materials were safe was to remove them from the country. In September 1998, the government of Kazakhstan announced that it planned to move 3 tons of weapons-useable nuclear materials from a facility near the Iranian border to Semipalatinsk, on the other side of the nation, over the next several years. Funds from the CTR program would help secure this material, as well.

International Science and Technology Centers

The United States, several European countries, and Japan have all provided funding to International Science and Technology Centers (ISTC) in Moscow and Kiev. These centers — which were originally funded through the CTR program, but are now funded by the State Department — are designed to provide research and peaceful employment opportunities for nuclear scientists and engineers. The United States has contributed just over $75 million to the centers. The Centers began operations in 1992 and have, thus far, funded around 450 projects at a cost of $145 million. More than 17,000 scientists and engineers have participated in ISTC projects. Many continue to work at their primary jobs in Russia's research facilities. But, because most have not received their full salaries at their primary jobs, the grants from the ISTC permit them to support their families without contemplating selling their knowledge to nations seeking nuclear weapons.

Material Protection, Control, and Accounting Programs

As was noted above, many in the United States have expressed concerns about the safety and security of nuclear materials in the former Soviet Union. Although some of the materials believed to be at risk are located at nuclear weapons facilities, many others are located at civilian nuclear research facilities. Although the Nunn-Lugar CTR program focused on securing nuclear weapons, not materials, it did include some funding for materials control and protection. But government-to-government negotiations with Russia and the other republics proceeded slowly, so projects at facilities with these materials did not begin until 1994. In a parallel effort that sought to reduce these delays, experts from the U.S. nuclear laboratories also began, in 1994, less formal contacts with their counterparts in Russia to identify and solve safety and security problems at Russian facilities. Together, the government-to-government and lab-to-lab projects constitute the Material Protection, Control and Accounting (MPC&A) program, which is funded through the U.S. Department of Energy; these merged into a single program in 1997.

The MPC&A program began with less than $3 million in the FY1993 Nunn-Lugar budget and $11 million in FY1994. This amount grew to $73 million in FY1995. In FY1996, Congress expanded these programs through the Nunn-Lugar-Domenici Amendment, and provided $99 million in the DOE budget for MPC&A. The program received an additional $115 million in FY1997 and $137 million in FY1998. The Administration requested and the Congress approved $152 million for MPC&A activities in FY1999. The Clinton Administration requested $145 million for MPC&A activities for FY2000 and nearly $145 million in FY2001; Congress approved both these requests.

According to GAO, the Department of Energy has identified 332 buildings that require nuclear security systems. By late 1999, DOE had helped upgrade security systems at 113 buildings that contained about 50 metric tons of nuclear materials, or 7% of the 650 metric

tons that DOE believed were at risk of theft. These upgrades include the installation of improved security systems that use modern technology and strict material control and accounting systems. The program has also provided security training for Russian nuclear specialists. DOE officials have noted that the program had has experienced some problems and results have been limited because most of the materials are in Russia's closed nuclear cities and nuclear weapons complex. MINATOM, which is responsible for these facilities, has been slow to provide DOE with information about and access to these facilities because of the sensitive nature of the nuclear weapons complex.

In August 2000, the Russian American Nuclear Security Advisory Council, a private organization, issued a report that praised the past efforts of the MPC&A program, but criticized DOE and the Administration for moving too slowly and with too little priority to secure nuclear materials in the Former Soviet Union. The report outlined a number of steps that it believed the next Administration should take to accelerate and strengthen the program. It repeated many of these suggestions in a paper released in October, 2001, noting that the September 11 attacks had renewed and strengthened concerns about the safety and security of Russia's nuclear materials.

The Clinton Administration requested $145 million for MPC&A activities for FY2001. It also requested an additional $100 million for a new initiative, the Long Term Nonproliferation Program for Russia. DOE planned to use $70 million of this amount to help Russia strengthen security and accounting for existing civil plutonium stockpiles and to prevent the further accumulation of separated plutonium from spent fuel produced by civil nuclear power programs. The remaining $30 million would support a number of nonproliferation programs related to Russia's nuclear infrastructure, including new initiatives for securing weapons-usable materials in Russia and to accelerate the closure of Russian nuclear weapons assembly facilities. Congress approved the Administration's request for the MPC&A program, but did not fund the new Long Term initiative, noting that funding for this program was premature.

The Bush Administration sharply reduced the planned funding for MPC&A programs in FY2002. DOD had planned to request more than $200 million, but the Administration's budget reduced the program to 138.8 million. The Senate Armed Services Committee added $5 million to this request and expressed its concern about that the reduced level of funding would be inadequate to meet current and future needs. The Senate and House Appropriations Committees, in the Energy and Water Appropriations bills for FY2002, also sought to increase funding for the DOE programs. In the final version of the bill, which was passed in early November 2001, Congress restored funding for the MPC&A program to its FY2001 level. But, in spite of wide-spread concerns about the vulnerability of Russia's nuclear materials after the September 11 attacks, it did not increase funding beyond that level.

Initiatives for Proliferation Prevention

The Department of Energy's Initiatives for Proliferation Prevention (IPP) program, which began in 1994, funds projects with non-military applications that have commercial value for both the United States and the former Soviet republics. This effort is designed to discourage scientists and engineers in Russia's nuclear complex from seeking employment in other nations seeking nuclear weapons. The program has coordinated lab-to-lab contacts that sought to identify technologies at former Soviet weapons facilities that might have

commercial applications. It also matches U.S. government funds with funds provided by U.S. companies in projects that seek to commercialize these technologies.

The IPP program received $35 million in the FY1994 Foreign Operations Appropriations Act, and funded 193 projects in 1995. In FY1996, Congress provided $10 million in the DOE budget and the program received another $20 million from the Nunn-Lugar CTR budget. IPP received $30 million in the DOE budget each year in FY1997 and FY1998. Through FY1998, the IPP program had obligated $115 million to 435 projects throughout the former Soviet republics. In FY1999, DOE requested only $15 million, noting that it had sufficient unexpended funds from previous years to continue ongoing projects with this funding level. The Senate, however, in its version of the FY1999 Defense Authorization Bill (S. 2057) provided $30 million for the IPP program. The Conference Report on the Defense Authorization Bill (H.Rept. 105-736) provided $20 million for the IPP Program. It also required that the Secretary of Defense submit a study on the number of former Soviet nuclear weapons scientists and engineers who are likely to be unemployed or unpaid and the extent to which commercialization projects, such as those sponsored by IPP, might employ these people and discourage them from selling their knowledge to other nations. The Clinton Administration requested $30 million for the IPP program for FY2000 and $22.5 million for FY2001. The Bush Administration requested $22.1 million for FY2002, and this was supported by the House and Senate Armed Services Committees.

In February 1999, the General Accounting Office issued a report that reviewed and criticized the IPP program. The report noted that Russian institutes had received only around one-third of the funds allocated to IPP projects — around 50% of the funds had gone to the DOE labs for oversight and implementation and around 12% had gone to U.S. companies that were participating in the program — and that taxes, fees, and other charges had further reduced the amount of money available to Russian scientists. The report also questioned DOE's oversight of the programs, noting that program officials do not always know how many scientists are receiving funds through the IPP program. Finally, the report questioned whether the program was contributing to U.S. nonproliferation objectives because none of the projects was yet a commercial success and because some scientists who received IPP funding might still be working in Russia's WMD programs. DOE agreed that the IPP program needed improved oversight, but it questioned the conclusions about its contributions to U.S. nonproliferation objectives. DOE noted that IPP has temporarily employed thousands of scientists in around 170 institutes. DOE also stated that the program did not subsidize scientists who were performing weapons-related work.

In response to the GAO report, the House and Senate both reduced the Administration's request for funding for the IPP program in FY2000 and limited the proportion of the funding that can be allocated to the U.S. national labs. In the Conference Report on the FY2000 Defense Authorization Bill, Congress approved $25 million for IPP and specified that no more than 35% of the funds be spent at the U.S. labs. It also mandated that the United States seek to negotiate agreements with Russia to ensure that funds provided under this program are not subject to taxes in Russia. Furthermore, it requested that the Secretary of Energy review IPP programs for their commercialization potential.

Nuclear Cities Initiative

In August 1998, Vice President Gore and then-Prime Minister Kiriyenko signed an agreement establishing the Nuclear Cities Initiative. This program is designed to bring commercial enterprises to Russia's closed nuclear cities, so that scientists and engineers will not be tempted to sell their knowledge to nations seeking nuclear weapons. In September 1998, Secretary of Energy Richardson and Russia's Minister of Atomic Energy signed an implementing agreement for this program. It is designed to promote nonproliferation goals by helping to redirect the work of nuclear weapons scientists, engineers, and technicians and to develop commercial opportunities in those cities. For example, it helped finance a computing center in Sarov, formerly known as Arzamas-16, that will produce software for sale around the world.

The Clinton Administration requested $30 million for the NCI program in FY2000. In its February 1999 report, the GAO recommended that DOE move slowly with this initiative to ensure that it met its stated goals and objectives. As a result, Congress reduced funding for this program to $7.5 million in FY2000, limiting U.S. assistance to only one of three nuclear cities that were included in the Administration's initiative. The Clinton Administration has requested $17.5 million for this program in FY2001. Although most members of Congress have questioned the value of this program, in April 2000, Senator Domenici announced that he was considering introducing legislation that would expand funding for the NCI program. He stated that his goal would be to expand U.S. efforts to help Russia downsize its nuclear complex. This legislation became S.Amdt. 3760 to the Senate version of the Defense Authorization Bill. It authorized $30 million for the NCI program for FY2001, and passed the Senate on July 13, 2000. The Conference Committee accepted this level of funding for NCI in FY2001 but limited the amount that could be expended until the Secretary of Energy implemented a review process for the program.

The Bush Administration cut funding for the NCI program sharply, requesting $6.6 million for FY2002. With this low level of funding, the program would have to withdraw from two of the three nuclear cities that participate. The Administration has also indicated that it might eliminate the NCI program completely and merge its remaining projects into the IPP program. The Senate Armed Services supported the Administration's funding request for NCI, but did not support the Administration's plan to merge the NCI program with the IPP program. The House, however, required that DOE merge the NCI program with the IPP program in by July 1, 2001.

Bilateral Meetings

Officials from the United States and Russia have met in several groups over the past 5 years to address specific problems in Russia's nuclear weapons complex. Some groups have produced numerous agreements and cooperative efforts; others have shown few results. This section briefly reviews the objectives of some of these bilateral working groups.

The U.S.-Russian Commission on Economic and Technological Cooperation (The Gore-Chernomyrdin Commission). In April 1993, Presidents Clinton and Yeltsin established the U.S.-Russian Commission on Economic and Technological Cooperation, to be chaired by Vice President Gore and Russia's Prime Minister Chernomyrdin. Although the Commission was created to foster cooperation on space and

energy issues, its mandate has expanded to include a number of other different policy areas. In addition, Vice President Gore and Prime Minister Chernomyrdin often used their meetings to address issues, such as arms control and missile defense cooperation, on the agenda for upcoming Presidential summits.

The Energy Committee had a working group that addressed fissile materials (e.g. weapons-grade uranium and plutonium) in an effort to ensure that they do not pose a proliferation or environmental threat. This working group has agreed on numerous projects, most of which were subsequently funded by the Nunn-Lugar CTR program. For example, in 1994, the commission announced that the two sides would cooperate in building a storage facility at Mayak (described above) for plutonium removed from Russia's nuclear weapons. In 1994, Vice President Gore and Prime Minister Chernomyrdin also signed the agreement that established the program through which the United States will purchase 500 metric tons of uranium removed from Russian nuclear weapons for use in nuclear power reactors.

In June 1994, the two sides signed an agreement requiring the shutdown of nuclear reactors that produce plutonium for nuclear weapons. Russia initially balked at this agreement because it used the same reactors to produce light and heat in the cities of Tomsk and Krasnoyarsk, but the two sides agreed to find ways to replace these energy sources. Although it announced that it had stopped producing plutonium for weapons in the reactors by the end of 1994, Russia refused to proceed with the shutdown because these alternatives were not yet available. In 1996, the two sides agreed to convert the reactors to a type that would not produce weapons-grade materials as a byproduct of energy production. The United States planned to contribute $80 million, through the Nunn-Lugar CTR Program, to convert the reactors. An implementing agreement was signed at the commission's meeting in September 1997. However, in February 2000, the Russian government reportedly told the Clinton Administration that it wanted to cancel the reactor conversion project because of delays, cost overruns, and fears of a catastrophic accident. Instead, Russia suggested that it would close the reactors altogether if the United States would help fund conventional energy sources for the affected cities. In response, in its version of the Defense Authorization Bill (H.R. 4205), the House prohibited the use of any CTR funds for the construction of "fossil fuel energy plants." And the Senate Armed Services Committee, in its version of the bill (S. 2549), limited the amount of funds that could be spent on this project until a new option was selected for the shutdown or conversion of the reactors.

During their June 24, 1998 meeting, Vice President Gore and Prime Minister Kiriyenko signed two agreements on nuclear issues. The United States agreed to provide Russia with assistance in converting plutonium from nuclear weapons to fuel for nuclear reactors. In the second agreement, the United States pledged $3.1 million for 9 projects that are designed to help scientists in Russia's closed nuclear cities convert their efforts to peaceful civilian endeavors, a project known as the Nuclear Cities Initiative. The Bush Administration has indicated that it will not continue to address U.S-Russian issues through this high-level bilateral commission. Instead, the Administration will establish working groups to address individual security and economic issues as the need arises.

The Strategic Stability Working Group (SSWG). In September 1993, Secretary of Defense Aspin and Defense Minister Grachev established a working group of experts from the U.S. DOD and the Russian MOD, to discuss ways to improve strategic stability, increase mutual confidence, and relax the Cold War nuclear force postures. One of the first topics the

SSWG addressed was ballistic missile "detargeting." In an agreement that took effect on May 30, 1994, the two nations agreed that no country would be targeted by any strategic forces on either side. Many observers praised this agreement as an overdue sign that the United States and Russia no longer consider each other enemies. Some also saw it as a move away from the nuclear hair-trigger and a concrete step to reduce the risk of accidental missile launches. Others, however, argued that its benefits were strictly symbolic because both sides could quickly retarget missiles during a crisis. Many also noted that the measure was not verifiable, so neither side could be sure that the other's missiles were actually detargeted.

During the mid-1990s the United States shared information with the Russians about threats to both sides from short-range ballistic missiles, and the two sides held joint table-top exercises their defenses against short-range ballistic missile attacks. The first phase of this project occurred in June 1996, in Colorado Springs. At that time, the Russians deployed SA-12 interceptors and the U.S. deployed Patriot batteries in a simulated combat scenario to defend against a common enemy. Another joint exercise took place in 1998, and a third occurred in early 2001. The exercises involved computer simulations, rather than actual military operations, and focused on scenarios where the two nations might practice coordinating and communicating in engaging targets in a theater of operations.

Safeguards, Transparency, and Irreversibility Talks. In January 1994, Presidents Clinton and Yeltsin established a working group to consider steps to ensure the transparency and irreversibility of the process of reducing nuclear weapons. The Safeguards, Transparency, and Irreversibility working group produced an agreement, in principle, for the two sides to exchange data on warhead stockpiles. But they were unable to complete an agreement that would permit the exchange of classified data on nuclear warheads. Congress had amended U.S. law to permit this exchange in 1994, but Russia has neither passed legislation nor issued the necessary executive decree.

Arms Control Proposals

Nonstrategic Nuclear Weapons. In 1991, the United States and Soviet Union both announced that they were withdrawing most of their deployed nonstrategic nuclear weapons and placing them in central storage areas. Each side adopted these measures unilaterally, without formal negotiations and without a formal verification regime. The United States and Russia have periodically exchanged information updating the status of the withdrawals and assuring the other side that the remaining weapons are in safe and secure storage areas. During their summit meeting in Helsinki in March 1997, Presidents Clinton and Yeltsin agreed that the two sides would explore possible arms control measures relating to tactical nuclear weapons and warheads removed from strategic nuclear weapons during the proposed START III negotiations (which will not begin until START II enters into force). These initiatives could include transparency measures and confidence-building measures, along with reciprocal inspections and monitoring at storage and dismantlement facilities.

The United States would like further restrictions on Russian tactical nuclear weapons both because it believes these might pose a proliferation risk and because Russia has a far greater number of these weapons than does the United States. Russia has resisted formal limits. However, in late April 1998, officials from NATO and Russia exchanged information about their nonstrategic nuclear weapons. This effort was designed not only to ease Russia's

concerns about NATO's nuclear weapons, but also to provide NATO with information about the thousands of tactical nuclear weapons still in service in Russia.

Agreement on the Disposition of Weapons-grade Plutonium. In Sept. 1998, Presidents Clinton and Yeltsin agreed that each nation would convert 50 metric tons of weapons-grade plutonium to a form that could not be returned to nuclear weapons. Clinton Administration officials estimated that this amount was approximately half of the U.S. stockpile and perhaps 25% of Russia's stockpile. The agreement highlighted two means for converting the plutonium — the parties could either convert it to fuel for nuclear power reactors or mix it with other nuclear wastes and dispose of it in a way the would preclude its use in nuclear weapons. This agreement is designed to ease concerns about the possible theft or diversion of weapons-grade plutonium by nations or others seeking to develop their own nuclear weapons. However, the Clinton Administration emphasized that this effort could cost hundreds of millions of dollars, and it called on other nations to help Russia implement the program. Congress allocated $200 million for this program in the Omnibus Appropriations Act passed at the end of the 105th Congress. The Clinton Administration had planned to request $400 million for this program in FY2002, but the Bush Administration has indicated that funding would remain at around $200 billion.

Sharing Early Warning Data. In September 1998, Presidents Clinton and Yeltsin agreed that the United States and Russia would share early warning data for all space launches and ballistic missile launches world wide. The two sides have agreed that they will share data on a continual basis, in real time (rather than providing it annually or biannually); they agreed that data would include information on strategic, theater, and intermediate range missiles, and on space launches; they agreed the data would be derived from early warning satellites and ground-based radars; and they agreed to establish a multilateral pre-launch notification system that would be open to all nations who agreed to share data prior to missile or space launches from their territories. The Clinton Administration emphasized that this agreement would strengthen stability and protect against the possibility of a nuclear launch triggered by false warning of an attack. Administration officials have also highlighted the cooperative nature of this endeavor; this Center will provide the first opportunity for U.S. and Russian military personnel to be permanently involved in a joint military operation.

In mid-December 2000, the United States and Russia signed an agreement outlining the types of information that would be exchanged in the newly-formed Joint Data Exchange Center (JDEC) near Moscow. This agreement establishes a pre-launch and post-launch notification system for ballistic missile and space launches and designed to reduce the risk that a test, experiment, or space launch, could be misread as a ballistic missile attack. Some critics of the planned center argued it would hinder U.S. access to space by requiring that notifications before launches, but the military space community reportedly reviewed all the provisions and approved of the plan because it allows for exceptions to the notification requirement in the interest of national security. Most experts hoped the center, which is to be based in an old school building near Moscow, would begin operations in 2001. However, the building's renovations have not yet begun. Disagreements between the United States and Russia about tax issues, along with a general cooling in the relationship between the two countries, have been cited as reasons for the delay.

Alert Rates for Strategic Nuclear Weapons. Many analysts argue that Russia's aging satellite and communication systems, when combined with the high alert rates for U.S.

and Russian nuclear forces (both can launch on very short notice), increase the possibility of a nuclear attack. Many analysts note that Russia may lack complete information about the status of U.S. forces and, therefore, might interpret ambiguous events as a missile launch. The agreement on sharing early warning data seeks to address this problem by providing Russia with information about ambiguous events. Some in the United States, such as Bruce Blair and former Senator Sam Nunn, have proposed that the United States and Russia go further and "de-alert" their nuclear weapons. They argue that, if U.S. weapons were not on alert, Russia would be less likely to assume that it were under attack if it detected ambiguous activities. In addition, if Russia took its forces off alert, it would not have to loosen controls over them to ensure their launch in a crisis because the missiles would not be ready to be launched in a crisis. Those who support de-alerting have outlined several different measures, from removing warheads from missiles and storing them separately, to removing launch keys from control centers or removing critical data from launch computers.

Those who oppose the idea of "de-alerting" argue that it will undermine, not enhance stability. They note that warheads in a few storage depots may be far more vulnerable to a preemptive attack than warheads deployed on hundreds of missiles in hardened silos. They also argue that each side might feel compelled to "re-alert" its forces quickly if it suspected that the other side had started the process, and that this could lead to a destabilizing "alert" race, with each trying to gain an advantage over the other. Finally, some have noted that officials in Russia have shown no interest in this proposal; instead, some Russians have argued that "de-alerting" appears to be a U.S. attempt to disarm Russian missiles.

In late 1997, an inter-agency working group assessed possible measures to "de-alert" U.S. nuclear forces. This effort stemmed, in part from the U.S.-Russian agreement to deactivate weapons that would be eliminated under START II by the end of 2003, even though they would not have to be eliminated until 2007. But it also was an effort to explore the idea of a more comprehensive change in nuclear weapons alert status. The effort, however, did not result in any changes in the alert status of U.S. nuclear forces. During testimony before the Senate Armed Services Committee, General Eugene Habiger, the Commander-in-Chief of the U.S. Strategic Command, noted that the reductions in offensive forces mandated by the START Treaties would serve to reduce the number of alert weapons in the U.S. force from about 2,300 today to less than 1,000 under START II and less than 700 under START III because only a portion of the U.S. force is on alert at any one time.

FOR ADDITIONAL READING

Executive Branch Reports

U.S. Department of Defense. *Cooperative Threat Reduction.* August 1997.

U.S. Department of Energy. *MPC&A Strategic Plan*. January 1998.

CRS Products

CRS Issue Brief IB98030. *Nuclear Arms Control: The U.S.-Russian Agenda.*

CRS Report 97-1027. *Nunn-Lugar Cooperative Threat Reduction Programs: Issues for Congress.*

CRS Report 97-586. *Russia's Nuclear Forces: Doctrine and Force Structure Issues*.