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Report to Congressional Requesters

February 2007

NUCLEAR NONPROLIFERATION

Progress Made in Improving Security at Russian Nuclear Sites, but the Long-term Sustainability of U.S.-Funded Security Upgrades Is Uncertain

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GAO-07-404

February 2007

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Highlights

Highlights of GAO-07-404, a report to congressional requesters

NUCLEAR NONPROLIFERATION

Progress Made in Improving Security at Russian Nuclear Sites, but the Long-term Sustainability of U.S.-Funded Security Upgrades Is Uncertain

Why GAO Did This Study

Safeguarding nuclear warheads and materials that can be used to make nuclear weapons is a primary national security concern of the United States. Since 1993, the Departments of Energy (DOE) and Defense (DOD) have worked to improve security at sites housing weapons-usable nuclear material and warheads in Russia and other countries. In 1995, DOE established the Materials Protection, Control, and Accounting (MPC&A) program to implement these efforts. GAO examined the (1) progress DOE has made in improving security at nuclear material sites in Russia and other countries, (2) rogress DOE and DOD have made in improving security at Russian nuclear warhead sites, and (3) efforts DOE and DOD have undertaken to ensure the continued effective use of U.S.-funded security upgrades. To address these objectives, among other things, GAO analyzed agency documents, conducted interviews with key program officials, and visited four Russian nuclear sites.

What GAO Recommends

GAO recommends that DOE (1) revise the metrics it uses to track progress in securing buildings with weapons-usable nuclear material and (2) develop a management information system to track DOE's progress in providing Russia with a sustainable MPC&A system by 2013.

DOE agreed with GAO's findings and recommendations. DOD did not provide written comments.

www.gao.gov/cgi-bin/getrpt?GAO-07-404.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

What GAO Found

Through fiscal year 2006, DOE and DOD spent over $2.2 billion to provide security upgrades and other assistance at sites in Russia and other countries that house weapons-usable nuclear materials and warheads. With regard to securing nuclear material, DOE reports to have "secured" 175 buildings and plans to improve security at 35 additional buildings by the end of 2008. However, DOE's reported total of buildings "secured" does not recognize that additional upgrades remain to be completed at some buildings because DOE considers a building "secured" after it has received only limited MPC&A upgrades, even when additional comprehensive upgrades are planned. Further, DOE and Russia have developed a Joint Action Plan that includes 20 sites and details the remaining work to be accomplished by 2008. However, the plan does not include two sites containing many buildings with vast amounts of nuclear material where Russia has denied DOE access.

DOE and DOD report to have improved security at 62 Russian warhead sites and plan to help secure 35 additional sites by the end of 2008. The departments have improved their coordination mechanisms since our 2003 report, in which GAO reported that the agencies had inconsistent policies for installing site security upgrades at Russian warhead sites. Additionally, DOE and DOD are using similar approaches to manage large security upgrade contracts at warhead sites. DOD has used earned value management (EVM), which at early stages can identify cost and schedule shortfalls. DOE has not used EVM on its fixed-price contracts, but, during the course of GAO's review, augmented its contract oversight to increase reporting frequency, which DOE officials consider a comparable alternative to EVM.

DOE has developed broad guidelines to direct its efforts to help ensure that Russia will be able to sustain (operate and maintain) U.S.-funded security systems at its nuclear material and warhead sites after U.S. assistance ends and is working with Russia to develop a joint sustainability plan. However, DOE lacks a management information system to track the progress made toward its goal of providing Russia with a sustainable MPC&A system by 2013. DOE and DOD's abilities to ensure the sustainability of U.S.-funded security upgrades may be hampered by access difficulties, funding concerns, and other issues. Finally, DOE and DOD plan to provide Russia with assistance to sustain security upgrades at nuclear warhead sites but have not reached agreement with Russia on access procedures for sustainability visits to 44 sites. As a result, the agencies may be unable to determine if U.S.-funded security upgrades are being properly sustained.

Category	Progress	Spending
Nuclear material (DOE)	DOE has helped improve security at 175 of 210 buildings with nuclear material in Russia and other countries.	$1.3 billion
Nuclear warheads (DOE and DOD)	DOE and DOD have completed work at 62 of 97 planned sites and provided assistance to improve warhead transportation security.	$920 million

Sources: GAO analysis of DOE and DOD data.

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Abbreviations

DOD	Department of Defense
DOE	Department of Energy
EVM	earned value management
FIS	Federal Information System
HEU	highly enriched uranium
MIMS	Metrics Information Management System
MOD	Ministry of Defense (Russia)
MOM	MPC&A Operations Monitoring
MPC&A	Materials Protection, Control, and Accounting
NNSA	National Nuclear Security Administration
OMB	Office of Management and Budget
Rosatom	Federal Agency for Atomic Energy of the Russian Federation

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United States Government Accountability Office
Washington, D.C. 20548

February 28, 2007

The Honorable Carl Levin
Chairman
Permanent Subcommittee on Investigations
The Honorable Norm Coleman
Ranking Member
Permanent Subcommittee on Investigations
Committee on Homeland Security
and Governmental Affairs
United States Senate

The Honorable John D. Dingell
Chairman
Committee on Energy and Commerce
House of Representatives

Safeguarding nuclear warheads and nuclear materials that can be used to make nuclear weapons is a primary national security concern of the United States and Russia. The collapse of the Soviet Union left Russia with the largest arsenal of nuclear weapons in the world with unclassified U.S. estimates of the number of Russia's nuclear warheads at the end of the cold war ranging from 18,000 to 25,000. Russia also inherited an estimated 600 metric tons of highly enriched uranium and plutonium—materials that could be used to build nuclear weapons.[1] Terrorists or countries seeking nuclear weapons could use as little as 25 kilograms of highly enriched uranium or 8 kilograms of plutonium to construct a nuclear weapon. During the Soviet era, security systems at Soviet nuclear sites emphasized heavy surveillance of site workers with severe penalties imposed on those who violated security procedures. However, the fall of the Soviet Union and subsequent social, political, and economic changes in Russia and other former Soviet republics exposed gaps in the physical security and material accounting at sites containing nuclear material and revealed weaknesses in these countries' abilities to secure nuclear sites against internal and external threats of theft.

[1]Weapons-usable nuclear materials are uranium enriched to 20 percent or greater in uranium-235 or uranium-233 isotopes and any plutonium containing less than 80 percent of the isotope plutonium-238 and less than 10 percent of the isotopes plutonium-241 and plutonium-242. These types of materials are of the quality used to make nuclear weapons.

Since the early 1990s, there has been concern that unsecured nuclear or radioactive material could fall into the hands of terrorists and be smuggled into the United States for use in a nuclear weapon or a device that uses conventional explosives with radioactive material (known as a "dirty bomb"). For example, in January 2007, international media reported that authorities in Georgia had seized about 100 grams of highly enriched uranium from a Russian citizen who was attempting to sell the material on the black market.[2] Key to the United States' efforts to combat this threat is securing nuclear materials and warheads at vulnerable civilian and military sites in the former Soviet Union and other countries. In 1991, the Congress authorized the Department of Defense (DOD) to establish the Cooperative Threat Reduction program to help Russia, Ukraine, Belarus, and Kazakhstan secure and protect former Soviet nuclear weapons.[3] Members of the Congress were concerned that nuclear weapons or materials might be lost, stolen, or sold and that nuclear scientists and technicians might be persuaded to sell their knowledge to nations or terrorists seeking to develop nuclear weapons. Between fiscal years 1992 and 2006, the Congress authorized about $9 billion for a variety of nuclear nonproliferation programs implemented by DOD and the Department of Energy (DOE), including efforts to help Russia and other countries secure sites where nuclear material and warheads are located. In 1993, DOE and the Russian government began working together to secure sites housing weapons-usable nuclear material and, in 1995, DOE established the

[2]We recently reported on U.S. efforts to combat nuclear smuggling. For additional information see GAO, *Combating Nuclear Smuggling: Corruption, Maintenance, and Coordination Problems Challenge U.S. Efforts to Provide Radiation Detection Equipment to Other Countries*, GAO-06-311 (Washington, D.C.: Mar. 14, 2006) and GAO, *Preventing Nuclear Smuggling: DOE Has Made Limited Progress in Installing Radiation Detection Equipment at Highest Priority Foreign Seaports*, GAO-05-375 (Washington, D.C.: Mar. 31, 2005).

[3]In 1991, the Congress passed the Soviet Nuclear Threat Reduction Act of 1991, popularly referred to as the Nunn-Lugar Act, authorizing U.S. threat reduction assistance to the former Soviet Union, due to concerns about the safety and security of Soviet nuclear weapons. Pub. L. No. 102-228, 105 Stat. 1691 (codified at 22 U.S.C. § 2551 note). The legislation authorized funding to assist the former Soviet Union with its efforts to (1) destroy nuclear, chemical and other weapons; (2) transport, store, disable and safeguard weapons in connection with their destruction; and (3) establish verifiable safeguards against the proliferation of such weapons. As a result of this assistance, Belarus, Kazakhstan, and Ukraine returned all Soviet nuclear weapons on their territories to Russia in the early 1990s.

Materials Protection, Control, and Accounting (MPC&A) program, which is now administered by the National Nuclear Security Administration (NNSA).[4] Through its MPC&A program,[5] DOE has provided nuclear facilities in Russia and other countries with modern nuclear security systems that include the following, among other things:

- physical protection systems, such as fences around buildings containing nuclear materials; metal doors protecting rooms where nuclear materials are stored; and video surveillance systems to monitor storage rooms;

- material control systems, such as seals attached to nuclear material containers to indicate whether material has been stolen from the containers, and badge systems that allow only authorized personnel into areas containing nuclear material; and

- material accounting systems, such as nuclear measurement equipment and computerized databases to inventory the amount and type of nuclear material contained in specific buildings and to track their location.

In 1998, DOE issued guidelines that provide a systematic approach for DOE program managers to develop and implement MPC&A systems that meet DOE's objective of helping Russia and other countries secure buildings with weapons-usable nuclear material and nuclear warhead storage sites.[6] DOE seeks to improve security at nuclear sites in Russia and other countries by providing security upgrades that protect against threats of theft from both internal adversaries, such as disgruntled nuclear workers (called the "insider" threat), and external adversaries, such as terrorist

[4]NNSA is a separately organized agency within DOE that was created by the National Defense Authorization Act for Fiscal Year 2000, Pub. L. No. 106-65 (2000), with responsibility for the nation's nuclear weapons, nonproliferation, and naval reactors programs.

[5]We reported on U.S. efforts to secure nuclear material and warheads in Russia, including DOE's MPC&A program, most recently in 2003. See GAO, *Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites*, GAO-03-482 (Washington, D.C.: Mar. 24, 2003).

[6]DOE, *Programmatic Guidelines for Material Protection, Control, and Accounting Upgrades at Russian Facilities* (first published December 1998, revised September 2001 and December 2005).

groups. DOE conducts these site security upgrades in two phases known as "rapid" upgrades and "comprehensive" upgrades.

- Rapid upgrades include such improvements as bricking up windows in buildings where nuclear material is stored; installing strengthened doors, locks, and nuclear container seals; establishing controlled access areas around nuclear material; and implementing procedures that require the presence of two people when nuclear material is handled (called the "two-person rule"). Rapid upgrades are primarily designed to be simple, easy to implement and maintain, and result in immediate, though limited, improvements to nuclear material security. Rapid upgrades include upgrades designed to detect and delay external adversaries and sometimes include basic material control and accounting equipment and procedures that can be implemented during a 6-to-12 month period.

- Comprehensive upgrades include electronic sensors, motion detectors, and closed circuit television systems to detect intruders; central alarm stations, where guards can monitor cameras and alarms; and computerized nuclear material accounting systems. Comprehensive upgrades are designed to secure against both internal and external threats and are usually put in place over the 18-to-24 months after the rapid upgrades have been installed but can be installed concurrently in some cases.

Buildings that contain nuclear material, which DOE considers to be of a high proliferation threat receive both rapid and comprehensive upgrades, and buildings with nuclear material of less concern may receive only rapid upgrades. In addition to providing security upgrades, DOE provides a variety of training to foreign officials and nuclear site personnel on how to operate MPC&A systems.

In February 2006, DOE changed the metrics it uses to track progress in its MPC&A program from measuring the percentage of nuclear material secured (out of the estimated 600 metric tons of loose nuclear material in the former Soviet Union) to measuring the number of buildings in Russia and other countries with weapons-usable nuclear material that have been

secured.[7] DOE currently plans to secure 210 buildings containing weapons-usable nuclear material in Russia and other countries by the end of 2008.

The United States has also assisted Russia in improving security at nuclear warhead storage sites, both temporary sites, such as rail transfer points, and permanent sites containing storage bunkers. In 1995, DOD began assisting the Russian Ministry of Defense (MOD) with enhancing transportation security for nuclear warheads and security at nuclear warhead sites. Also, in 1998, at Russia's request, DOE expanded the scope of its efforts with the Russian Navy from protecting naval reactor fuel to helping secure nuclear warheads. In February 2005, President Bush and Russian President Putin issued a joint statement on nuclear security cooperation, including enhanced cooperation on nuclear terrorism prevention efforts.[8] In 2006, Presidents Bush and Putin reaffirmed their commitment to completing security upgrades at nuclear material and warhead sites in Russia by the end of 2008.[9] DOE and DOD plan to help Russia secure a total of 97 nuclear warhead sites by the end of 2008.

After completing the installation of site security upgrades, DOE and DOD provide ongoing technical and financial support to help ensure that U.S.-funded security upgrades continue to reduce the risk of theft at foreign nuclear sites. These efforts are known as sustainability activities. Sustainability support is necessary to ensure that U.S.-funded security upgrades are properly maintained and continue to support risk reduction goals as intended. However, security of nuclear material and warheads in Russia and other countries ultimately depends on these countries' ability to sustain the continued operation of U.S.-funded security upgrades after U.S. funding ends. In 2002, the Congress directed DOE to work with Russia to develop a sustainable MPC&A system to be solely supported by Russia no later than January 1, 2013.[10]

[7]DOE, *Department of Energy Fiscal Year 2007 Congressional Budget Request, National Nuclear Security Administration*, vol. 1, 514, February 2006.

[8]*Joint Statement by President Bush and President Putin on Nuclear Security Cooperation*, February 24, 2005.

[9]*Joint Statement by President George W. Bush and President V. V. Putin*, July 17, 2006.

[10]*Bob Stump National Defense Authorization Act for Fiscal Year 2003*, Pub. L. No. 107-314, § 3156(b)(1) (codified at 50 U.S.C. § 2343).

As agreed with your offices, this report addresses U.S. efforts to secure nuclear material and warheads in Russia and other countries by assessing: (1) the progress DOE has made in helping Russia and other countries secure weapons-usable nuclear material, (2) the progress DOE and DOD have made in helping Russia secure its nuclear warhead sites, and (3) the efforts undertaken by DOE and DOD to ensure the sustainability and continued use of U.S.-funded security upgrades at sites that house nuclear materials and warheads in Russia and other countries.

To address these objectives, we analyzed documentation from DOE and its contractors at Los Alamos, Oak Ridge, and Sandia National Laboratories; DOD; and DOD contractors. We conducted interviews with key program officials at each of these agencies and at the Department of State. We also discussed the implementation of DOE and DOD's programs with Russian officials. However, the Federal Agency for Atomic Energy of the Russian Federation (Rosatom), which is responsible for the production of all nuclear materials in Russia and the development, testing, and production of Russian nuclear weapons, denied our request for access to facilities under its control. We were able to complete our audit objectives by visiting four Russian nuclear facilities—civilian, educational, and research institutes not under Rosatom's control—where DOE installed MPC&A upgrades. We discussed security issues and the sustainability of MPC&A upgrades with officials at these sites. In addition, we analyzed cost and budgetary information from DOE and DOD on U.S. efforts to help Russia and other countries secure nuclear materials and warheads. We interviewed knowledgeable DOE and DOD officials on the reliability of these data, including issues such as data entry, access, quality control procedures, and the accuracy and completeness of the data. We determined these data were sufficiently reliable for the purposes of this report. More details on our scope and methodology can be found in appendix I. We conducted our review from April 2006 to February 2007 in accordance with generally accepted government auditing standards.

Results in Brief

From fiscal year 1993 through fiscal year 2006, DOE spent about $1.3 billion to provide security upgrades and other related assistance to sites with buildings that house weapons-usable nuclear material in Russia and other countries, and the agency reports to have "secured" 175 buildings containing about 300 metric tons of weapons-usable nuclear material. However, the number of secured buildings does not fully present the extent and nature of upgrades made and work remaining to be completed because DOE considers a building to be "secure" after it has received only limited

MPC&A upgrades (rapid upgrades), even when additional comprehensive upgrades have yet to be completed. Specifically, 51 of the 175 buildings DOE reported to have "secured" by the end of fiscal year 2006 do not have completed MPC&A upgrades. While DOE officials told us that rapid upgrades offer a measure of risk reduction against some threats, they also noted that rapid upgrades do not meet all of DOE's risk reduction goals for most buildings with weapons-usable nuclear material. Further, in response to terrorist actions and rising threat levels in Russia, DOE is examining the impact of an increased design basis threat for its MPC&A program and providing additional assistance to protective forces at Russian nuclear sites. Finally, DOE and Rosatom have developed a Joint Action Plan that includes 20 civilian and nuclear weapons complex sites housing buildings with weapons-usable nuclear material. While the plan details the remaining scope of work to be accomplished by 2008, it does not include two key sites involved in manufacturing of Russian nuclear warheads that contain many buildings with hundreds of metric tons of weapons-usable nuclear material. Because of the sensitive nature of the work conducted at these sites, Rosatom has denied DOE's proposals for upgrading the sites, including proposals with less intrusive access requirements, and informed DOE that it is not interested in pursuing MPC&A cooperation at these sites.

Since 1995, DOE and DOD have spent about $920 million to help Russia improve security at 62 nuclear warhead sites, and the agencies plan to help Russia secure 35 additional sites by the end of 2008. Through the end of fiscal year 2006, DOE spent about $374 million to help Russia secure 50 nuclear warhead sites, while DOD spent about $546 million to secure 12 nuclear warhead storage sites and to improve security for the transportation of Russian warheads. DOE plans to provide security upgrades at 23 additional sites, and DOD plans to provide upgrades at 12 additional sites by the end of 2008. Coordination between DOE and DOD has improved since 2003, when we reported that the agencies had inconsistent policies for installing site security upgrades at Russian nuclear warhead sites. For example, DOE and DOD have now jointly developed common designs for security upgrades at similar Russian warhead sites in order to ensure a level of consistency in the assistance provided to these sites. We also found that DOE and DOD use similar approaches to managing large contracts to provide security upgrades at Russian nuclear warhead sites. DOD has used an earned value management (EVM) system to identify cost and schedule variances on contracts to provide security upgrades at Russian nuclear warhead sites so they can be addressed in a timely manner. DOE does not require its contractors to implement EVM systems on its fixed-price contracts for installing security upgrades at

Russian warhead sites. However, during the course of our review, the department augmented its contract oversight mechanisms, and DOE officials believe that their improved oversight system constitutes a comparable alternative to an EVM system.

As DOE and DOD near the completion of their security upgrade programs, the sustainability of U.S.-funded nuclear security upgrades in Russia and other countries has become increasingly important for ensuring that the substantial investment of U.S. funds over the past 15 years is not wasted. To this end, DOE has developed broad guidelines to direct its efforts to help ensure that Russia will be able to sustain (operate and maintain) U.S.-funded security systems at its nuclear material and warhead sites after U.S. assistance ends and is working with Rosatom to develop a joint U.S.-Russian sustainability plan. However, DOE lacks a management information system to assist MPC&A management in tracking the progress being made toward its goal of providing Russia a sustainable MPC&A system by 2013, similar to the system DOE uses to track the number of buildings and sites where it has installed security upgrades. Further, access challenges and other issues could impact DOE and DOD's ability to prepare Russia to sustain U.S.-funded security upgrades on its own. In 2002, the Congress directed DOE to work with Russia to provide a sustainable MPC&A system to be solely supported by Russia no later than January 1, 2013. In response, DOE issued interim guidelines in May 2004 to direct its efforts to create a sustainable MPC&A system in Russia and finalized these guidelines in December 2006. DOE's sustainability guidelines include seven key elements, such as a site MPC&A operational plan and preventative maintenance program. However, access difficulties, sites' financial ability to maintain equipment, and other issues could impact DOE's ability to prepare Russia to sustain security upgrades at nuclear material sites. For example, at one facility where DOE completed upgrades in 1998, DOE officials were denied access from 1999 through 2002 and, upon returning to the facility, found the security upgrades were in a severe state of disrepair. As a result, DOE had to spend about $800,000 to correct problems resulting from the site's inability to properly maintain the security upgrades DOE had provided. Finally, DOE and DOD also plan to provide Russia with assistance to sustain U.S.-funded security upgrades at nuclear warhead sites, but access difficulties may prevent the agencies from carrying out their plans. Specifically, neither DOE nor DOD has reached an agreement with the Russian Ministry of Defense on access procedures for sustainability visits to 44 permanent warhead storage sites. Site access or alternative means of verification are necessary to ensure that U.S. funds are being used to help Russia maintain security upgrades at these sites. If DOE

and DOD cannot reach an agreement with the Russian Ministry of Defense on access procedures for sustainability activities at these 44 sites, the agencies will be unable to determine if U.S.-funded security upgrades are being properly sustained and may not be able to spend funds appropriated for these efforts.

To strengthen program management and the effectiveness of DOE's efforts to improve security at nuclear material and warhead sites in Russia and other countries, we are recommending that the Secretary of Energy, working with the Administrator of NNSA, (1) revise the metrics used to measure MPC&A program progress to better reflect the level of security upgrade completion at buildings reported as "secure" and (2) develop a management information system to track DOE's progress in providing Russia with a sustainable MPC&A system by 2013.

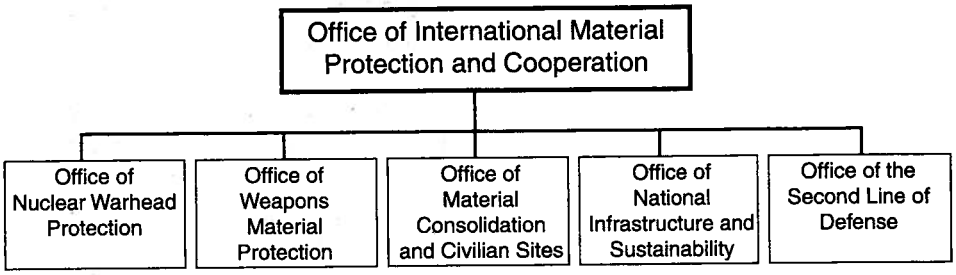
We provided a draft of this report to DOE and DOD for comment. DOE generally agreed with our findings and recommendations. DOD had no written comments on our report. DOE provided additional information about the metric it uses to track progress in the MPC&A program, its reasons for not using EVM on fixed-price contracts, and on its efforts to work with Rosatom on sustainability issues. DOE and DOD also provided technical comments, which we incorporated, as appropriate.

Background

In 1993, DOE and the Russian government began working together to secure sites housing weapons-usable nuclear material and, in 1995, DOE established the MPC&A program, which is now administered by NNSA. DOE's Office of International Material Protection and Cooperation, within NNSA, consists of five offices whose collective efforts contribute to enhancing the security of nuclear material and warheads in countries of concern and to improving the ability to detect illicit smuggling of those materials (see fig. 1). Four of these offices implement DOE's MPC&A program, which, among other things, provides security upgrades at nuclear sites in Russia and other countries, and the fifth office, the Office of the Second Line of Defense, works to improve detection of illegal nuclear trafficking activities at border crossings and seaports.[11]

[11]The Office of the Second Line of Defense is composed of two programs: the Second Line of Defense-Core program and the Megaports Initiative. We recently reported on these efforts, which are not discussed in this report. For additional information, see GAO-06-311 and GAO-05-375.

Figure 1: Organizational Structure of DOE's Office of International Material Protection and Cooperation



Source: DOE.

The Office of Nuclear Warhead Protection works with the Russian Ministry of Defense, including the 12th Main Directorate—the Russian Defense Ministry's organization for nuclear munitions, the Strategic Rocket Forces, and the Navy to install security upgrades at nuclear warhead storage sites. The Office of Nuclear Warhead Protection also oversees DOE's security upgrades work at naval nuclear fuel sites. The Office of Weapons Material Protection upgrades MPC&A systems at sites within the Rosatom nuclear weapons complex and also oversees DOE efforts to sustain U.S.-funded security upgrades at nuclear sites within the former Soviet Union that are not in Russia, such as facilities in Ukraine and Uzbekistan. The Office of Material Consolidation and Civilian Sites works to install MPC&A upgrades at nonmilitary nuclear facilities throughout Russia and oversees efforts to consolidate nuclear material into fewer buildings and to convert excess weapons-usable nuclear material into less attractive forms. The Office of Material Consolidation and Civilian Sites also manages DOE's efforts to provide nuclear security assistance to countries outside of the former Soviet Union. The Office of National Infrastructure and Sustainability manages a variety of crosscutting programs, including transportation and protective forces assistance, and oversaw the development of guidelines for DOE's efforts to help ensure that Russia can sustain the operation of U.S.-funded security systems at its nuclear sites after U.S. assistance ends.

DOD has also assisted Russia in securing nuclear warhead storage sites, both temporary sites, such as rail transfer points, and permanent sites containing storage bunkers. In 1995, DOD began assisting the Russian Ministry of Defense with enhancing transportation security for nuclear warheads and security at nuclear warhead sites. DOD's efforts to help Russia secure its nuclear warhead storage sites and to improve the security of warheads in transit are implemented by the Defense Threat Reduction

Agency. Oversight and policy guidance for this work is provided by DOD's Office of the Undersecretary of Defense for Policy. Additional information on the history of U.S. efforts to help Russia and other countries secure nuclear material and warheads can be found in appendix II.

Since Fiscal Year 1993, DOE Has Spent About $1.3 Billion to Provide Security Upgrades at Nuclear Material Sites in Russia and Other Countries, but DOE's Reporting of the Number of Buildings Secured May Be Misleading

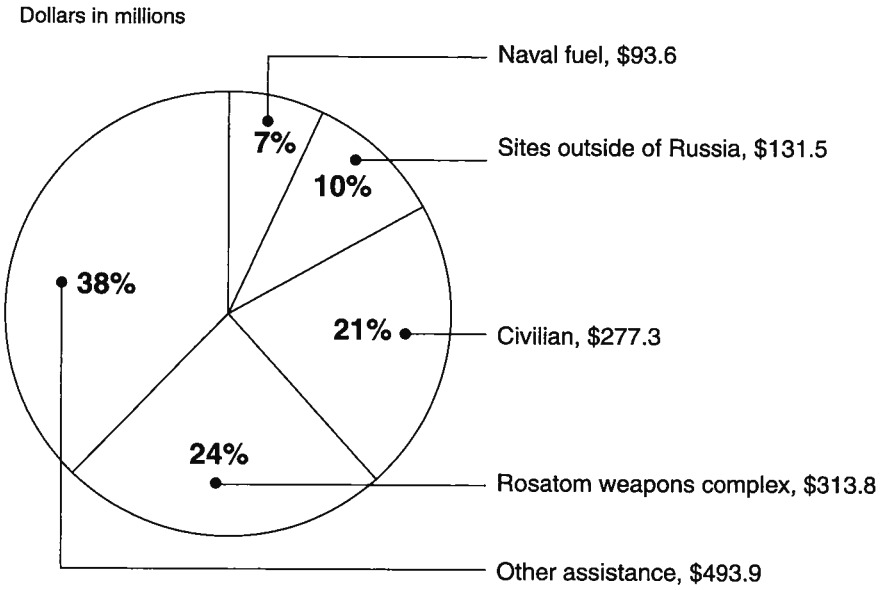
DOE spent about $1.3 billion between fiscal year 1993 and fiscal year 2006 to provide security upgrades and other related assistance to facilities that house weapons-usable nuclear material in Russia and other countries and reports to have "secured" 175 buildings containing about 300 metric tons of weapons-usable nuclear material in Russia and the former Soviet Union. The number of buildings that DOE reports as secured, however, does not recognize that additional upgrades remain to be completed at some buildings because DOE considers a building to be "secure" after it has received only limited MPC&A upgrades (rapid upgrades), even when additional comprehensive upgrades have yet to be completed. Further, in response to terrorist actions and rising threat levels in Russia, DOE is examining the impact of an increased design basis threat it uses to measure the adequacy of security upgrades provided to Russian nuclear facilities and providing additional assistance to protective forces at Russian nuclear sites. Finally, DOE and Rosatom have developed a Joint Action Plan that includes 20 civilian and nuclear weapons complex sites housing buildings with weapons-usable nuclear material. While the plan details the remaining scope of work to be accomplished by 2008, it does not include two key sites involved in manufacturing of Russian nuclear warheads that contain many buildings with hundreds of metric tons of weapons-usable nuclear material where DOE has been denied access.

Through the End of Fiscal Year 2006, DOE Spent About $1.3 Billion for Security Upgrades and Other Related Assistance at Nuclear Material Sites in Russia and Other Countries

From fiscal year 1993 to fiscal year 2006, DOE spent about $1.3 billion to enhance security at buildings that house weapons-usable nuclear materials in foreign countries. The majority of these buildings are located in Russia and fall into three categories: Rosatom weapons complex sites, civilian sites, and naval fuel sites. DOE has also helped to secure buildings with weapons-usable nuclear material in nine other countries.[12] Figure 2 shows a breakdown of DOE's spending on MPC&A efforts.

[12]Additional information on DOE's MPC&A efforts in countries outside of Russia can be found in appendix III.

Figure 2: DOE Spending to Secure Nuclear Materials in Russia and Other Countries through the End of Fiscal Year 2006



Total = $1,310.1

Source: GAO analysis of DOE data.

Note: Figure does not include program management expenses, and amounts have been rounded.

As figure 2 shows, DOE spent about $684.7 million to provide security upgrades to civilian, naval fuel, and Rosatom weapons complex sites with weapons-usable nuclear material in Russia and an additional $131.5 million to provide security upgrades to sites located outside of Russia. DOE also spent about $493.9 million on additional and related MPC&A efforts in Russia, such as assistance for transportation security, providing equipment for protective forces at nuclear facilities, and efforts to consolidate nuclear material into fewer buildings and sites. According to DOE officials, these efforts are important to increasing the overall security of nuclear materials in Russia and other countries, and they support DOE's goal of enhancing the security of vulnerable stockpiles of weapons-usable nuclear material. For example, because DOE believes that nuclear materials are most vulnerable while they are in transit, the department has provided Russia with specialized secure trucks, armored escort vehicles, and secure containers—called overpacks—to improve the security of nuclear material transported within and between nuclear sites in Russia. Further, DOE's assistance to protective forces at Russian nuclear sites, which includes

such items as bulletproof vests, helmets, and response vehicles, helps ensure that guards at those sites are properly equipped and trained so that they can quickly respond to alarms. Additional information on other DOE efforts to improve security at sites with weapons-usable nuclear materials can be found in appendix IV.

DOE Considers Buildings "Secure" After Only Limited or "Rapid" Upgrades Have Been Installed, Even When More Comprehensive Upgrades Are Planned

At the end of fiscal year 2006, DOE reported to have "secured" 175 buildings containing about 300 metric tons of weapons-usable nuclear material in Russia and the former Soviet Union, but 51 of the 175 buildings DOE reported to have "secured" as of the end of fiscal year 2006 do not have completed MPC&A upgrades. These 51 buildings are located at sites in the Rosatom weapons complex. In its program metrics, DOE defined a building to be "secure" after it has received only limited MPC&A upgrades (called rapid upgrades), even when additional comprehensive upgrades, which would further improve security, have yet to be completed.[13]

The buildings with weapons-usable nuclear material where DOE is working to improve security fall into four categories: Rosatom weapons complex, civilian, naval fuel, and sites outside of Russia. As table 1 shows, all planned upgrades have been completed at naval fuel sites and sites outside of Russia. The vast majority of remaining buildings that have not yet received security upgrades are in the Rosatom weapons complex, where DOE has historically had access difficulties, including being denied access to key sites and buildings housing weapons-usable nuclear material.

[13]DOE officials noted that comprehensive upgrades work is in "varying stages of implementation" at these 51 buildings.

Table 1: Status of DOE Security Enhancements at Buildings with Weapons-Usable Nuclear Material through the End of Fiscal Year 2006

Site type	Number of buildings DOE reports as "secured"	Number of buildings where DOE has not installed security upgrades	Total number of buildings where DOE plans to install security upgrades
Rosatom weapons complex[a]	92	32	124
Civilian	47	3	50
Naval fuel	21	0	21
Outside of Russia	15	0	15
Total	**175**	**35**	**210**

Source: DOE.

[a]At some sites in the Rosatom weapons complex, DOE counts individual material storage or handling areas (material balance areas) within large buildings separately in its program performance measurements in an attempt to more accurately reflect the amount of work involved. According to DOE, the work that would go into securing a material balance area of this size would be commensurate to the work that goes into securing a smaller building.

While DOE officials told us that rapid upgrades offer a limited measure of risk reduction against some threats, they also noted that rapid upgrades fall short of meeting all of DOE's risk reduction goals for buildings with weapons-usable nuclear material. For example, rapid upgrades generally include only limited measures designed to address the insider threat of theft, such as establishing a two-person rule and providing certain types of tamper indication devices that would set off alarms at guard stations in the case of an unauthorized attempt to access nuclear materials. According to NNSA, which implements the MPC&A program at DOE, the greatest threat DOE faces in its effort to help Russia secure nuclear materials is the threat of insider theft. However, the majority of measures to address the insider threat at Russian nuclear material sites, such as computerized nuclear material inventory databases and barcoding of nuclear material containers, are provided in the comprehensive upgrades phase.

DOE Is Examining the Impact of an Increased Design Basis Threat for Its MPC&A Program

In response to terrorist actions and rising threat levels in Russia, DOE recently analyzed the implications of an increased design basis threat it uses to measure the adequacy of security upgrades provided to Russian nuclear facilities. The design basis threat is defined as the attributes and

characteristics of potential adversaries (a group or groups of armed attackers) against which a facility's physical protection systems are designed and evaluated. According to DOE, the design basis threat is critical to determining an MPC&A system's effectiveness. In 2005, DOE began examining the impact of increasing the number of adversaries against which Russian sites with U.S.-funded security upgrades should be able to defend themselves. DOE is currently reassessing the effectiveness of the security upgrades it has provided through the MPC&A program and has increased its emphasis on providing assistance to the protective forces at Russian nuclear material sites. Specifically, DOE is currently working with a number of sites to relocate guard forces closer to the target nuclear material to improve their response times to an incident. For example, at all four of the nuclear material sites we visited in Russia, Russian officials told us that they were working with DOE to relocate guard forces closer to buildings that contain weapons-usable nuclear material at their sites. However, DOE is limited in the scope of assistance it can provide to protective forces at nuclear facilities in Russia and other countries. For example, DOE is neither allowed to provide weapons or ammunition to these forces, nor is it allowed to pay the salaries of protective forces at these sites. According to DOE officials, the department has provided assistance to the protective forces at all nuclear material sites where the department has access and agreement to work, including helmets, winter uniforms, radios, and other equipment intended to improve their effectiveness in responding to alarms and their survivability against potential adversaries.

DOE Plans to Complete All Security Upgrades Work by the End of 2008 but Lacks Access or Agreement to Work at Two Key Sites That Contain Vast Amounts of Nuclear Material

Historically, DOE has had difficulty obtaining access to some sensitive sites in Russia, especially within the Rosatom weapons complex. For example, we reported in 2003 that DOE's lack of access to many buildings that store weapons-usable nuclear material in the Rosatom weapons complex was the greatest challenge to improving nuclear material security in Russia. DOE requires access to these buildings to validate Russian security system designs and to confirm the installation of equipment as intended. DOE signed an access agreement with the Russian Ministry of Atomic Energy (now called Rosatom) in September 2001 that described administrative procedures to facilitate access, such as specifying which DOE personnel are allowed to make site visits and the number and duration of those visits. We reported in 2003 that this access agreement had done little to increase DOE's ability to complete its work at many key sites in the Rosatom weapons complex. Since that time, DOE has worked with Rosatom through a Joint Acceleration Working Group and other mechanisms to develop

alternative access procedures, such as the use of remote video monitoring, that have allowed work to progress at some sensitive buildings and sites that had previously been inaccessible to DOE project teams. In June 2005, DOE and Rosatom signed a Joint Action Plan detailing the remaining scope of work to be completed by the 2008 deadline. Rosatom and DOE are using this plan to guide cooperative activities and to develop a multiyear budget for DOE's MPC&A program. DOE officials told us that they have been granted access to almost all of the sites and buildings covered in the plan and that all security upgrades should be completed, as scheduled, by the end of 2008. DOE plans to spend about $98 million to complete its planned security upgrades at 210 buildings containing weapons-usable nuclear material in Russia and other countries by the end of calendar year 2008.

The DOE–Rosatom Joint Action Plan covers 20 Russian civilian and nuclear weapons complex sites. However, the Joint Action Plan does not include two key sites in the Rosatom weapons complex where Russian nuclear weapons are assembled and disassembled. Because of the nuclear weapons manufacturing work conducted at these sites, DOE believes these two sites contain many buildings with hundreds of metric tons of weapons-usable nuclear material. According to DOE officials, the department has offered numerous alternative access proposals to try to obtain access to install security upgrades at these two sites. For example, in November 2004, DOE provided senior Russian officials with access to some of the most sensitive sites in the U.S. nuclear weapons complex, including the Pantex nuclear weapons plant in Texas, which is the only U.S. nuclear weapons assembly and disassembly facility. However, Rosatom has refused to grant DOE officials reciprocal access to analogous Russian sites. Because of the sensitive nature of the work conducted at these sites, Rosatom has denied DOE's requests for access, rejected DOE offers to provide assistance without access, and informed DOE that it is not interested in pursuing MPC&A cooperation at these sites. DOE officials expressed very little optimism that Rosatom would allow DOE to help improve security at these facilities in the near future.

DOD and DOE Have Spent About $920 Million to Help Russia Secure 62 Nuclear Warhead Sites and to Improve Warhead Transportation Security

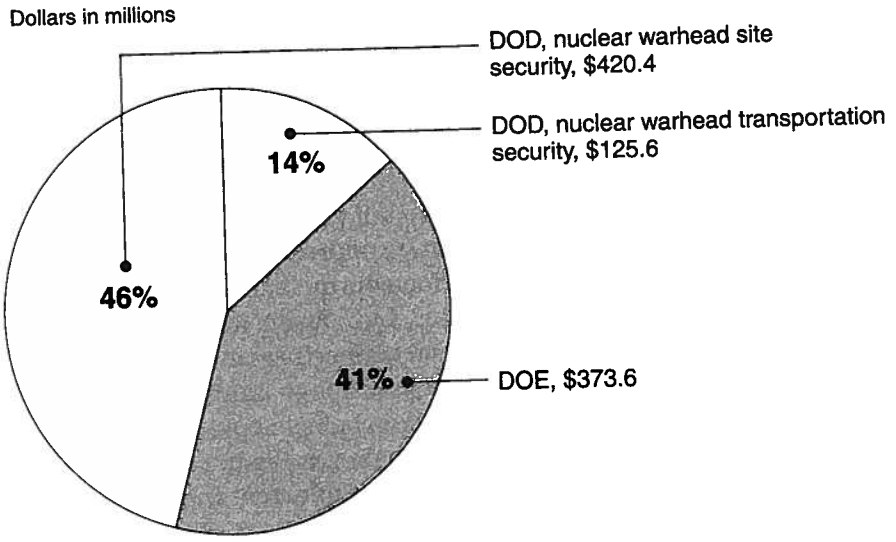
Through the end of fiscal year 2006, DOE and DOD spent about $920 million to help Russia improve security at 62 nuclear warhead sites. The agencies plan to help Russia secure a total of 97 nuclear warhead sites by the end of 2008. Coordination between DOE and DOD has improved since 2003, when we reported that the agencies had inconsistent policies toward providing security assistance to Russian nuclear warhead sites. In addition, DOE and DOD are currently taking similar approaches to managing large contracts to provide security upgrades at Russian nuclear warhead sites. DOD has used EVM to identify cost and schedule variances for its contracts to install security upgrades at Russian warhead sites at early stages so they can be addressed in a timely manner. DOE has not used EVM on its fixed-price contracts to install security upgrades at Russian nuclear warhead sites, but, during the course of our review, the department augmented its contract performance management system to include additional reporting mechanisms to identify and address schedule variances, which DOE officials believe constitute a comparable alternative to an EVM system. DOE believes the benefits of EVM techniques do not justify the additional costs to implement them on fixed-price contracts.

DOE and DOD Helped Russia Improve Security at 62 Nuclear Warhead Storage Sites and Provided Assistance to Improve Security of Warheads in Transit

Through the end of fiscal year 2006, DOE had spent about $374 million to improve security at 50 Russian nuclear warhead sites and plans to install security upgrades at 23 additional sites by the end of 2008. Additionally, DOD spent approximately $546 million to help Russia secure 12 warhead sites and to provide security for nuclear warheads in transit.[14] DOD plans to complete security upgrades at 12 additional sites by the end of 2008. Figure 3 shows a breakdown of U.S. funding to improve security of Russian nuclear warheads through the end of fiscal year 2006.

[14]DOE and DOD differ somewhat in their definition of what constitutes a "site." For example, some temporary nuclear warhead storage sites controlled by the Russian Navy, where DOE installed upgrades, consist of one or more piers where submarines are berthed, which are generally smaller than permanent warhead storage sites.

Figure 3: U.S. Spending on Nuclear Warhead Security in Russia through the End of Fiscal Year 2006



Sources: GAO analysis of DOE and DOD data.

Note: DOD spending for nuclear warhead site security efforts includes spending on related DOD efforts, such as the development of an Automated Inventory Control and Management System for Russia's nuclear warhead stockpile, a personnel reliability program and training equipment for guard forces at nuclear warhead sites, an emergency response capability, and a variety of training for site personnel. DOE's program also includes training for site personnel and the development of a personnel reliability program for those Russian nuclear commands not supported by DOD. Percentages do not total 100 due to rounding.

DOE plans to provide security upgrades at 23 additional sites, and DOD plans to provide upgrades at 12 additional sites by the end of 2008. DOE and DOD gained authorization and access to work at 15 of these sites as a result of an agreement reached at the summit between President Bush and Russian President Putin in Bratislava, Slovakia, in February 2005. After this summit, Russia offered access to 15 additional nuclear warhead sites of which DOE has agreed to install upgrades at 7 sites, and DOD will help secure the remaining 8 sites. Table 2 provides an overview of DOE and DOD's progress in improving security at Russian nuclear warhead sites.

Table 2: DOE and DOD Progress in Helping Russia Secure Nuclear Warhead Sites

Site type	DOE sites complete	DOD sites complete	Total sites completed	DOE sites remaining	DOD sites remaining	Total sites remaining
Permanent warhead sites	8	9	17	14	10	24
Temporary warhead sites	42	3	45	9	2	11
Total	**50**	**12**	**62**	**23**	**12**	**35**

Sources: GAO analysis of DOE and DOD information.

Despite the agencies' optimism that all sites within this scope will be secured by the end of 2008, they face challenges in meeting this goal. For example, DOE and DOD officials stated that work in Russia involves extensive bureaucracy, changing requirements to meet Russian demands and, at times, difficult relationships and coordination with Russian subcontractors. DOD officials told us that there have been performance issues with a certain Russian subcontractor, but finding alternatives is difficult because there are only a limited number of Russian subcontractors qualified for this type of work and cleared by the Russian MOD to work at nuclear weapons sites. Additionally, the harsh environmental conditions at some remote sites have caused delays in the installation of security upgrades. Specifically, DOD officials stated that adverse weather conditions delayed the installation of security upgrades at four Russian warhead sites by about 1 month.

In addition, DOD spent over $125 million through the end of fiscal year 2006 to improve the security of nuclear warheads during transportation by rail to consolidation and dismantlement sites. According to DOD officials, security experts consider nuclear warheads to be highly vulnerable to theft during transport. DOD has attempted to address this threat by providing the Russian MOD with security enhancements for railcars, hardened shipping containers for nuclear warheads to protect against small arms fire and other threats, and payment of railway tariffs associated with transporting nuclear warheads to consolidation and dismantlement sites. Since 1995, DOD has supported maintenance on 200 specialized, secure railcars for transporting nuclear weapons and provided 15 armored railcars for guard forces protecting shipments of nuclear weapons. DOD is in the process of procuring up to 100 additional nuclear warhead transport railcars for use by the Russian MOD.

Coordination between DOE and DOD's Nuclear Warhead Security Efforts in Russia Has Improved

DOE and DOD have mechanisms for sharing information and avoiding duplication of effort. Coordination between the agencies has improved since 2003, when we reported that the agencies did not have consistent policies toward providing security assistance to Russian nuclear warhead sites. We recommended in 2003 that the departments work together to develop a standardized approach to improving security at Russian nuclear warhead sites. Since our 2003 report, DOD and DOE have expanded their efforts to share information about their work at Russian nuclear warhead sites.

Specifically, the departments coordinate their efforts through an interagency working group, which reports to the National Security Council.[15] According to DOE and DOD officials, this group was instrumental in coordinating the U.S. response to proposals for security upgrades at additional Russian nuclear warhead sites stemming from the summit between Presidents Bush and Putin at Bratislava, Slovakia, in 2005. In addition, DOE and DOD participate in joint coordinating groups that include key representatives from DOE, DOD, and the various branches of the Russian MOD. All of these groups meet regularly to discuss ongoing work at Russian nuclear warhead sites and resolve problems or issues that arise in this effort. Furthermore, DOE and DOD have jointly developed common designs for security upgrades at similar Russian warhead sites to ensure a level of consistency in the assistance provided to these sites. DOD officials stated that having a standardized design between the two agencies allows DOE and DOD leverage with the Russian MOD, to deny requests if they are made for items not in the site design plan of either agency. Further, DOE and DOD seek to present a united image to Russian officials by writing letters jointly on common issues and answering Russian site proposals together.

[15]We reported in 2003 that DOE and DOD did not have consistent plans to balance nuclear warhead security improvements against the possibility of enhancing the operational capability of Russia's nuclear forces. In January 2003, the National Security Council issued guidelines that generally prohibited assistance to operational sites due to concerns that U.S. assistance might enhance Russia's military capability. As a result of these guidelines and other internal policy decisions, DOE plans no further assistance to 21 nuclear warhead sites where the department had installed rapid upgrades and one additional site where DOE had installed both rapid and comprehensive upgrades.

DOE and DOD Use Similar Systems to Manage Large Contracts to Improve Security at Russian Nuclear Warhead Sites

In their efforts to provide security upgrades at Russian nuclear warhead sites, DOE and DOD are taking similar approaches to managing large contracts. Generally, OMB requires federal agencies to use EVM[16] or an alternative performance management system on major acquisition contracts to identify cost and schedule variances at early stages so they can be addressed in a timely manner.[17] DOD has used EVM to evaluate its contracts to install security upgrades at Russian warhead sites. DOE does not require its contractors to implement EVM to evaluate its contracts to install security upgrades at Russian warhead sites, but, during the course of our review, augmented its contract performance management system to include additional reporting mechanisms for identifying and addressing schedule variances, which DOE officials believe represent a comparable alternative to an EVM system.

DOD officials stated that EVM is one of many tools that provide empirical data to validate testimonial information about the status of security upgrades provided in its contractors' monthly and quarterly reports. Additionally, EVM enhances program management capabilities by providing an early warning system for deviations from plans and quantifies technical and schedule problems in terms of cost. This provides DOD with an objective basis for considering corrective action. DOD officials told us that their use of EVM allowed them to identify schedule variances due to poor contractor performance at one Russian nuclear warhead site where the department is installing security upgrades. DOD officials stated that this early detection allowed them to reassign the work to a different Russian subcontractor and formulate a plan to make up for the lost time and work in order to meet their scheduled completion date and critical path milestones.

[16]An EVM system compares the value of the work accomplished during a given period with the value of the work scheduled to be accomplished during that period. Differences from the scheduled work plan are measured in both cost and schedule variances. For example, program activities that are completed ahead of schedule would be reported as positive variances, while activities that are completed behind schedule would be reported as negative variances. Similarly, the EVM system tracks whether completed activities are costing more or less than expected. A negative cost variance would indicate that activities are costing more than expected, while a positive cost variance would mean activities are costing less than expected.

[17]Office of Management and Budget, *Office of Management and Budget Circular No. A-11, Part 7, Planning, Budgeting, Acquisition, and Management of Capital Assets* (June 30, 2006).

Similarly, DOE recently proposed requirements that its large contracts for security upgrades at nuclear warhead sites be managed with a system similar to EVM. In September 2006, DOE initiated security upgrades at four large nuclear warhead storage sites in Russia.[18] Until January 2007, DOE managed these fixed-price contracts according to the NNSA Programmatic Guidelines, which do not require the use of EVM or an alternative system to assess contract performance for cost and schedule variances. In part, as a result of our inquiry into its contracting practices, DOE altered its oversight mechanisms for these contracts in January 2007 and will now require monthly reports and other measures to more accurately ascertain the progress of contracted items, including the identification of schedule variances due to inclement weather and other unforeseen events and, subsequently, the development of recovery plans. According to DOE officials, these new reporting mechanisms represent a comparable alternative to an EVM system and will give DOE project managers additional opportunities to identify potential schedule slippages and enable appropriate management intervention to take place in a timely manner.[19]

Long-term Sustainability of U.S.-Funded Security Upgrades Is Uncertain because Access Problems and Other Issues May Hamper DOE and DOD Sustainability Efforts

DOE has developed sustainability guidelines to help Russia prepare to take financial responsibility for maintaining U.S.-funded security upgrades at nuclear material and warhead sites without DOE assistance by 2013 as the Congress mandated. DOE and Rosatom are developing a joint sustainability plan that will provide an agreed-upon framework to guide DOE's sustainability efforts at nuclear material sites in Russia. However, DOE's ability to ensure that U.S.-funded security upgrades at nuclear material sites are being sustained may be hampered by access difficulties, funding concerns, and other issues. Finally, access difficulties at some Russian nuclear warhead sites may also prohibit DOE and DOD from ensuring that U.S.-funded security upgrades are being properly sustained.

[18]Two of these fixed-price contracts are managed by Sandia National Laboratories, and two are managed by Oak Ridge National Laboratory.

[19]Since DOE negotiates fixed-price contracts for its work to improve security at Russian nuclear warhead sites, an EVM system would only track schedule variances, rather than cost and schedule variances. As a result, DOE has elected to monitor schedules with comparable, but less expensive alternatives to EVM.

DOE Issued Guidelines to Direct Its Efforts to Help Russia Prepare to Maintain U.S.-Funded Security Upgrades without DOE Assistance

In May 2004, DOE issued interim guidelines (referred to as Sustainability Guidelines) to direct its efforts to assist Russia in developing sustainable MPC&A systems at Russian nuclear material and warhead sites by 2013 as the Congress mandated. In December 2006, DOE issued a final version of its Sustainability Guidelines for the MPC&A program. These guidelines require DOE program managers to develop assessments of each site's existing capabilities to sustain MPC&A systems and to identify requirements that should be met before a site transitions from DOE support to full Russian responsibility. According to DOE, these assessments will be used to develop site-specific sustainability plans that detail the remaining cooperative activities required to address each of the seven elements of sustainability. The guidelines also require DOE project teams to develop site-specific transition plans, which would detail how sustainability activities will be funded as the sites move toward transition to full Russian responsibility by 2013.

DOE's Sustainability Guidelines set forth seven key elements of a sustainable MPC&A program at sites receiving MPC&A upgrades, such as the development of site operating procedures, which form the foundation for all of DOE's sustainability activities at nuclear material and warhead sites in Russia and other countries where DOE has provided security upgrades. DOE uses a variety of sustainability indicators for each of the seven elements to determine the degree to which the individual elements are being addressed at Russian sites. Table 2 shows the seven elements of sustainability outlined in DOE's Sustainability Guidelines and some of the indicators DOE uses to assess the degree to which each element of sustainability is being met at a given Russian site.

Table 3: Seven Elements of Sustainability in DOE's Guidelines

Element	Definition	Select sustainability indicators
Site MPC&A organization	Site MPC&A operations plans establish management structures, assign staff responsibilities that support MPC&A operations, identify how site actions reduce risk, and identify how the site will allocate human and financial resources to effectively operate the MPC&A systems.	• Site has an established and documented MPC&A organization with clear roles and responsibilities. • Site has conducted MPC&A sustainability planning. • Site has a budget for MPC&A operations and personnel.
Site operating procedures	MPC&A systems require a set of procedures to direct site personnel in the proper operation of equipment. Site operating procedures help staff operate systems consistently and effectively in conformance with Russian national regulations.	• Site has written procedures covering all key MPC&A operations. • Site procedures are consistent with regulations. • Site has a mechanism for modifying procedures.
Human resource management and site training	A human resource management system is designed to provide qualified and well-trained MPC&A professionals to perform assigned MPC&A duties.	• Training requirements for each MPC&A position have been identified. • The site has a mechanism to track corrective actions from inspections and offers retraining to staff.
Operational cost analysis	Operational cost analysis helps sites to plan and allocate resources for MPC&A operations throughout the system's life cycle by estimating the costs associated with long- and short-term maintenance of MPC&A systems.	• Site has identified life cycle costs, capital equipment replacement costs, etc. • Site has established a budget for MPC&A operation, which covers the site's system requirements.
Equipment maintenance, repair, and calibration	Preventative maintenance, repair, and equipment calibration should be governed by a formal maintenance and repair process to ensure that malfunctioning equipment is promptly repaired, spare parts are available, and equipment is properly calibrated.	• Site has documented maintenance requirements, strategy, and schedule, prioritized based on relative importance of the components. • Site has adequate resources to maintain or repair MPC&A systems. • Site has a documented calibration plan.
Performance testing and operational monitoring	Performance testing and operational monitoring allows site MPC&A organizations to assess the effectiveness of MPC&A components and systems and to take corrective actions when deficiencies are identified.	• Site has an internal or external review system to evaluate MPC&A system performance. • Site has evidence of identifying and correcting MPC&A deficiencies.
MPC&A system configuration management	MPC&A systems operate as part of the overall nuclear operations at a site. Configuration management systems are designed to ensure that changes in site operations do not compromise the effectiveness of the site's MPC&A systems.	• Site has a configuration control plan or similar document. • Changes to configuration are reviewed by appropriate staff to verify that system effectiveness is not degraded.

Source: DOE.

According to DOE, the Sustainability Guidelines provide general criteria for DOE project teams to follow when working with their Russian counterparts in developing sustainability programs for sites where DOE

has installed MPC&A systems. DOE officials noted that some sites may not require assistance to address issues in each of the seven categories. For example, many sites that store naval nuclear fuel are administered by the Russian Navy, which has its own human resource management system and would not require DOE assistance to address the human resource management and site training sustainability element.

In addition, DOE and Rosatom are currently developing a joint sustainability plan that is intended to govern sustainability activities at the sites under Rosatom's control where DOE has installed MPC&A systems. DOE officials told us that this joint sustainability plan may be completed in March 2007. DOE officials believe that this plan will be an important step in gaining Rosatom's buy-in to the concepts of sustainability and will lead to a specific path forward and detailed plan for funding sustainability activities for DOE, while transitioning to full Russian responsibility in 2013. According to DOE officials, the plan will be based largely on DOE's Sustainability Guidelines and will include the seven key elements of sustainability outlined in those guidelines. DOE anticipates spending about $437.8 million to provide sustainability support to sites in Russia and other countries between fiscal year 2007 and fiscal year 2013.

While DOE's Sustainability Guidelines provide a framework for the department's approach to sustainability implementation, the guidelines do not call for a tracking system to assist MPC&A management in assessing the progress being made toward DOE's goal of providing Russia a sustainable MPC&A system by 2013. Currently, DOE's Metrics Information Management System (MIMS) contains data detailing the department's progress in implementing the MPC&A program by tracking the number of buildings and sites where DOE has installed security upgrades, among other things. DOE also uses MIMS to track some measures of progress in their sustainability efforts, such as the development of site-specific plans that document how MPC&A site management will plan, budget, direct, monitor, and evaluate all MPC&A systems. DOE managers use MIMS as a tool in their oversight of the MPC&A program. However, DOE officials acknowledged that the current MIMS data do not provide an accurate picture of the department's progress toward its goal of preparing Russia to take full responsibility for funding the maintenance and sustainability of U.S.-funded upgrades by 2013. Expanding MIMS to include tracking for all sustainability elements could give DOE managers an improved tool for monitoring the MPC&A program's progress toward the goal of preparing Russia to take full responsibility for funding the maintenance and sustainability of U.S.-funded upgrades by 2013. Further, DOE officials told

us that improved tracking of sustainability implementation would be useful to allow the department to provide more accurate information to the Congress on DOE's progress in its sustainability efforts.

DOE's Ability to Ensure That U.S.-Funded Security Upgrades at Nuclear Material Sites Are Being Sustained May Be Hampered by Access Difficulties, Funding Concerns, and Other Issues

Several challenges could impact DOE's ability to prepare Russia to sustain security upgrades on its own at sites that house weapons-usable nuclear material, including: (1) access difficulties at some sites, (2) the limited financial ability of some Russian sites to maintain DOE-funded MPC&A equipment, (3) the lack of certification of some DOE-funded MPC&A equipment, and (4) delays in installing the MPC&A Operations Monitoring (MOM) system at Rosatom facilities.

- According to DOE officials, Russia has denied DOE access at some sites after the completion of security upgrades, making it difficult for the department to ensure that funds intended for sustainability of U.S.-funded upgrades are being properly spent. For example, at one facility where DOE completed upgrades in 1998, DOE officials were denied access from 1999 through 2002. DOE officials told us that after commissioning the MPC&A system at this facility, the department had not developed specific plans for sustaining the U.S.-funded security equipment. Upon returning to the facility in September 2002, DOE officials found that the U.S.-funded security upgrades were in a severe state of disrepair. As a result, DOE has had to spend about $800,000 to correct problems resulting from the site's inability to properly maintain the U.S.-funded security upgrades. According to DOE officials, these security upgrade replacement efforts are scheduled to be completed in fiscal year 2007.

- Despite improvements in the Russian economy, some sites may not be financially able to maintain DOE-funded security upgrades. The Russian economy has improved since the collapse of the Soviet Union in 1991 and the financial troubles of the late 1990s.[20] In September 2006, the Deputy Head of Rosatom stated that Russia is no longer in need of U.S. assistance and that it is easier and more convenient for Russia to pay for its own domestic nuclear security projects. However, during our visit to Russia, officials at three of the four civilian nuclear research institutes

[20]For example, in 1999, Russia's foreign debt amounted to about 96 percent of its gross domestic product, but in 2006, it fell to about 9 percent. Russia's economy was expected to grow about 6 percent in 2006.

we visited told us that they are concerned about their sites' financial ability to maintain U.S.-funded security upgrades after U.S. assistance ends. Some of these sites do not receive regular funds from the Russian government to support the operation and maintenance of their MPC&A systems. As a result, Russian site officials told us that, after DOE financial support ends in 2013, they will likely face difficult choices about how to pay for maintenance of the security upgrades DOE has provided.

- Some U.S.-funded MPC&A equipment is not certified for use at Russian facilities, which means that the Russian government may not pay for its maintenance. Certification is a mandatory Russian regulatory requirement designed to ensure the functionality, safety, and security of specific equipment, products, and technology used in Russian nuclear sites. Certification of U.S.-funded MPC&A equipment must be obtained before it can be legally used at Russian nuclear sites. DOE has historically maintained that certification is a Russian responsibility, and current DOE policy generally precludes funding for certification of equipment. Despite repeated attempts to persuade Russia to fund equipment certification, DOE is paying for some equipment to be certified on a case-by-case basis. According to DOE officials, some sites have equipment or MPC&A systems that are not fully certified for use. For example, at eight sites that house weapons-usable nuclear material, DOE-funded equipment used to make accurate measurements of the type and quantity of nuclear material stored at these sites has not been certified for use. Unless this equipment receives certification in the near future, DOE may be forced to pay for maintenance longer than it intends. Rosatom and DOE also have established a Joint Certification Working Group that is developing a joint plan to certify key equipment items. DOE developed the Equipment Certification and Vendor Support project in 1998 to provide DOE project managers with accurate information on the Russian certification process. DOE spent $23.6 million on this project through the end of fiscal year 2006.

- There have been delays installing the MOM system at some Rosatom facilities. In February 2001, we recommended that DOE develop a system, in cooperation with Russia, to monitor, on a long-term basis, the security systems installed at the Russian sites to ensure that they continue to detect, delay, and respond to attempts to steal nuclear

material.[21] In response to this recommendation, DOE developed the MOM system, consisting of off-the-shelf video cameras and other equipment designed to allow Russian officials to ensure that MPC&A systems are properly staffed, personnel are vigilant, and key security procedures are enforced. DOE officials told us in 2002 they anticipated that the MOM system would be an integral part of DOE's sustainability assistance to Russian sites. However, through the end of fiscal year 2006, only five sites with weapons-usable nuclear material where DOE installed security upgrades had the MOM system.[22] While DOE also plans to install equipment at two additional sites in fiscal year 2007, none of the seven sites where DOE has installed or plans to install MOM systems is controlled by Rosatom. Rosatom has been unwilling to allow DOE to install MOM systems at sites under its control.[23] Unfortunately, DOE was unable to anticipate Rosatom's resistance to the MOM system and, in 2002, the department pre-purchased MOM equipment for use at Rosatom facilities. As a result, DOE has had to pay for storage and upkeep of 367 MOM cameras and other equipment since 2002. DOE officials told us that if Rosatom decides not to allow MOM equipment at its sites, the excess equipment may be used by other DOE programs, such as the Second Line of Defense program, which works with Russia to combat nuclear smuggling by installing radiation detection equipment at key border crossings. Through fiscal year 2006, DOE had spent a total of $20.5 million on the MOM project, including about $270,000 to pay for storage and upkeep of unused MOM equipment that has been in storage since 2002.

[21]GAO, *Nuclear Nonproliferation: Security of Russia's Nuclear Material Improving; Further Enhancements Needed*, GAO-01-312 (Washington, D.C.: Feb. 28, 2001).

[22]In addition, two other sites that do not contain nuclear material had been provided with MOM systems—the Interdepartmental Special Training Center, where Russian officials are trained on MPC&A systems, and the Information Security Center, which performs certification activities for MOM equipment.

[23]DOE and Rosatom have agreed to install a pilot MOM system in Rosatom's Situation and Crisis Center in Moscow. Although this facility does not have nuclear material, it functions as a technical center authorized by Rosatom to evaluate the feasibility of using the MOM system at Rosatom sites. DOE officials are hopeful that Rosatom will allow the installation of MOM equipment at its facilities in the near future.

Access Difficulties at Some Russian Nuclear Warhead Sites May Prohibit DOE and DOD from Ensuring That Security Upgrades Are Being Sustained

DOE and DOD plan to provide Russia with assistance to sustain security upgrades at nuclear warhead sites, but access difficulties may prevent the agencies from carrying out their plans. Specifically, neither department has reached an agreement with the Russian MOD on access procedures for sustainability visits to 44 permanent warhead storage sites where the agencies are installing security upgrades. Site access is needed to ensure that U.S. funds are being used to help Russia maintain security upgrades at these sites. If DOE and DOD cannot reach an agreement with the Russian MOD on access procedures for sustainability activities at these 44 sites, or develop acceptable alternatives to physical access, the agencies will be unable to determine if U.S.-funded security upgrades are being properly sustained and may not be able to spend funds allotted for these efforts.

Transparency Issues at DOD-Built Fissile Material Storage Facility Not Resolved

From fiscal year 1993 through fiscal year 2004, DOD spent about $335 million to design and build a Fissile Material Storage Facility in Russia to house nuclear material from dismantled nuclear weapons and spent an additional $69.2 million to provide fissile material containers for use in the facility. Although it was completed in December 2003, the facility sat empty and unused for nearly 3 years. Russia began loading material into the facility in July 2006, but DOD has yet to secure a transparency agreement to allow the United States to verify the type, quality, and quantity of material stored at the facility. Consequently, DOD does not currently have access to the facility and, as a result, cannot ensure that it is being used as intended. DOD and Department of State officials told us that negotiations are ongoing to resolve outstanding issues related to transparency at the facility. DOD officials noted that there currently is no budget for transparency activities. If an agreement is secured, DOD officials told us that funding for transparency and verification activities would have to be shifted from other programs.

DOE and DOD have formed an informal working group to more effectively coordinate their efforts on sustainability of security upgrades at Russian nuclear warhead sites. DOE and DOD have agreed in principle that the seven elements of sustainability outlined in DOE's Sustainability Guidelines will be applied to the agencies' efforts to help the Russian MOD sustain security upgrades at nuclear warhead sites. DOE and DOD's joint plan to address sustainability at Russian nuclear warhead sites uses a three-phased approach, (1) addressing processes and procedural issues, (2) establishing regional training and maintenance centers, and (3) providing site-level assistance, such as warrantees and spare parts.

- First, DOE is assisting the Russian MOD with the development of regulations, operating procedures, and an independent inspections process to help ensure that security systems continue to operate as intended. Similarly, DOD has supported the development of a personnel reliability program for the 12th Main Directorate of the MOD and DOE is planning to support a similar program for the Russian Navy and Strategic Rocket Forces.

- Second, DOE and DOD have funded the construction of regional training and maintenance centers. For example, DOE recently completed construction of the Kola Technical Center, near Murmansk, Russia, which serves as the centralized training and maintenance facility for all Russian MOD sites in the Murmansk region, both naval nuclear

fuel sites and nuclear warhead storage sites.[24] The Kola Technical Center was commissioned in fall 2005, and Russian MOD officials told us that the facility will help them prepare to assume full financial responsibility for maintenance and sustainability when U.S. assistance ends.

- Finally, at the site level, once DOE and DOD come to agreement with the Russian MOD on verification of sustainability assistance, they will assist in sustaining the upgraded security systems with a focus on training and developing the Russian MOD's capability to maintain the modernized systems. Initially, DOE and DOD will rely on contractor support for repair of failed security systems while the Russian MOD's capability is being developed, gradually transitioning to full Russian system support.

Although DOE and DOD are working closely to provide sustainability assistance at Russian nuclear warhead storage sites, differences exist in the length of time DOE and DOD intend to fund sustainability activities at these sites. Specifically, DOE intends to fund sustainability until 2013, while DOD plans to halt funding in 2011. This has the potential to cause difficulties for the Russian MOD when it comes to funding sustainability earlier at sites where DOD installed security upgrades. In addition, DOD plans no further support with respect to sustainability for warhead transportation upgrades it has provided to the Russian MOD, because, according to DOD officials, the Russian MOD has not requested assistance for this activity.

Conclusions

DOE and DOD have made significant progress in helping Russia and other countries improve security at vulnerable sites housing weapons-usable nuclear material and nuclear warheads. Since our 2003 report, DOE has worked with Russia to resolve many of the access difficulties that we reported, especially at sites within the Rosatom weapons complex. However, in our view, DOE's current metric for reporting progress on the number of buildings secured by its MPC&A program provides the Congress with a potentially misleading assessment of the security at these facilities.

[24]DOD's Security Assessment and Training Center, which was completed in fiscal year 2003 at a cost of $25.9 million and is located near Moscow, serves a similar purpose for sites located in the Moscow region. DOD is also funding the construction of a third facility, the Far East Training Center, to support sites in the Russian Far East, including the Russian Navy's Pacific Fleet. DOD expects the facility to be completed in 2009 at a cost of $16.9 million.

Specifically, DOE should not report to the Congress that buildings with weapons-usable nuclear material in Russia and other countries are "secure" until all DOE risk reduction goals have been achieved, and all planned upgrades at those buildings are completed. Currently, DOE considers buildings to be "secured" after only limited MPC&A upgrades (rapid upgrades) are installed, even when additional comprehensive upgrades are planned. Rapid upgrades do not include the majority of measures DOE uses to address the threat of insider theft at Russian nuclear sites, which DOE considers to be one of its most pressing concerns. DOE provides most upgrades designed to address the insider threat during the comprehensive upgrades phase. Further, DOE officials told us that comprehensive upgrades are necessary to achieve all risk reduction goals at buildings with nuclear material, calling into question DOE's decision to report buildings without such upgrades completed as "secure."

As DOE nears the completion of its security upgrade work in its MPC&A program, the sustainability of U.S.-funded nuclear security upgrades in Russia and other countries has become increasingly important for ensuring that the substantial investment of U.S. funds over the past 15 years is not wasted. DOE and Rosatom have been cooperating to develop a joint sustainability plan for the majority of sites where DOE has installed MPC&A upgrades. We believe this is a critical step in gaining agreement on what remains to be done before DOE transfers full responsibility for sustainability of MPC&A upgrades to Russia in 2013. While DOE uses its Metrics Information Management System to track some measures of progress in its sustainability efforts, DOE officials acknowledged that the current MIMS data do not provide an accurate picture of the department's progress toward its goal of preparing Russia to take full responsibility for funding the maintenance and sustainability of U.S.-funded upgrades by 2013. Creating a new management information system for sustainability or expanding MIMS to include tracking for all sustainability elements could give DOE managers an improved tool for monitoring the MPC&A program's progress on sustainability and would aid the department in providing the Congress with a more accurate assessment of the progress made toward DOE's goal of providing Russia with a sustainable MPC&A system by 2013.

Recommendations for Executive Action

To increase the effectiveness of U.S. efforts to secure nuclear material and warheads in Russia and other countries, we recommend that the Secretary of Energy, working with the Administrator of NNSA, take the following two actions:

- revise the metrics used to measure progress in the MPC&A program to better reflect the level of completion of security upgrades at buildings reported as "secure;" and

- develop a sustainability management system or modify the Metrics Information Management System to more clearly track DOE's progress in developing a sustainable MPC&A system across all sites where it has installed MPC&A upgrades, including evaluations of progress for each of the seven key elements of sustainability outlined in DOE's Sustainability Guidelines.

Agency Comments and Our Evaluation

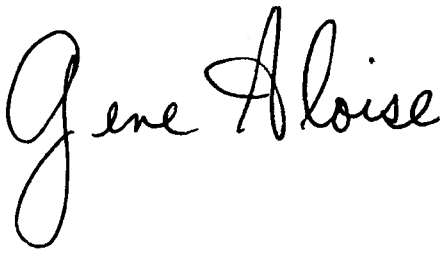
DOE generally agreed with our findings and recommendations. DOD had no written comments on our report. DOE and DOD also provided technical comments, which we incorporated, as appropriate.

In its comments, DOE provided additional information about the metric it uses to track progress in the MPC&A program, its reasons for not using EVM on fixed-price contracts, and on its efforts to work with Rosatom on sustainability issues. DOE agreed that the current metric it uses to track progress in the MPC&A program may be confusing. DOE wrote that it is changing the metric to one that more accurately identifies the level of completion for upgrades. Similarly, DOE officials told us in January 2007 that they were taking steps to modify the progress metric. However, in February 2007, DOE issued its *Fiscal Year 2008 Budget Request*, which did not include modifications to clarify the confusions DOE agrees are present in its progress metric. As a result, DOE's most recent budget justification continues to present the Congress with an unclear picture of the progress made in improving security at buildings with weapons-useable nuclear material in Russia and other countries because DOE's progress metric does not recognize that additional upgrades remain to be completed at some buildings that the department lists as being "secure."

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Secretaries of Energy and Defense; the Administrator, National Nuclear Security Administration; the Director, Office of Management and Budget; and interested congressional committees. We also will make copies

available to others upon request. In addition, this report will be made available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or aloisee@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. The GAO contact and staff acknowledgments are listed in appendix VI.



Gene Aloise
Director, Natural Resources and Environment

Appendix I

Scope and Methodology

We performed our review of U.S. efforts to assist Russia and other countries in securing nuclear materials and warheads at the Departments of Energy (DOE), Defense (DOD) and State (State); the National Nuclear Security Administration (NNSA) in Washington, D.C.; the Defense Threat Reduction Agency in Fort Belvior, Virginia; Oak Ridge National Laboratory in Oak Ridge, Tennessee; Los Alamos National Laboratory in Los Alamos, New Mexico; and Sandia National Laboratories in Albuquerque, New Mexico. We visited Russia to discuss the implementation of U.S. nuclear material and warhead security assistance programs with Russian officials. We also spoke with officials from the U.S. embassy in Moscow, DOE's Moscow office, and the DOD's Defense Threat Reduction Office in Moscow.

While in Russia we met with officials from the Federal Agency for Atomic Energy of the Russian Federation (Rosatom), Rostekhnadzor (the Russian nuclear regulatory authority), and the Ministry of Defense (MOD)—including representatives from the 12th Main Directorate, Navy, and Strategic Rocket Forces. We requested visits to the Institute of Nuclear Materials, Institute of Physics and Power Engineering, Interdepartmental Special Training Center, Russian Methodological Training Center, and All-Russian Scientific Research Institute of Technical Physics (also known as Chelyabinsk-70 and Snezhinsk), but Rosatom denied us access to all facilities under its control, including these. In fact, we were denied access to some Russian sites GAO officials had visited during past reviews of U.S. nonproliferation programs. Rosatom officials told us that because our names were not on the list of 185 individuals provided by DOE for access under the terms of a 2001 access arrangement, we would not be allowed to visit any Rosatom facilities. Rosatom officials did not deny our request for access until we had already arrived in Russia to begin our fieldwork for this review. In addition, the Russian MOD denied our request to visit a naval nuclear fuel facility, Site 49, and a naval nuclear warhead facility near Murmansk, Russia, due to military exercises scheduled near these sites during the time of our visit.

We were able meet our audit objectives by visiting four sites—civilian, educational, and research institutes that are not under Rosatom's control—where DOE had provided security upgrades through NNSA's Materials Protection, Control, and Accounting (MPC&A) program: Karpov Institute for Physical Chemistry, Kurchatov Institute, Joint Institute for Nuclear Research, and Moscow State Engineering and Physics Institute. During our visits to these sites, we discussed the implementation of the MPC&A program, sustainability of U.S.-funded MPC&A upgrades, and the future of DOE cooperation with Russian officials. In addition, we visited a training

facility near Murmansk, Russia, built with DOE funds to provide training to Russian MOD personnel in the Murmansk region.

To assess the progress DOE has made in helping Russia and other countries secure nuclear material, we had discussions with officials from NNSA's MPC&A program, DOE's contractors at Oak Ridge, Los Alamos, and Sandia National Laboratories, and experts from nongovernmental organizations that specialize in nuclear nonproliferation. We reviewed various program documents, including the MPC&A Programmatic Guidelines, MPC&A Program Management Document, project work plans, and the DOE-Rosatom Joint Action Plan. We also analyzed financial information detailing program expenditures, projected costs and schedule estimates, and contract data for expenditures of the MPC&A program through the end of fiscal year 2006. To assess the reliability of these data, we questioned key database officials about data entry access, internal control procedures, and the accuracy and completeness of the data, following up with further questions, as necessary. Although any caveats and limitations to the data were noted in the documentation of our work, we determined that the data we received were sufficiently reliable for the purposes of this report.

To assess the progress DOE and DOD have made in assisting Russia with securing nuclear warheads, we reviewed documents and had discussions with officials from NNSA's MPC&A program, DOE's contractors at Oak Ridge and Sandia National Laboratories, DOD's Office of the Undersecretary of Defense for Policy, and the Defense Threat Reduction Agency. We spoke with officials from the Russian MOD and visited a training facility near Murmansk, Russia, built with DOE funds to provide training to Russian MOD personnel. We analyzed financial information detailing program expenditures, projected costs and schedule estimates, and contract data from both DOE and DOD through the end of fiscal year 2006. To assess the reliability of these data, we questioned key database officials about on data entry access, internal control procedures, and the accuracy and completeness of the data, following up with further questions, as necessary. Although any caveats and limitations to the data were noted in the documentation of our work, we determined that these data were also sufficiently reliable for the purposes of this report.

In addition, we reviewed guidance on government contracting, including the Office of Management and Budget (OMB) Circular No. A-11, DOD Earned Value Management (EVM) Implementation Guide, and DOE Order

413.3A.[1] After reviewing this guidance, we requested copies of DOE and DOD's ongoing contracts valued over $20 million for work to help Russia and other countries secure nuclear material and warheads. To determine how DOE's large contracts were being managed, we reviewed contract documents and identified a requirement for quarterly reporting in the contracts. We contacted the Contracting Officers identified in the contracts to request information on how the contracts are managed in respect to applicable criteria required by OMB and DOE directives. Additionally, we reviewed DOD's large contracts for installing security upgrades at Russian nuclear warhead sites and reviewed documentation from DOD's contractors, Bechtel National, Inc., and Raytheon Technical Services. After analyzing these contracts and other related documentation, we determined that both of DOD's contracts reflected an EVM system. DOD provided us with certification documentation for Bechtel and Raytheon's EVM systems, a requirement called for by federal guidance for all EVM systems. Since the scope of work within the Bechtel contract was at or near completion, we evaluated only the contract performance management for Raytheon, in order to determine how DOD was executing and managing its large contracts for security upgrades at Russian warhead sites. DOD provided Raytheon's cost performance reports which GAO contracting experts assessed for cost and schedule variances in contracted work. After review of Raytheon's cost performance reports, we determined that shortfalls in scheduled work were resulting in a schedule variance equivalent to around $13 million.[2]

To assess the efforts undertaken by DOE and DOD to ensure the sustainability and continued use of U.S.-funded security upgrades, we had discussions with officials from NNSA's MPC&A program; DOE's contractors at Oak Ridge, Los Alamos, and Sandia National Laboratories; DOD's Office of the Undersecretary of Defense for Policy; and the Defense Threat Reduction Agency. We analyzed program documents, including DOE's May 2004 interim Sustainability Guidelines, DOE's December 2006 final Sustainability Guidelines, DOE-DOD Joint Sustainability Task Force

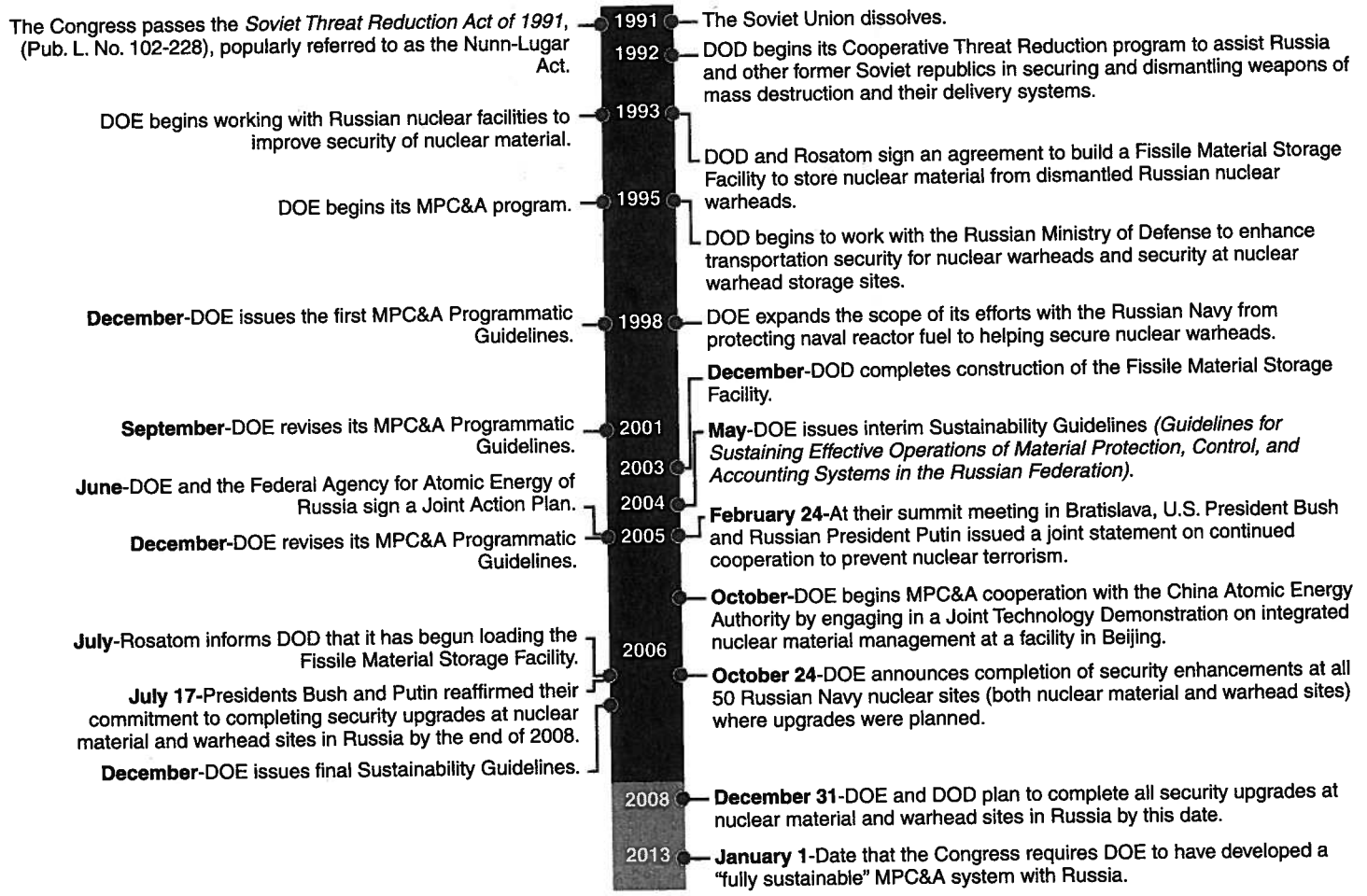
[1]DOD and DOE's guidance in these directives requires the use of EVM on contracts valued over $20 million.

[2]We followed up with DOD program managers who stated that they had identified this same variance through use of their EVM system. DOD officials stated that this schedule variance had been addressed with a plan to recoup lost work and, in any case, the variance did not affect the critical path forward. They remained confident that they would complete upgrades within their scope by the 2008 deadline.

documents, DOE-Rosatom Joint Sustainability Working Group documents, and project work plans. We interviewed program officials responsible for the development of DOE's Sustainability Guidelines and program managers responsible for implementing them. We also discussed the sustainability of U.S.-funded upgrades with Russian officials at sites we visited.

We performed our review from April 2006 to February 2007 in accordance with generally accepted government auditing standards.

Time Line of Major Events in the History of U.S. Efforts to Secure Nuclear Material and Warheads in Russia and Other Countries



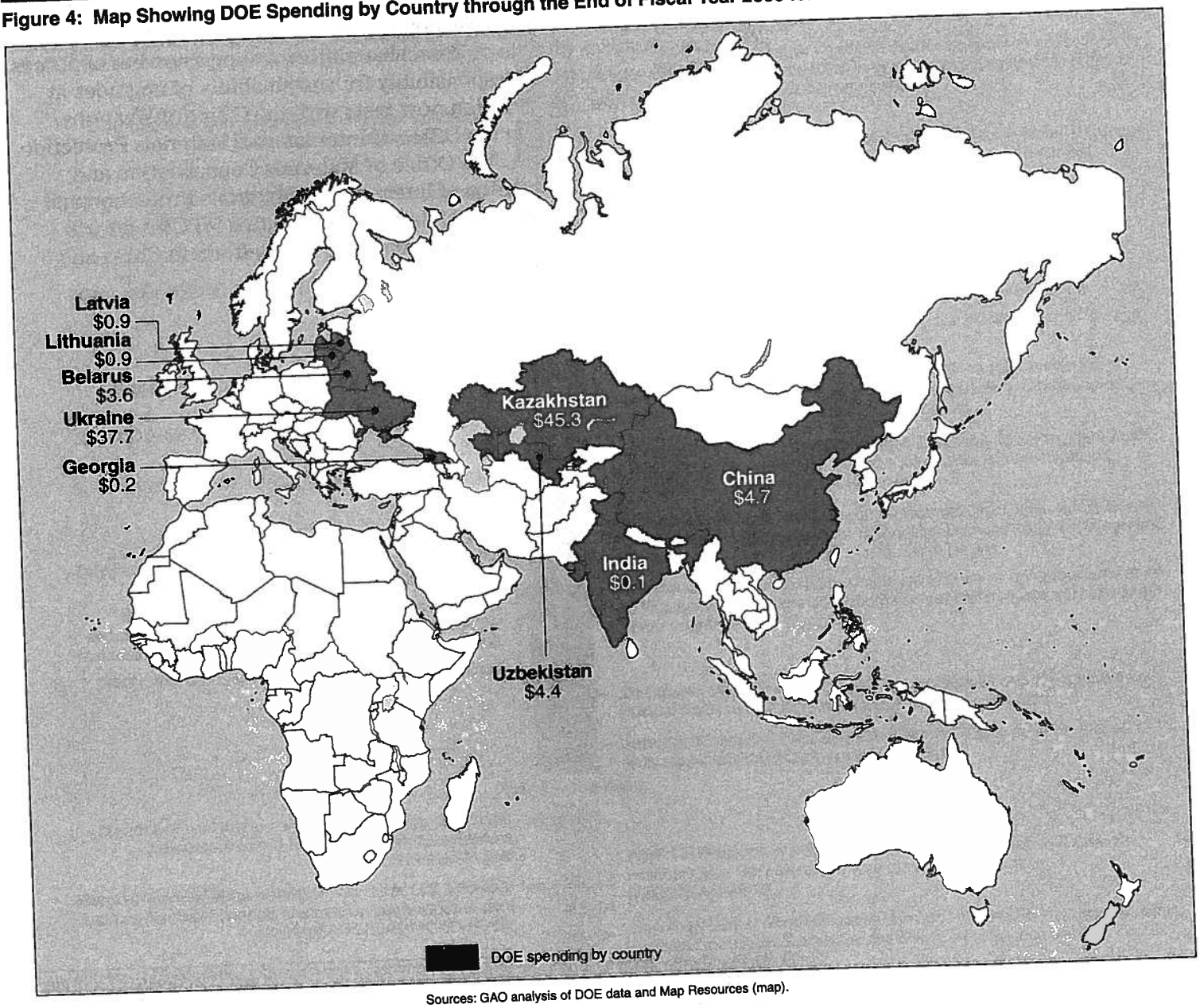
Source: GAO.

Additional Information on DOE Efforts to Secure Sites with Weapons-Usable Nuclear Material in Countries Other Than Russia

From fiscal year 1993 through fiscal year 2006, DOE spent a total of $131.5 million on efforts to help countries outside of Russia secure facilities with nuclear material (see fig. 4). Responsibility for managing DOE's MPC&A efforts in countries outside of Russia has shifted among a number of offices within DOE and NNSA.[1] Responsibility for sustainability of upgrades at sites in the former Soviet Union now rests with the Office of Weapons Material Protection within the Office of International Materials Protection and Cooperation in NNSA. The Office of Materials Consolidation and Civilian Sites within the Office of International Materials Protection and Cooperation in NNSA is responsible for implementing MPC&A efforts outside of the former Soviet Union, such as DOE's efforts in China and India.

[1]From fiscal year 1993 through fiscal year 2006, DOE's MPC&A projects in Belarus, Georgia, Latvia, Lithuania, Kazakhstan, Ukraine, and Uzbekistan were managed by four separate offices within NNSA and one task force. Program activities in these countries included work on physical protection, material control and accounting, International Atomic Energy Agency safeguards requirements, and other nuclear security issues. Funding noted here reflects the total level of effort in this region, though the majority of funds cited relate to the MPC&A activities on which this report focuses.

Figure 4: Map Showing DOE Spending by Country through the End of Fiscal Year 2006 for MPC&A Assistance Outside of Russia



Sources: GAO analysis of DOE data and Map Resources (map).

Note: In addition to the spending illustrated in the above figure, DOE also spent $33.7 million on miscellaneous MPC&A efforts outside of Russia through the end of fiscal year 2006. Also, all dollar amounts are rounded, and dollars are in millions.

Belarus

DOE provided security upgrades to two buildings at one facility—the Sosny Scientific and Technical Center (now known as the Joint Institute of Power and Nuclear Research-Sosny)—in Belarus. DOE began work at this site in April 1994, and the initial phase of MPC&A upgrades was completed in December 1997. After this, DOE was unable to conduct additional work in the country due to sanctions the United States had placed on Belarus.[2] However, in May 2003, the Department of State modified its position and allowed a team from DOE to visit Sosny solely to review the status of the MPC&A systems provided with U.S. funds. The DOE team visited the site in June 2003 and noted several security deficiencies that required immediate improvement. Shortly thereafter, DOE received approval from the Department of State to return to Belarus to perform a comprehensive vulnerability assessment at the Sosny site. According to DOE officials, the Department of State's Nonproliferation and Disarmament Fund allocated $250,000 for design work and $1.6 million for further upgrades in 2003 and 2005, respectively. Since there is currently no government-to-government agreement between the United States and Belarus, the project is being administered via the International Scientific and Technical Center's Partners Program. However, no funding has been spent yet because the Belarusian government suspended the project due to concerns over sharing information with a foreign entity. In the fall of 2006, Belarus indicated that it was again ready to move forward with the project. DOE sent a team to Sosny in December 2006 and was able to re-establish relations, as well as, develop a statement of work for the design of a communications system for the site and a project work plan for material control and accounting. Additional trips are planned for February and April 2007. DOE hopes to complete a second phase of MPC&A upgrades at the site in fiscal year 2008. In total, DOE spent about $3.6 million through the end of fiscal year 2006 to provide MPC&A assistance to Belarus.

China

DOE has a cooperative engagement program with China on issues related to nuclear material security. The purpose of the engagement is to increase awareness of our respective approaches to nuclear security issues, as well as MPC&A methodologies and applicable technologies, and to work cooperatively to improve security in these areas when and where appropriate. DOE is pursuing this objective through dialogue and technical

[2]The Department of State's Selective Engagement Policy prohibits a variety of U.S. assistance to Belarus and was applied to that country beginning in 1997.

collaboration with the China Atomic Energy Authority in China's civilian nuclear sector and is attempting initial engagements with the China Academy of Engineering Physics in China's defense nuclear sector.

DOE is pursuing bilateral cooperation with the Chinese civilian nuclear sector under the Statement of Intent signed with the China Atomic Energy Authority in January 2004 and the DOE-China Atomic Energy Authority Peaceful Uses of Nuclear Technology Agreement. In February 2004, DOE and the China Atomic Energy Authority agreed to conduct a Joint Technology Demonstration on integrated nuclear material management in Beijing. The purpose of this demonstration project was to promote the adoption of modern security practices and technologies at civilian nuclear facilities by demonstrating established physical protection, nuclear material control and accounting, and international safeguards technologies that provide a first line of defense against nuclear material theft, diversion, and sabotage. The Joint Technology Demonstration took place in Beijing in October 2005. Following the completion of the technology demonstration project, DOE is currently discussing ideas for future bilateral work with the China Atomic Energy Authority and the Chinese Institute of Atomic Energy. Through fiscal year 2006, DOE had spent about $4.7 million on MPC&A cooperation with China.

Georgia

DOE provided security upgrades at one facility in Georgia, the Andronikashvili Institute of Nuclear Physics in Tbilisi. Work began at this site in January 1996 and was completed in May 1996, at a cost of about $0.2 million. All fresh and spent nuclear fuel was transferred from the facility to a secure nuclear site in Scotland in April 1998 under a multinational effort known as Operation Auburn Endeavor. DOE's MPC&A program currently has no ongoing work in Georgia.

India

DOE's cooperative security engagement program with India is in its initial stages. DOE is investigating near-term opportunities to engage India on issues related to nuclear material security with the intent of initiating a cooperative program with India on nuclear security best practices. Potential issues for discussion include the theoretical framework for developing and implementing a design basis threat; the methodology for designing effective physical protection systems; a vulnerability assessment methodology; regulatory infrastructure for material control and accounting, and physical protection; and general nuclear security culture.

DOE spent about $100,000 on MPC&A cooperation with India through the end of fiscal year 2006.

Latvia

DOE provided security upgrades at one facility in Latvia, the Latvian Academy of Sciences Nuclear Research Center (also known as the Latvian Institute of Nuclear Physics at Salaspils). Work began at this site in July 1994 and was completed in February 1996. Since fiscal year 1994, DOE has spent about $900,000 to install and maintain security upgrades at this facility. In May 2005, 2.5 kilograms of fresh highly enriched uranium (HEU) fuel were removed from the Salaspils reactor and returned to Russia. According to the Federal Agency for Atomic Energy of the Russian Federation (Rosatom), the HEU fuel will be downblended into low-enriched uranium nuclear fuel for use in civilian nuclear power plants. DOE's MPC&A program currently has no ongoing work in Latvia.

Lithuania

DOE provided security upgrades at one facility in Lithuania, the Ignalina Nuclear Power Plant. Work began at this site in October 1995 and was completed in August 1996. Since fiscal year 1996, DOE has spent about $900,000 to install and maintain security upgrades at this facility. DOE counted one building at this facility as secure in its progress metric for the MPC&A program that tracks the number of buildings with weapons-usable nuclear material secured, even though the facility never possessed such material.[3] During the course of our review, we brought this to the attention of DOE management, and they agreed to remove the facility from the progress report in DOE's fiscal year 2008 budget justification document. DOE's MPC&A program currently has no ongoing work in Lithuania.

Kazakhstan

DOE provided security upgrades to four sites in Kazakhstan: the Institute of Atomic Energy–Kurchatov, the Institute of Nuclear Physics at Alatau, the BN-350 breeder reactor at Aktau, and the Ulba Metallurgical Plant. In total,

[3]We reported in 2000 that DOE improved the security at the Ignalina Nuclear Power Plant because the nuclear security systems would assist the site in implementing the International Atomic Energy Agency safeguards. Safeguards are systems designed to limit the risk of proliferation through the diversion of nuclear materials and assist efforts to reduce global nuclear weapons stockpiles. See GAO, *Nuclear Nonproliferation: Limited Progress in Improving Nuclear Material Security in Russia and the Newly Independent States*, GAO/RCED/NSIAD-00-82 (Washington, D.C.: Mar. 6, 2000).

DOE spent about $45.3 million from fiscal year 1994 through fiscal year 2006 to provide MPC&A assistance to Kazakhstan.

Institute of Atomic Energy-Kurchatov

The Institute of Atomic Energy-Kurchatov, formerly called Semipalatinsk-21, is a branch of the Kazakhstan National Nuclear Center. Two nuclear research reactors are located at the site. DOE began providing both physical security and material control and accounting upgrades to the site in October 1994, and the site was commissioned in September 1997. The perimeter security system at the site was commissioned in July 1998. DOE plans to continue to assist the Institute of Atomic Energy-Kurchatov with spare parts, extended warranties, and training to sustain its MPC&A systems in fiscal year 2007.

Institute of Nuclear Physics

The Institute of Nuclear Physics is a branch of the Kazakhstan National Nuclear Center located in the town of Alatau. The site operates a 10-megawatt research reactor used to manufacture radioisotopes as a radiation source for industrial and medical use, among other activities. DOE began work at the site in September 1995 and completed upgrades in October 1998. DOE plans to continue to assist the Institute of Nuclear Physics at Alatau with extended warranties and training to sustain its MPC&A systems in fiscal year 2007.

BN-350 Reactor at Aktau

DOE provided upgrades to two buildings at the BN-350 reactor site at Aktau. MPC&A upgrade work began in September 1994 and was completed in December 1998. In May 2002, HEU fuel was transferred from the BN-350 breeder reactor in Aktau to the Ulba Metallurgical Plant with the assistance of a nongovernmental organization involved in nonproliferation efforts—the Nuclear Threat Initiative. The HEU fuel will be downblended into low-enriched uranium nuclear fuel for use in civilian nuclear reactors.

Ulba Metallurgical Plant

The Ulba Metallurgical Plant contains a low-enriched uranium fuel fabrication facility, among other resources. The fuel fabrication facility produces nuclear fuel pellets with a capacity of 1,000 metric tons per year. Security upgrades work began in September 1994 and was completed in September 1997. DOE plans to continue to assist the Ulba Metallurgical Plant with extended warranties and spare parts to sustain its MPC&A systems in fiscal year 2007.

In addition, on November 21, 1994, 581 kilograms of HEU was transferred from the Ulba Metallurgical Plant to the United States in a highly secret project code-named "Sapphire." The project was carried out with cooperation from the Kazakhstani government and DOE and DOD.[4] The large stockpile of HEU, reportedly left over from the Soviet Union's secret Alfa submarine program, had been stored at the Ulba Metallurgical Plant in unsecured and unsafeguarded facilities without electronic means of accounting. Experts estimate the nuclear material was sufficient to make 20-25 nuclear bombs. The HEU was downblended into low-enriched uranium for use in civilian nuclear power plants in the late 1990s.

Ukraine

DOE provided MPC&A assistance to four sites in Ukraine: Kharkiv Institute of Physics and Technology, Kiev Institute of Nuclear Research, Sevastopol National Institute of Nuclear Energy and Industry, and South Ukraine Nuclear Power Plant. In total, DOE spent about $37.7 million from fiscal year 1993 through fiscal year 2006 to provide MPC&A assistance to Ukraine, including installation of security upgrades, maintenance of installed MPC&A systems, and training for site personnel.

Kharkiv Institute of Physics and Technology

The Kharkiv Institute of Physics and Technology conducts nuclear fuel cycle research and has important experimental physics facilities including a number of electron and ion accelerators. DOE provided upgrades to one building at this site. Security upgrades work began in May 1995 and was completed in January 1999. DOE plans to continue to assist the Kharkiv Institute of Physics and Technology with extended warranties and training to sustain its MPC&A systems in fiscal year 2007.

Kiev Institute of Nuclear Research

The Kiev Institute of Nuclear Research was established in 1970 and is operated by the Ukrainian Academy of Sciences. The institute's primary function is to perform research in low- and medium-energy nuclear physics. Security upgrades work began at one building at this site in December 1993 and was completed in October 1997. DOE plans to continue to assist the Kiev Institute of Nuclear Research with extended warranties and training to sustain its MPC&A systems in fiscal year 2007.

[4]The costs of this project are not readily available and, as a result, are not included in our total of DOE spending on MPC&A assistance in Kazakhstan.

Sevastopol National Institute of Nuclear Energy and Industry

The Sevastopol National Institute of Nuclear Energy and Industry's mission is to support Ukraine's nuclear power industry by training nuclear power plant personnel. The facility operates a 200-kilowatt, light-water cooled, research reactor. Security upgrades work began at one building at this facility in May 1996 and was completed in January 1999. DOE plans to continue to assist the Sevastopol National Institute of Nuclear Energy and Industry with extended warranties and training to sustain its MPC&A systems in fiscal year 2007.

South Ukraine Nuclear Power Plant

In addition to these facilities, DOE provided MPC&A upgrades to a fourth site that does not possess weapons-usable nuclear material, the South Ukraine Nuclear Power Plant. DOE began security upgrades work at this site in August 1994 and completed its upgrades work in January 1999. DOE counted this facility as secured in its progress metric for the MPC&A program, even though the facility never possessed such material. During the course of our review, we brought this to the attention of DOE management, and they agreed to remove the facility from their progress report in DOE's fiscal year 2008 budget justification document. According to DOE officials, no further MPC&A assistance is planned at this site.

Uzbekistan

In Uzbekistan, DOE's project goal is to continue to enhance capabilities and commitment to operating and maintaining security improvements at two institutes: the Institute of Nuclear Physics in Tashkent and the Foton facility. In total, DOE spent about $4.4 million from fiscal year 1995 through fiscal year 2006 to provide MPC&A assistance to Uzbekistan.

Institute of Nuclear Physics

Founded in 1956 as part of the Uzbekistan Academy of Sciences, the Institute of Nuclear Physics operates a 10-megawatt research reactor. Often described as the largest facility of its kind in central Asia, the site has an ambitious program to become the primary nuclear research and isotope production facility for the region. The facility maintains fresh and irradiated nuclear fuel storage facilities to support continued reactor operations. Security upgrades at the site began in June 1995 and were provided by a joint team from the United States, Australia, Sweden, and the United Kingdom. Australia and Sweden agreed to provide assistance in the area of material control and accounting, while the United States and United Kingdom agreed to provide physical protection upgrades. Upgrades were

provided in two phases. Phase I upgrades were completed in August 1996. After the attacks of September 11, 2001, DOE began to work with the facility to develop a plan to further improve its security system. Additional upgrades focused on the facility perimeter and included the installation of new fencing and exterior intrusion detection sensors. In addition, the Department of State provided about $0.6 million in fiscal year 2002 through its Nonproliferation and Disarmament Fund to supply cameras and lighting for the facility's perimeter. All Phase II upgrades were completed in September 2002. A commissioning ceremony was held in October 2002. In 2006, DOE announced the removal of 63 kilograms of HEU in the form of spent nuclear fuel from the facility. The HEU spent fuel was returned to Russia through DOE's Global Threat Reduction Initiative. DOE plans to continue to assist the Institute of Nuclear Physics with extended warranties and training to sustain its MPC&A systems in fiscal year 2007.

Foton Facility

The Foton facility has a small research reactor containing less than 5 kilograms of HEU. MPC&A upgrades at the site began in January 2005 and were completed in May 2005. Physical security upgrades at the Foton facility focused on the research reactor building and included such things as intrusion detection sensors, improved access controls, and a central alarm station. DOE plans to continue to assist the Foton facility with extended warranties to sustain its MPC&A systems in fiscal year 2007.

Appendix IV

Additional Information on DOE's National Infrastructure and Related Programs

In addition to DOE's efforts to provide security upgrades at sites with weapons-usable nuclear material and warheads in Russia and other countries, the department implements other crosscutting efforts to support the efforts of its MPC&A program, such as assistance for transportation security, equipment for protective forces at nuclear facilities, and efforts to consolidate nuclear material into fewer buildings and sites. According to DOE officials, these efforts support DOE's goal of improving security of vulnerable stockpiles of weapons-usable nuclear material by contributing to the overall security systems at nuclear materials sites in Russia and other countries. As table 4 shows, through the end of fiscal year 2006, DOE spent about $493.9 million on these efforts.

Table 4: DOE Spending on Crosscutting MPC&A Assistance Efforts through the End of Fiscal Year 2006

Dollars in millions	Spending
Project	
Material consolidation and conversion	$128.8
Secure transportation	88.1
Training and technical support infrastructure	63.6
Russian Federation inspection implementation	43.1
Protective forces assistance	30.2
Federal Information System	29.1
Regulatory development	27.0
Certification[a]	23.6
MPC&A operations monitoring[a]	20.5
MPC&A operations/sustainability[a]	13.9
MPC&A education	13.4
Material control and accounting measurements	10.8
MPC&A security culture	1.3
Taxation and customs	0.5
Total	**$493.9**

Source: GAO analysis of DOE data.

[a]The certification, MPC&A operations monitoring, and MPC&A operations/sustainability projects are discussed in the body of this report. Dollar amounts are rounded.

Material Consolidation and Conversion

DOE's Material Consolidation and Conversion project supports the transfer of HEU from Russian sites where it is no longer needed in order to secure locations within Russia for eventual conversion to low-enriched uranium. According to DOE, consolidation and conversion efforts significantly reduce the requirements and costs of securing material. For example, in 2006, DOE announced the completion of a 2-year cooperative effort to remove HEU from the Krylov Shipbuilding Research Institute, a Russian research facility located near St. Petersburg. DOE teams worked with their Russian counterparts to validate the inventory of nuclear material and confirm that it was securely packaged for transport. DOE paid for the HEU to be shipped to another facility in Russia where it will be converted (downblended) to low-enriched uranium, which will eliminate it as a proliferation concern. Through the Material Consolidation and Conversion project, DOE has also supported the secure storage and conversion of Russian-origin HEU that has been returned to Russia from countries such as Bulgaria, the Czech Republic, Latvia, Serbia, and Uzbekistan. DOE reported in July 2006 that more than 8,000 kilograms of HEU had been downblended into low-enriched uranium under the project. Through the end of fiscal year 2006, DOE had spent about $128.8 million on the project.

Secure Transportation

In the aftermath of the September 11, 2001, terrorist attacks, DOE increased funding for its efforts to secure nuclear material during transit. By providing upgraded security for transport and guard railcars, specialized secure trucks and escort vehicles, and secure containers—called overpacks—DOE seeks to reduce the risks of theft and sabotage of nuclear material transported within and between nuclear facilities in Russia. The goal of the Secure Transportation project is to reduce the risk of theft or diversion of material or warheads during transportation operations in Russia by improving security for railcars and trucks, Russian nuclear material and warhead transport infrastructure, and communications interface with response forces. Through fiscal year 2006, DOE had spent about $88.1 million to improve the transportation security of nuclear material in Russia, by providing 76 cargo trucks, 86 escort vehicles, as well as 66 cargo railcars, 25 guard railcars, and 283 security overpacks. This included 54 refurbished cargo railcars, 25 new manufactured guard railcars, 12 new manufactured cargo railcars, and approximately 78 cargo trucks and 89 escort trucks to support both on-site and off-site nuclear material shipments.

Training and Technical Support Infrastructure

DOE provides a variety of training and technical support to both the Russian Navy and Rosatom to help these entities operate and maintain U.S.-funded security upgrades and MPC&A systems. One of the primary accomplishments of the project was the construction of the Kola Technical Center near Murmansk. The facility was designed and constructed by DOE to be a central training and maintenance center to support naval nuclear fuel and warhead sites in the Murmansk region. DOE completed construction of the Kola Technical Center in June 2005 at a cost of $24 million.[1] We visited the facility during our trip to Russia. Russian officials told us that the Kola Technical Center is critical to help the Russian MOD transition to full financial responsibility for sustainability after U.S. funding ends.

In addition, DOE provides support to Rosatom's regional training facilities through the Rosatom Training and Technical Support Infrastructure project. These facilities, such as the Interdepartmental Special Training Center and the Russian Methodological and Training Center, seek to train specialists and guard forces to safeguard materials at Russian nuclear sites. Additionally, these centers seek to assist Rosatom by providing effective and sustainable training and technical support infrastructures. To date, DOE has spent $42.5 million on the establishment of these training and technological support centers.

Russian Federation Inspection Implementation

The Russian Federation Inspection Implementation project seeks to enhance nuclear material inspections by establishing a sustainable infrastructure with sufficient resources to enforce MPC&A regulations through federal and industry oversight. Under this project, DOE provides inspection support to Rostekhnadzor, Rosatom, and other Russian ministries and agencies. The project enhances MPC&A nuclear material inspections at the ministerial, agency, and site-level by providing comprehensive training, inspection, and technical assistance, as well as sufficient information technology to aid inspectors in conducting systematic inspections. For example, DOE assists Russian organizations in developing a systematic inspection approach that assures the MPC&A

[1]Prior to fiscal year 2003, funding for this project derived from DOE's Office of Nuclear Warhead Protection. From fiscal year 2003 through fiscal year 2006, funding for the project came from the budget of DOE's Office of National Infrastructure and Sustainability, which spent $21.2 million on its construction.

objectives are met and assists organizations in defining the inspection program by benchmarking proposed inspection methodologies against U.S. and other inspection approaches. Through fiscal year 2006, DOE has sponsored 83 inspections by Rosatom and Rostekhnadzor, and 980 Russian personnel have attended inspection courses. DOE's goal for the project is to maintain a cadre of about 125 trained inspectors. DOE had spent about $43.1 million on this project through the end of fiscal year 2006.

Protective Forces Assistance

The objective of the Protective Force Assistance project is to ensure that a sufficient number of organized, equipped, and trained response forces are present and able to protect against threats to highly-desirable nuclear material at Russian and Ukrainian sites and during transit. The project includes efforts in Russia and Ukraine, although the bulk of the efforts and money are spent in Russia. As of fiscal year 2006, DOE spent about $26.7 million to purchase a variety of equipment, such as bulletproof vests, helmets, response vehicles, and cold-weather uniforms for use by the forces that protect sites that store weapons-usable nuclear material in Russia. As of fiscal year 2006, DOE spent about $3.4 million to purchase the same type of equipment for Ukrainian sites.

Federal Information System

The Federal Information System (FIS) is a computerized management information system designed to track the location and movement of nuclear material between organizations throughout Russia. The FIS provides information on the quantity of nuclear material located at facilities that report to Rosatom. The system is centralized and automated to ensure that information can be received, tracked, and monitored by Rosatom. The development of the FIS is important to the MPC&A program because, prior to its development, Russian nuclear facilities generally used paper-based systems to track nuclear material inventories. The FIS will allow the Russian government to maintain an accurate and complete inventory of its weapons-usable nuclear material. As of fiscal year 2006, DOE reported that 21 organizations and facilities throughout Russia report to the FIS. Through the end of fiscal year 2006, DOE had spent about $29.1 million to develop the FIS.

Regulatory Development

The purpose of the Regulatory Development project is to assist Russian regulatory and operating agencies and services in developing a sustainable MPC&A regulatory system for civilian nuclear materials site security and to

Material Control and Accounting Measurements

The Material Control and Accounting Measurements project provides support to Russia for developing a national system of reference materials (standards), nuclear material measurement methods, instruments, and infrastructure to support the accurate measurement and accounting of weapons-usable nuclear material at Russian facilities. Reference materials, measurement methods, and instruments are needed to accurately measure the quantity and isotopic composition of nuclear material during inventories and transfers for input into accountability databases. Accurate material control and accounting measurements are key components to any MPC&A system. Through fiscal year 2006, DOE had spent about $10.8 million under this project and has purchased and distributed transportable equipment that allows for the testing of uranium and plutonium.

MPC&A Security Culture

The MPC&A Security Culture project supports the overall MPC&A goal of assisting Russia with enhancing its capabilities and strengthening its commitment to operating and maintaining improved nuclear security by fostering the development of training centers and developing an outreach strategy to enhance partner countries' awareness and understanding of MPC&A benefits, e.g., an MPC&A security "culture." The main objective of this project is to establish an infrastructure that emphasizes the importance of MPC&A and increase the commitment throughout Russia to operate and maintain MPC&A systems with minimal U.S. support by reinforcing the necessary attitudes and beliefs required to instill a strong MPC&A culture. Accomplishments under this project include training 1,800 staff in security culture and initiating a pilot security culture coordinator project at nine sites. Through the end of fiscal year 2006, DOE had spent about $1.3 million on the MPC&A Security Culture project.

In addition to its efforts to improve the security culture at Russian nuclear sites, DOE recently conducted a series of workshops for Russian officials on MPC&A best practices at U.S. nuclear sites. The workshops included presentations by U.S. MPC&A experts. In conducting this workshop series, DOE intends to further enhance the security culture at Russian sites by working to educate Russian site officials on the methods used at U.S. facilities, so that these best practices can be applied at Russian sites.

Taxation and Customs

The MPC&A Taxation and Customs project began in 1999 to meet a congressional mandate that U.S. nuclear safety and security programs not pay taxes in Russia. The MPC&A program must obtain a certified tax

exemption when providing technical equipment and services. The Taxation and Customs project assists DOE project teams' understanding of taxation and customs issues and ensures compliance with Russian laws. The project stays abreast of Russian taxation and customs legislation, as well as guidance on bureaucracy and requirements for tax exemption, by holding workshops for Russian sites; tracking the tax-exemption process; and maintaining a taxation Web site for DOE project teams. Through the end of fiscal year 2006, DOE had spent about $0.5 million on the project.

Comments from the Department of Energy

Department of Energy
National Nuclear Security Administration
Washington, DC 20585

February 21, 2007

Mr. Gene Aloise
Director
Natural Resources and Environment
Government Accountability Office
Washington, DC

Dear Mr. Aloise:

The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Government Accountability Office's (GAO) report, "NUCLEAR NONPROLIFERATION: Progress Made in Improving Security at Russian Nuclear Sites, but the Long-Term Sustainability of U.S.-Funded Security Upgrades is Uncertain." We understand that this report was done at the request of the Chairman, House Energy and Commerce Committee, and the Chairman and Ranking Member of the Senate's Permanent Subcommittee on Investigations, Committee on Homeland Security and Governmental Affairs.

While we generally concur with the findings in the report, we have a number of comments for clarification.

Regarding the metric reporting the number of buildings secured, we agree that the metric as currently applied may be confusing, but we are already changing the metric to one that more accurately identifies the level of completion for upgrades. In addition, we would like to point out that important risk reduction activities, including additional delay at the target, two-person rule for access to material, and the confirmation of rapid base-line inventories, occur during rapid upgrades, which significantly reduce the risk of theft by both an outside adversary and a facility insider. We would also like to point out that during our upgrades process there is no sharp delineation between the completion of rapid upgrades and the beginning of comprehensive upgrades. In most situations comprehensive upgrades begin before rapid upgrades are completed, and in the 51 buildings identified in the GAO report, comprehensive upgrades are already underway, and are in varying stages of implementation.

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Regarding earned value management, we do not require our contractors to implement earned value management (EVM) systems for firm fixed price contracts such as the ones used by the Department to upgrade security on Russian nuclear weapon storage sites. DOE Policy P 413.1 and DOE Order O 413.3A instruct program managers to utilize EVM for the acquisition of capital assets for Departmental use, but specifically exclude projects conducted under cooperative agreements. The Department's Office of Engineering and Construction Management has confirmed that EVM is not required for projects at sensitive Russian military facilities, where day-to-day management of events could not be directly monitored by U.S. personnel. While EVM may be appropriate for contracting methodologies used by DOD -- which feature "cost-plus-award fee" mechanisms and are executed through various task orders – our Laboratories negotiate fixed-priced contracts directly with Russian integrating contractors. Since we negotiate all costs upfront prior to commencing the upgrades, and these costs include all equipment and installation prices, there is zero-cost variance during the period of performance, for which EVM would otherwise be appropriate. We concentrate on managing possible schedule variances due to force majeure or unforeseen technical challenges that may arise during the period of performance, and have therefore implemented a system for managing large contracts, which combines classical milestone/work breakdown structure methodologies with those principles of EVM appropriate for assistance work in Russia. This system includes stringent periodic reporting requirements, institutionalized In-Progress Review meetings with contractors, and detailed laboratory analyses. This system helps us ensure that upgrades are installed in accordance with the established milestones, the conceptual designs agreed to between NNSA and the Russian MOD, and the site-specific designs required by the contracts.

Regarding sustainability, as the report correctly points out, in the Bob Stump National Defense Authorization of 2003, the Congress directed us to transfer a sustainable MPC&A system to sole Russian support no later than January 1, 2013. To carry out this mandate, the Department has been actively engaged with the Russian Federal Atomic Energy Agency (Rosatom) to develop a program to transition full support to the Russian Federation. Rosatom and NNSA established a Joint Sustainability working group that has met on six occasions since January 2005 to develop a joint Russian-U.S. sustainability plan which identifies sustainability requirements that need to be met by each site before a full transition to sole Russian support can take place. We expect that a final plan will be presented to the Joint Coordinating Committee at its next meeting in April 2007. We have developed and recently updated our programmatic guidelines for sustainability that provide standardized criteria for sustaining MPC&A upgrades, and a list of sustainability indicators that we currently use to track progress at 15 sites. We will

extend the use of these metrics to all sites as they complete the MPC&A upgrades and incorporate the reporting into a sustainability management system as called for in the report.

Should you have any questions related to this response, please contact Richard Speidel, Director, Policy and Internal Controls Management, or me.

Sincerely,

Michael C. Kane
Associate Administrator
for Management and Administration

cc: Deputy Administrator for Defense Nuclear Nonproliferation

GAO Contact and Staff Acknowledgments

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Staff Acknowledgments

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Related GAO Products

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