



## Testimony

Before the Subcommittee on Emerging Threats and Capabilities, Committee on Armed Services, U.S. Senate

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# NUCLEAR NONPROLIFERATION

## DOE's Efforts to Secure Nuclear Material and Employ Weapons Scientists in Russia

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Mr. Chairman and Members of the Committee:

We are pleased to be here today to discuss our reviews of two Department of Energy (DOE) nonproliferation programs that address important U.S. national security concerns—(1) improving the security of hundreds of tons of nuclear material at various sites throughout Russia and (2) employing weapons scientists in Russia’s 10 closed nuclear cities so that they will not sell sensitive information to countries or terrorist groups trying to develop weapons of mass destruction. Both programs are managed by the National Nuclear Security Administration’s Office of Defense Nuclear Nonproliferation. Our testimony focuses on each of these programs’ impact and future plans. Our statement is based on our February 28, 2001, report on the Material Protection, Control, and Accounting (MPC&A) program and our report on the Nuclear Cities Initiative (NCI) program that is being released today.<sup>1</sup>

Mr. Chairman, the following summarizes our findings:

The security systems installed by DOE are reducing the risk of theft of nuclear material in Russia, but hundreds of metric tons of nuclear material still lack improved security systems. As of February 2001, DOE had installed, at a cost of about \$601 million, completed or partially completed systems protecting, among other things, 192 metric tons of the 603 metric tons of nuclear material identified at risk of theft. These systems, while not as stringent as those installed in the United States, are designed to prevent individuals or small groups of criminals from stealing nuclear material. Russian officials’ concerns about divulging national security information continue to impede DOE’s efforts to install systems for several hundred metric tons of nuclear material at sensitive Russian sites. The program’s continued progress depends on DOE’s ability to gain access to these sensitive sites and reach agreement with Russia on reducing the number of sites and buildings where nuclear material is located and security systems are needed. DOE agreed with our recommendation to develop options for completing the program on the basis of the progress made in gaining access to these sites and agreement on the closure of buildings and sites. Furthermore, while DOE currently does not have a means to monitor the security systems it is installing to ensure that they are operating properly on a continuing basis, the Department has agreed to implement our recommendation to develop such a system in

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<sup>1</sup>*Nuclear Nonproliferation: Security of Russia’s Nuclear Material Improving: Further Enhancements Needed.* (GAO-01-312, Feb. 28, 2001) and *Nuclear Nonproliferation: DOE’s Efforts to Assist Weapons Scientists in Russia’s Nuclear Cities Face Challenges* (GAO-01-429, May 3, 2001).

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cooperation with Russia. DOE estimates that the MPC&A program will be completed in 2020 at a cost of about \$2.2 billion.

Regarding DOE's Nuclear Cities Initiative, we found that during its first 2 years of operation, the program had limited success. The Department estimates that the program employs about 370 people, including many weapons scientists who are primarily working on a part-time basis through research projects sponsored by the U.S. national laboratories. According to Russian officials, most of the scientists receiving program funds continue to work on Russia's weapons of mass destruction and are also receiving a salary paid for by the Russian government. About one-half of the program's projects focus on such activities as the delivery of medical equipment and school exchange programs and are not designed to create jobs for weapons scientists. With regard to funding, we found that a disproportionate amount of the NCI program's funding has been spent in the United States. About 70 percent, or about \$11.2 million, of the \$15.9 million that DOE spent through December 2000 was spent in the United States—primarily at its national laboratories—for such items as overhead, labor, equipment, and travel. The remaining 30 percent was spent for projects and activities in Russia. DOE, in response to direction provided by the Congress in a conference report on appropriations for fiscal year 2001, stated that its goal is to spend 51 percent of its program funds in Russia this fiscal year. DOE will have to more effectively monitor and control the program's spending to meet this goal. We also found that DOE's NCI program lacks a plan for the future. DOE agreed with our recommendations to develop a plan that addresses the program's future costs and a time frame with quantifiable performance measures to determine how effectively the program is meeting its goals and whether it should be expanded. DOE has two programs—NCI and the Initiatives for Proliferation Prevention (IPP)—operating in Russia's nuclear cities. We believe that DOE needs to address a fundamental question—does it need two programs with a shared underlying goal—employing Russian weapons scientists—and, in some cases, implementing the same kinds of projects? We recommended that DOE determine if these two programs should be consolidated into one effort to achieve potential cost savings and other efficiencies. DOE agreed to review both the IPP and NCI programs with a view toward consolidation.

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## Background

In 1995, DOE established the MPC&A program to install improved security systems for nuclear material at civilian nuclear sites, naval fuel sites, and nuclear weapons laboratories in Russia. Terrorists and countries seeking nuclear weapons could use as little as 25 kilograms of uranium or 8 kilograms of plutonium to build a nuclear weapon. With the dissolution of the Soviet Union, DOE estimates that Russia inherited 603 metric tons of highly enriched uranium and plutonium in forms highly attractive to theft. As of February 2001, DOE had identified 252 buildings at 40 sites that require nuclear

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security systems. In addition to installing security systems, DOE is providing sites with long-term operational assistance through equipment warranties, operating procedure development, and training. DOE also has projects under way to help Russia's Ministry of Atomic Energy (MINATOM) and nuclear regulatory authority develop (1) a total inventory of nuclear material, (2) regulations to ensure the effective operation and maintenance of the systems, and (3) inspection and enforcement systems to ensure that sites comply with regulations. In addition, DOE is supporting security improvements for trains and trucks that transport nuclear material between and within sites and for nuclear material security training centers.

DOE's Nuclear Cities Initiative focuses on weapons scientists in the 10 closed nuclear cities that form the core of Russia's nuclear weapons complex. Many of these cities are located in geographically remote locations and were so secret that they did not appear on any publicly available maps until 1992. These cities remain high security areas and access to them is limited. MINATOM manages the nuclear facilities that are located within the cities and estimates that about 760,000 people live there, including approximately 122,000 residents who are employed in key nuclear enterprises. The Russian government has announced its intention to reduce the size of its nuclear weapons complex, and a critical component of this effort includes finding new employment opportunities for weapons scientists, engineers, technicians, and support staff who will lose their jobs from the downsizing of the complex. Russian officials have identified a need to create 30,000 to 50,000 jobs in the 10 closed nuclear cities over the next several years. DOE has tasked the national laboratories to play a major role in the program, which works in conjunction with another DOE program—the Initiatives for Proliferation Prevention—that also seeks to employ weapons scientists in several countries, including Russia.

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## DOE Has Reduced the Risk of Theft for About 32 Percent of the Nuclear Material in Russia, but Hundreds of Metric Tons of Material Remain Unprotected

DOE has installed completed or partially completed security systems in 115 buildings holding about 192 metric tons, or about 32 percent, of the 603 metric tons of weapons-useable nuclear material at risk of theft in Russia. DOE installed completed systems in 81 buildings protecting about 86 metric tons (or about 14 percent) of nuclear material. DOE has also installed partially completed systems known as rapid upgrades in 34 additional buildings protecting 106 metric tons, or 18 percent of the nuclear material. Rapid upgrades consist of such things as bricking up windows in storage buildings; installing strengthened doors, locks, and nuclear container seals; and establishing controlled access areas around the nuclear material. Completed systems include such components as electronic sensors, motion detectors, closed circuit surveillance cameras, central alarm stations to monitor the cameras and alarms, and computerized material-accounting systems. By installing rapid upgrades, DOE helps Russian sites

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establish basic control over their nuclear material while U.S. project teams finish installing the security systems.

DOE's reviews of installed systems and our visits to nine nuclear sites in Russia indicate that most of the security systems are currently reducing the risk of theft. DOE has established a panel of experts known as the Technical Survey Team that examines project documents and meets with project teams to determine if the installed systems meet departmental guidelines for effectively reducing the risk of nuclear theft in Russia. From January 1999 through September 2000, the Technical Survey Team reviewed projects for 30 of the 40 sites in Russia. They found that systems at 22 of the sites were reducing the risk of theft by increasing the ability of the Russian sites to detect, delay, and respond to an attempted theft or otherwise strengthen control over their nuclear material. For six of the sites they reviewed, little or no risk reduction occurred because the systems were not installed in accordance with the guidelines, the teams did not have sufficient access to the buildings to install systems, or the systems were installed around material presenting a low risk of proliferation. For two of the other sites, it was too soon to tell if the systems reduced risk. DOE is taking steps to correct these problems.

At the nine sites we visited in Russia where DOE had installed systems, we observed, among other things,

- ? storage vaults equipped with strengthened doors, locks, video surveillance systems, and alarms that can detect and delay thieves as they attempt to steal nuclear material;
- ? nuclear material containers equipped with computerized bar codes and tamper-resistant seals that allow site personnel to perform quick inventories of the material and determine whether the containers were tampered with; and
- ? nuclear material portal monitors that scan people and vehicles entering and leaving facilities to ensure that they have not taken nuclear material from storage locations.

While DOE has made progress in installing systems, DOE's project teams do not have access to 104 of the 252 buildings requiring improved security systems. These buildings, located mostly at Russian nuclear weapons laboratories, contain hundreds of metric tons of nuclear material. MINATOM is reluctant to grant access to these buildings because of Russian national security concerns and Russian laws on the protection of state secrets. DOE officials told us they need access to these buildings to confirm the type of material to be protected, design systems that provide adequate protection for the material, ensure that the systems are installed properly, and ensure that the sites operate the systems properly. DOE recently reached a draft agreement with MINATOM to provide program

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personnel with greater access to sensitive MINATOM sites. According to DOE officials, even with the agreement, some of the more sensitive MINATOM sites will remain inaccessible to program personnel but the agreement, when concluded, will allow the program to further expand its work.

Just installing security systems will not ensure the long-term success of the MPC&A program. DOE's Technical Survey Team and our observations provide only a snapshot of how effectively the installed systems are reducing the risk of nuclear material theft in Russia. DOE has not established a means to systematically measure the effectiveness of the security systems that it has installed at Russian nuclear sites. However, DOE is currently collecting information from individual sites that would be useful in measuring the new systems' effectiveness. For example, DOE project teams visit sites and observe systems that have been installed, and at certain sites, DOE has contracts with the Russians to collect information on the functioning of equipment. In addition, before installing security systems, DOE and Russian site officials conduct vulnerability assessments, which assess the probability of the existing nuclear security systems at the sites to prevent nuclear material theft. In commenting on a draft of our report, DOE agreed with our recommendation to develop a system to monitor, on a long-term basis, the security systems at nuclear sites in Russia to ensure that they continue to detect, delay, and respond to attempts to steal nuclear material.

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## DOE Faces Challenges in Adhering to MPC&A Program's Cost Projections and Time Frames

From fiscal year 1993 through February 2001, DOE spent about \$601 million on the MPC&A program in Russia. DOE spent about \$376 million, or 63 percent of the \$601 million, on installing security systems at Russia's civilian sites, nuclear weapons laboratories, the Russian navy's nuclear fuel sites, and the Russian navy's nuclear weapons sites. DOE spent the remainder of the \$601 million on, among other things, operational assistance and program management.

According to DOE, it will complete the MPC&A program in 2020 at a total cost of \$2.2 billion. However, DOE officials told us that the cost estimate and time frame for completing the program are uncertain because DOE faces challenges in implementing the program. For example, DOE does not know how much assistance it will need to provide Russian sites with to operate and maintain the security systems. Some sites where DOE is installing systems are in better financial condition and have a greater potential to generate revenue than other sites and therefore are more likely to have the resources to maintain the security systems. Other sites will need more DOE assistance to maintain the systems. Furthermore, because of a lack of access to many nuclear sites, DOE is not certain about how many buildings will require security systems or when it will be

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able to start and complete the installation of these systems. DOE is also working with Russia to consolidate nuclear material into fewer buildings and convert the highly enriched uranium in these buildings into forms that cannot be used in nuclear weapons. While this effort could reduce the program's costs by reducing the number of sites and buildings needing systems, MINATOM has not yet identified which buildings and sites it plans to close. Our report ([GAO-01-312](#)) recommends that DOE include in its strategic plan, currently under development, (1) an estimate of how much assistance is required to sustain operations at each site on the basis of an analysis of the costs and the sites' ability to cover these costs and (2) options for completing the program on the basis of the progress made in gaining access to sensitive sites and the closure of buildings and sites. DOE concurred with this recommendation.

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## DOE's Nuclear Cities Initiative Projects Have Had Limited Impact

During its first 2 years, NCI has had limited success in meeting the program's principal objectives—creating jobs for weapons scientists and helping to downsize Russia's weapons complex. According to DOE, the program is employing about 370 people, including many weapons scientists who are working primarily on a part-time basis through research projects sponsored by the U.S. national laboratories. About 40 percent of the work was generated through the Open Computing Center in the closed city of Sarov. The center's director told us that the part-time employees are also working at the weapons design institute in Sarov on weapons-related activities and are receiving salaries from the institute. The center has had some success in attracting business investment, and DOE officials estimated that, with successful marketing to commercial businesses, the center would be able to employ 500 people by 2005.

Although some jobs have been created, about one-half of the 26 NCI projects are not designed to create jobs for weapons scientists. Instead, these projects focus on, among other things, such activities as the delivery of medical equipment and school exchange programs. DOE officials told us that these community development projects are needed to make the nuclear cities more attractive to business investment. However, Russian officials have criticized the projects because they do not create jobs for weapons scientists, which they believe is the primary goal of NCI and the 1998 agreement between the United States and Russia. Furthermore, none of the industry officials we spoke with said that they would be more likely to invest in the nuclear cities because of municipal and social improvements in the nuclear cities.

Eight of the program's projects are designed to develop sustainable commercial ventures, but only one of these has successfully created jobs. Numerous factors have contributed to the limited success of the NCI projects. Some projects have

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been canceled or delayed because of the lack of Russian support and cooperation. Other reasons for these projects' lack of success include poor economic conditions in Russia, the remote location and restricted status of the nuclear cities, and the lack of an entrepreneurial culture among weapons scientists. Furthermore, DOE and national laboratory officials have told us that the Department's project selection process has been inconsistent and "ad hoc." According to the program director, projects were approved for funding without a comprehensive review process in order to implement the program quickly and engage the Russians. In January 2001, DOE issued new program guidance that includes more detail on project selection and approval. For example, the new guidance will give preference to those projects with the strongest prospects for early commercial success and those in which the start-up costs are shared with other U.S. government agencies, Russian partners, and/or private entities. While the guidance, if effectively implemented, will address the problems with DOE's inadequate project-selection process, it remains unclear to us why DOE took over 2 years to develop these procedures when similar procedures already existed under the IPP program.

Despite the numerous problems we found with the NCI projects, the program has made some strides. For example, according to DOE officials, one of the most successful projects involves the conversion of weapons assembly buildings at the Avangard weapons facility in Sarov into production space for commercial ventures, including the proposed establishment of a kidney dialysis manufacturing facility. The program has helped facilitate the relationship between a Western business and the Russian weapons institute, and DOE has allocated about \$1.5 million to support this effort.

Interestingly, Mr. Chairman, the most successful commercial effort we observed in the nuclear cities involved a major U.S. computer firm that employs former weapons scientists in Sarov. This effort, which began about 7 years ago, has been undertaken without U.S. government assistance and now employs about 100 scientists. When we visited the software operation in September 2000, we were told that the employees work full-time and that their salaries are up to three times what they had been paid at the weapons institute.

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## Majority of Nuclear Cities Program Funds Have Been Spent in the United States

From fiscal year 1999 through December 2000, the expenditures for NCI totaled about \$15.9 million. Of that amount, about \$11.2 million (or 70 percent) was spent in the United States, and about \$4.7 million (or 30 percent) was spent for projects and activities in Russia. The U.S. national laboratories' costs to implement the program represented the bulk of the funds spent in the United States and included such items as overhead, labor, equipment, and travel. In fact, 75 percent of the funds spent by the laboratories were for

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overhead and labor costs. DOE officials told us that laboratory expenditures, although significant, were part of startup costs for NCI. They noted that the program has taken longer to start up because of the economic problems facing Russia and the barriers involved in trying to start new businesses and related activities in the nuclear cities. DOE officials told us that they were concerned about the amount of funds spent by the laboratories to administer the program—particularly the overhead costs—and have taken steps to reduce these costs such as by managing some projects directly from headquarters. These officials also told us that laboratory costs will be reduced and that the laboratories' role will diminish as commercial investors develop business contacts in the nuclear cities as a result of the program.

The \$4.7 million in expenditures for Russia included contracts with Russian organizations to buy computers and other equipment, a small business bank loan program, and various community development projects. Furthermore, MINATOM officials made it clear to us, during our September 2000 visit to Russia, that they were dissatisfied with the amount of program funds that had been spent in Russia. The First Deputy Minister of MINATOM told us that it was his understanding that DOE planned to spend the majority of program funds in Russia and wanted to know what happened to these funds. He said that the lack of progress in the program increases the negative views of the program held by various Russian government officials, who allege that the program is a way for the United States to gain access to weapons data in Russia's nuclear cities.

In response to direction provided by the Congress in a conference report on DOE's fiscal year 2001 appropriations, DOE stated that its goal is to spend at least 51 percent of its program funds in Russia during this fiscal year. DOE will have to more effectively monitor and control the program's spending to meet this goal. Regarding future program expenditures, the Department has not developed a plan that addresses the program's future costs and a time frame with quantifiable performance measures to determine how effectively the program is meeting its goals and when and if the program should expand beyond the three nuclear cities. In 1999, DOE officials believed that the total funding level for NCI could reach \$600 million over a 5-year period. However, the program's director told us that because the program had not received expected funding levels during its first years of operation, he is uncertain about the program's future costs and time frames.

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## Duplication Has Occurred in the Operation of DOE's Two Programs in Russia's Nuclear Cities

DOE has two programs operating in Russia's nuclear cities—the Nuclear Cities Initiative and the Initiatives for Proliferation Prevention—that share a common underlying goal—to employ Russia's weapons scientists in nonmilitary work. We believe that DOE needs to address a fundamental question—does it need two programs operating in Russia's nuclear cities with a shared goal and, in some cases, the same types of projects? The operation of these two similar programs has led to some duplication of effort, such as two sets of project review procedures and several similar types of projects. Both programs provide Russia's nuclear cities with funds and since 1994, DOE has spent over \$13 million on about 100 IPP projects in five nuclear cities, including the three nuclear cities participating in NCI—Sarov, Snezhinsk, and Zheleznogorsk. One U.S. national laboratory official told us that there was not a clear distinction between the two programs, and other laboratory officials noted that some projects have been proposed for funding under both programs, have been shifted from one program to another, or have received funding from both programs. The IPP program director told us that although he did not believe that the two programs were duplicative, there is a potential for duplication to occur because both have a common approach for creating jobs in the nuclear cities. Both programs reside within DOE's Office of Defense Nuclear Nonproliferation, National Nuclear Security Administration; have adjoining offices; and share staff to perform budget, travel, and secretarial functions.

Our work shows that some of the failures of NCI's commercial development projects might have been avoided if DOE had a common project approval process and incorporated some of the elements of the IPP project selection process from the onset of the NCI program. Furthermore, most of NCI's initial commercial development projects would not likely have been approved under the IPP program's more rigorous approval process. This is because, unlike the IPP program, NCI did not require that projects have industry partners or demonstrate commercial viability until January 2001, when program guidance was issued. In addition, NCI has recently (1) begun to develop a more systematic process, as IPP already has, for obtaining the views of business or industry experts on commercial development and (2) adopted practices established under the IPP program regarding the funding of projects. In commenting on a draft of our report being released today, DOE agreed to review both programs with a view toward consolidation.

Mr. Chairman, this concludes our testimony. We would be happy to respond to any questions that you or other Members of the Committee may have.

### Contact and Acknowledgement

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For further information on this testimony, please contact Ms. Gary L. Jones at (202) 512-3841. Individuals making key contributions to this testimony included Gene Aloise, Charles Bolton, Ross Campbell, Joseph Cook, Glen Levis, and Joseph O. McBride.