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NUCLEAR NONPROLIFERATION

DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenges



G A O

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Abbreviations

DOE	Department of Energy
EBRD	European Bank for Reconstruction and Development
ENCI	European Nuclear Cities Initiative
GAO	General Accounting Office
IPP	Initiatives for Proliferation Prevention
MINATOM	Russian Ministry of Atomic Energy
NCI	Nuclear Cities Initiative
VNIIEF	All-Russian Scientific Research Institute of Experimental Physics



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Accountability * Integrity * Reliability

United States General Accounting Office
Washington, DC 20548

May 3, 2001

The Honorable John W. Warner
Chairman
Committee on Armed Services
United States Senate

The Honorable Pat Roberts
Chairman, Subcommittee on
Emerging Threats and Capabilities
Committee on Armed Services
United States Senate

In September 1998, the United States and Russia embarked on an ambitious nonproliferation program, known as the Nuclear Cities Initiative (NCI), to create sustainable job opportunities for weapons scientists in Russia's closed nuclear cities and to help Russia accelerate the downsizing of its nuclear weapons complex. Ten of these cities formed the core of the former Soviet Union's nuclear weapons complex. Many are located in geographically remote locations and were so secret that they did not appear on any publicly available maps until 1992. Behind their walls, thousands of scientists and engineers worked on the design, assembly, and production of the Soviet nuclear arsenal. These Russian cities remain high-security areas, and access to them is limited. Russia's Ministry of Atomic Energy (MINATOM) manages the nuclear facilities that are located within the cities. MINATOM estimates that about 760,000 people live in the nuclear cities, including the family members of the nuclear workers as well as teachers and various support personnel. Approximately 122,000 inhabitants are employed in key nuclear enterprises.

The Russian government has announced its intention to reduce the size of its nuclear weapons complex and asked for U.S. assistance in this endeavor. 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 complex's downsizing. The U.S. government has also been concerned that Russian weapons scientists in need of money may sell sensitive information to countries or

terrorist groups trying to develop weapons of mass destruction. NCI, which is being implemented by the Department of Energy (DOE) and its national laboratories,¹ seeks to assist Russia in downsizing its weapons complex by employing weapons scientists and other residents of the cities in nonmilitary scientific or commercial activities. NCI works in conjunction with another DOE program—the Initiatives for Proliferation Prevention (IPP)—which also seeks to employ weapons scientists and is implemented throughout all of Russia, including several nuclear cities, as well as Ukraine, Belarus, and Kazakhstan.

In early 1999, we issued a report addressing both programs, identified a number of management weaknesses, and recommended several corrective actions.² Regarding NCI, we pointed out that the program faced impediments to success, including restrictions on access to the cities and poor prospects for foreign investment. We recommended that NCI not expand beyond three pilot cities in Russia—Sarov, Snezhinsk, and Zheleznogorsk—until DOE had demonstrated that its efforts were achieving the program’s objectives of creating jobs for weapons scientists. Currently, the program is operating in these cities, plus Avangard—a nuclear weapons assembly/disassembly facility located in Sarov. This report discusses the (1) costs to implement NCI, including the amount of program funds spent in the United States and Russia, as well as planned expenditures; (2) impact of the Department’s NCI projects; and (3) status of the European Nuclear Cities Initiative (ENCI).

To develop this information, we obtained cost data from DOE’s headquarters and the national laboratories. We reviewed all of DOE’s NCI projects to determine their impact on meeting the program’s goals and objectives. We also met with MINATOM officials in Russia and visited the closed nuclear city of Sarov. In addition, we met with, among others, officials of Italy’s Ministry of Foreign Affairs who are major proponents of the proposed ENCI.

¹The Department manages the largest laboratory system of its kind in the world. The mission of DOE’s 23 laboratories has evolved. Originally created to design and build atomic bombs, these laboratories have since expanded to conduct research in many disciplines—from high-energy physics to advanced computing.

²See *Nuclear Nonproliferation: Concerns With DOE’s Efforts to Reduce the Risks Posed by Russia’s Unemployed Weapons Scientists* (GAO/RCED-99-54, Feb. 19, 1999).

Results in Brief

From fiscal year 1999 through December 2000, the expenditures for the Nuclear Cities Initiative totaled about \$15.9 million. Of that amount, about \$11.2 million (or 70 percent) had been spent in the United States, and about \$4.7 million (or 30 percent) had been 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 for such items as overhead, labor, equipment, and travel. Department of Energy officials told us that these expenditures, although significant, were part of startup costs for the program. These officials 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. Officials from Russia's Ministry of Atomic Energy told us that they are dissatisfied with the amount of program funds that have been spent in Russia and that if the Department is serious about creating jobs for Russian weapons scientists, more funds must be spent in Russia. 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. In response to direction provided in a conference report on its fiscal year 2001 appropriations, the Department of Energy stated that its goal is to spend at least 51 percent of its program funds for fiscal year 2001 in Russia. Regarding planned expenditures, the Department has not developed (1) a plan that addresses future program costs and (2) 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. This report recommends that the Department develop a plan with clearly defined goals that serves as a basis for determining the program's future scope and direction and strengthen its efforts to reduce national laboratory costs in order to place more program funds in Russia.

During its first 2 years, the Nuclear Cities Initiative has funded 26 projects that have had limited success in meeting the program's principal objectives—creating jobs for weapons scientists and helping to downsize Russia's weapons complex. Many of the projects were not carefully reviewed for their commercial potential, as the Department wanted to implement the program quickly and engage the Russians. According to the Department, the projects are 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. However, according to Russian officials, most of the scientists receiving program funds continue to work on Russia's weapons of mass destruction program and are also receiving a salary paid for by the Russian government. One

project has helped create commercial space in several buildings previously used for nuclear weapons assembly work in the city of Sarov. About one-half of the projects are not designed to create jobs for weapons scientists and instead focus on, among other things, such activities as the delivery of medical equipment and school exchange programs. While Department officials told us that these projects are needed to make the nuclear cities more attractive to business investment, Russian officials have criticized them because they do not create jobs for weapons scientists. Furthermore, none of the industry officials we spoke with said that they would more likely invest in the nuclear cities because of municipal and social improvements. The Department has two programs—the Nuclear Cities Initiative and the Initiatives for Proliferation Prevention—operating in Russia’s nuclear cities that share a common underlying goal and, in some cases, the same types of projects. The operation of these two very similar programs in Russia’s nuclear cities has caused duplication of effort. This report contains a recommendation that the Department evaluate all of the Nuclear Cities Initiative projects, particularly community development activities, and eliminate those that do not meet the program’s basic objectives of creating jobs and assisting with the downsizing of Russia’s nuclear weapons complex. The report also recommends that the Department determine whether the Nuclear Cities Initiative and the Initiatives for Proliferation Prevention should be consolidated into one effort in order to achieve potential cost savings and other efficiencies.

The European Nuclear Cities Initiative is a proposed program that is being supported by the Italian Ministry of Foreign Affairs. The European program is expected to be smaller in scope than the U.S. Nuclear Cities Initiative and to differ in some respects from the U.S. program. For example, the European Nuclear Cities Initiative is expected to (1) target older scientists, who are considered to pose a greater proliferation risk than younger Russian scientists; (2) initially be limited to two Russian nuclear cities; and (3) emphasize environmental and energy-efficiency projects. Furthermore, officials responsible for developing the European Nuclear Cities Initiative told us that their program will not focus on establishing sustainable commercial businesses in the cities. Instead, the European program plans to fund projects that utilize weapons scientists’ skills to help develop environmental and energy-efficiency-related technologies that can be used by European companies. The funding for the European Nuclear Cities Initiative has not yet been determined, but Italian officials estimated that \$50 million would be needed over the next 5 years to implement the program.

We presented a draft of this report to the Department for comment, and it concurred with our recommendations. The Department also provided technical clarifications, which we incorporated where appropriate.

Background

In July 1998, then Vice President Gore and the former Prime Minister of Russia issued a joint statement noting that nuclear disarmament is associated with several socioeconomic factors, including the problem of finding worthwhile civilian-sector employment for Russian personnel formerly employed in the nuclear weapons complex. In September 1998, both countries signed an agreement—the Nuclear Cities Initiative—to create jobs for people in the nuclear weapons complex. Russian officials have identified the need to create 30,000 to 50,000 jobs in its nuclear cities over the next several years. Under the terms of the agreement, the United States will seek to assist in creating new jobs by

- sharing its experience in downsizing the U.S. nuclear weapons production complex;
- facilitating the selection of promising commercial projects that will lead to employment opportunities for workers;
- developing entrepreneurial skills for displaced workers, including training in how to write business plans;
- facilitating the search for potential investors, market analysis, and marketing for products and services; and
- facilitating access to existing investment mechanisms, including investment funds.

NCI is limited to working in the municipal areas of each city. Beyond these areas are various secret nuclear institutes or technical areas. DOE's strategy is to encourage investment in commercial enterprises in the municipal areas of the cities thus shrinking, over time, the size of the restricted areas in accordance with the plans of the Russian government. DOE officials believe that if commercial efforts are successful, not only will those employed in weapons manufacturing remain in the city but so will their relatives and friends and there will be less reason for weapons scientists, technicians, and engineers to leave the area. Figure 1 shows the location of Russia's 10 nuclear cities, and appendix I provides additional information about each city.

Figure 1: Russia's Nuclear Cities



Note: The Avangard plant is not a separate nuclear city. It is a major weapons assembly/disassembly facility located in the city of Sarov.

Source: GAO's presentation of information from DOE and MINATOM.

The day-to-day management of NCI resides within DOE's Office of Defense Nuclear Nonproliferation, National Nuclear Security Administration. DOE and its national laboratories have long-standing relationships with MINATOM and several closed cities as well as experience in the downsizing of the U.S. weapons complex. The NCI program is managed by an office director with a headquarters staff of seven employees who provide technical, budget, and procurement support. DOE headquarters is

responsible for, among other things, setting overall program policy, providing oversight and guidance for the national laboratories, and allocating program funds. DOE has tasked the national laboratories to play a major role in the program.

DOE, under the same general authority under which it operates the NCI program, also operates the Initiatives for Proliferation Prevention program.³ IPP seeks to employ weapons scientists in several countries of the former Soviet Union, including Russia and some of its nuclear cities. According to DOE, IPP is designed to commercialize technologies that utilize the expertise of the scientists who work at the various nuclear weapons institutes. Although the IPP program focuses on employing nuclear weapons scientists, it also has a component that seeks to employ scientists in the former Soviet Union's chemical and biological weapons institutes. In our 1999 report, we recommended that the Secretary of Energy take steps to maximize the impact of IPP's funding and improve oversight of the program. Specifically, we recommended, among other things, that the Secretary (1) reexamine the role and costs of the national laboratories' involvement with a view toward maximizing the amount of program funds going to the former Soviet Union, and (2) eliminate those IPP projects that did not have commercial potential. DOE subsequently implemented our recommendations.

The U.S. government has supported other programs that have directed money to scientists working in the closed cities. For example, since 1994, the U.S. Departments of State and Defense have spent over \$40 million on scientific research projects in which one or more of the weapons institutes in Sarov, Snezhinsk, or Zheleznogorsk have participated.⁴ These projects are administered under the auspices of the State Department's International Science and Technology Center program. The Center was established by international agreement in November 1992 as a nonproliferation program to provide peaceful research opportunities for weapons scientists and engineers in countries of the former Soviet Union. The scientists working with the Center conduct research and development

³See 42 U.S.C. 5817(a), 42 U.S.C. 7112(10), and 42 U.S.C. 5813(9). DOE's fiscal year 2001 expenditures for both programs are authorized under separate provisions of the National Defense Authorization Act for Fiscal Year 2001 and are subject to different requirements and restrictions under this and other authorization acts.

⁴ Other institutes throughout Russia and other countries of the former Soviet Union also participate in some of these projects.

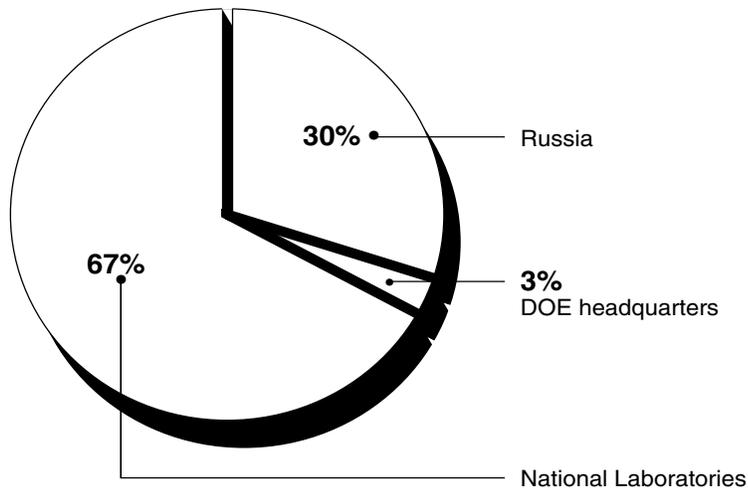
in a variety of scientific fields, such as environmental remediation and monitoring, nuclear reactor safety, vaccines and other medical treatment, and energy production.

The U.S. government has also undertaken efforts in the nuclear cities through the U.S. Civilian Research and Development Foundation. Established by the U.S. government in 1995, the Foundation is a nonprofit charitable organization designed to promote scientific and technical collaboration between the United States and the countries of the former Soviet Union. From October 1996 through December 2000, the Foundation awarded 19 grants totaling about \$275,000 to support projects in Sarov and Snezhinsk. The Foundation receives funding from the Department of State, the National Science Foundation, the National Institutes of Health, the Department of Defense, and several private organizations.

NCI Program Expenditures

From fiscal year 1999 through December 2000, NCI's expenditures totaled about \$15.9 million. Of that amount, about \$11.2 million (or 70 percent) had been spent in the United States by the national laboratories and DOE's headquarters, and about \$4.7 million (or 30 percent) had been spent for projects and activities in Russia as shown in figure 2. The U.S. national laboratories' costs to implement the program for such items as overhead, labor, equipment, and travel represented the bulk of the funds spent in the United States. DOE officials told us that these expenditures were significant but were part of the program's start up costs. These officials 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 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. MINATOM officials told us that they were dissatisfied with the amount of program funds that had been spent in their country. In response to direction provided in a conference report on its fiscal year 2001 appropriations, DOE stated in its program guidance that its goal is to spend at least 51 percent of fiscal year 2001 program funds in Russia.

Figure 2: Breakout of NCI Program Expenditures Totaling \$15.9 Million as of December 2000

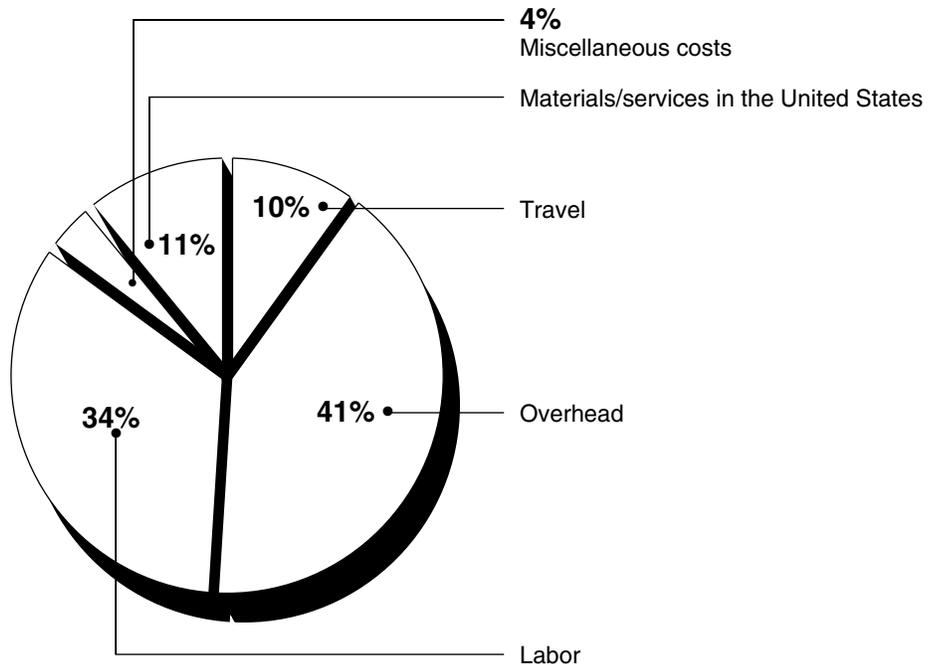


Source: GAO's presentation of data based on information provided by DOE.

U.S. National Laboratories' Expenditures Comprise Majority of U.S. Program Costs to Date

Of the \$11.2 million that was spent in the United States for the program, the national laboratories' expenditures made up \$10.7 million, or about 96 percent of that amount. DOE's headquarters' expenditures, totaling about \$500,000, comprise the remainder of the program funds spent in the United States. DOE's headquarters' expenditures covered, among other things, obtaining studies related to Russia's defense conversion activities and establishing a Website for the program. Regarding the laboratories' expenditures in the United States, these costs were incurred primarily to develop and monitor various NCI projects and activities. According to DOE officials, the laboratories' expenditures represent program startup costs. 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. Figure 3 shows a breakout of the national laboratories' costs in the United States as of December 2000, and appendix II provides more details about the NCI program's cumulative expenditures.

Figure 3: Breakout of the National Laboratories' Expenditures in the United States Totalling \$10.7 Million as of December 2000



Note1: Does not include DOE's headquarters' expenditures.

Note 2: Travel includes travel of U.S. personnel within the United States and Russia.

Source: GAO's presentation of data based on information provided by DOE.

As indicated in figure 3, 75 percent of the funds spent by the laboratories were for overhead and labor costs. Overhead costs comprised the greatest percentage of costs (about 41 percent) and were charged for various activities, such as contract/procurement support and other activities related to the program's implementation. For example, some laboratories charge an overhead fee for administering travel services for both U.S. and Russian officials. The next highest cost was for labor—34 percent. The laboratories have assigned a principal investigator to manage each NCI project. The principal investigators from the laboratories told us that they spent from 5 to 75 percent of their time on monitoring NCI projects. Additionally, they told us they spent most of this time during the early stages of the project to establish contacts with their Russian counterparts and to help develop contracts with Russian organizations in the nuclear cities. As the figure shows, the remaining 25 percent of the U.S. expenditures included travel (airfare and per diem) of laboratory personnel within the United States and to Russia; costs to purchase

materials and services for the program, such as U.S.-based consultants; and other miscellaneous costs, such as training, videoconferences, and translation services.

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. However, these officials believe that the laboratories play an important role in the start up of the NCI program. Some DOE officials, including the program director, stated that laboratory costs would be reduced over time as businesses invest their own capital in the nuclear cities. However, the program director was not sure when the laboratories' role in the program would be reduced.

DOE has taken some steps to reduce laboratory costs as shown in the following examples:

- One laboratory official from the Savannah River Site told us that, in general, overhead for contracts at his site is about 37 percent of the total cost of NCI-related contracts. He subsequently negotiated with DOE an 11-percent overhead rate in fiscal year 2000 for Russian-related programs to include NCI-related contracts. He said this was done to increase the amount of funds going to Russia.
- Some of the NCI projects are being managed directly by DOE's headquarters in an effort to limit national laboratories' overhead expenditures.
- DOE recently took over from a national laboratory the management of a U.S. firm that is responsible for monitoring the day-to-day operations of International Development Centers.⁵ NCI program funds were used to pay the laboratory for this supervisory function. According to DOE and laboratory officials, DOE's headquarters assumed this responsibility to reduce the laboratory's costs.

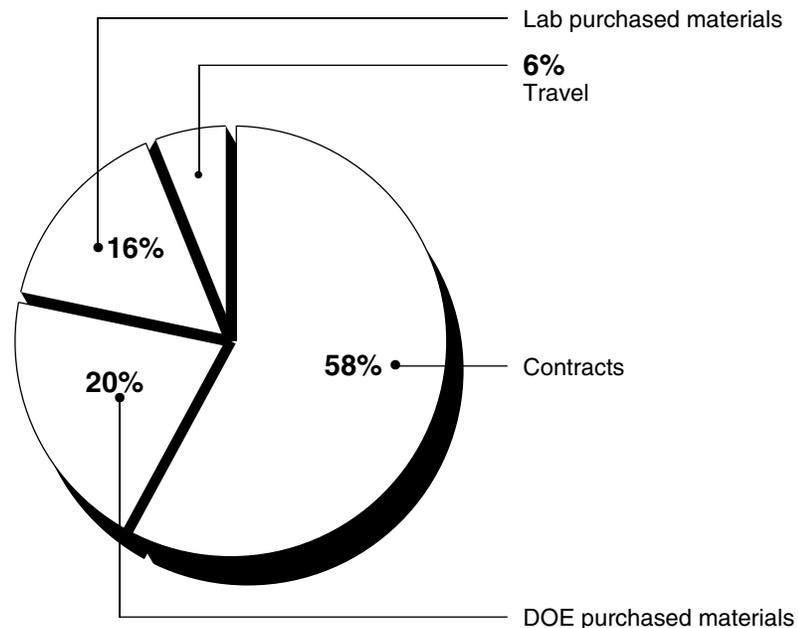
Thirty Percent of NCI Program Funds Spent for Activities in Russia

As of December 2000, NCI program expenditures for projects and activities in Russia totaled \$4.7 million, or 30 percent of the \$15.9 million spent by the NCI program. As figure 4 shows, the largest category of expenditures (about 58 percent) was for contracts. The contracts were

⁵These centers are funded by the NCI program and operate in two of the nuclear cities. They provide local business owners with training and counseling on preparing business plans and finding sources of capital and work to attract foreign investors to the cities.

used to establish, among other things, the Sarov Open Computing Center. The Center was established in 1999 with NCI funds to help Russian scientists develop commercial skills. According to Center's officials, a portion of these funds was used to supplement the salaries of the Russian scientists. In addition, some of these funds were used to (1) finance the European Bank for Reconstruction and Development's (EBRD) activities to establish a small business bank loan program in the cities and (2) support various community development activities. The materials purchased by DOE and the national laboratories for use in Russia comprised 36 percent of the expenditures and included such things as medical equipment, computers, and payments to Russian consultants/trainers. The remaining expenditures (about 6 percent of the total) were for Russian personnel traveling to the United States.

Figure 4: Breakout of NCI Program Expenditures in Russia Totaling \$4.7 Million as of December 2000



Source: GAO's presentation of data based on information provided by DOE.

MINATOM officials told us that they were dissatisfied with the amount of NCI funds that had been spent in Russia. The First Deputy Minister of MINATOM told us that Russia should have received about 65 percent of the funds programmed for NCI, as it was his understanding that DOE had planned to spend that percentage of program funds in Russia. He

questioned why Russia had not received the amount he had expected and wanted to know what happened to these funds. The First Deputy Minister also noted that Russia needs help in creating about 1,500 jobs per year in the nuclear cities and that DOE's funding for the program has been insufficient to meet this goal. He concluded that when MINATOM officials review NCI's progress to date, the picture is not optimistic. In his opinion, 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.

The Congress and DOE have set goals for increasing the amount of NCI program funds spent in Russia. An October 2000 conference report on DOE's appropriations for fiscal year 2001 stated that the conferees were concerned about the amount of funding for Russian assistance programs that remain in the United States for DOE contractors and laboratories rather than going to the facilities in Russia. The conferees directed that not more than 49 percent of NCI program funding be spent in the United States in fiscal year 2001. The conferees expect DOE to continue to increase the level of funding (beyond 51 percent) for Russia in each subsequent year but did not establish a ceiling for the amount of funds that should ultimately be spent in Russia. DOE's NCI Program Guidance, issued in January 2001, noted that in order to meet the spending target established by the conference report, U.S. project managers will spend or commit at least 65 percent of the funds for each project in Russia. DOE officials said they expect overall program expenditures to reach the congressional target of 51 percent if 65 percent of each NCI-project's funds are spent in Russia.

DOE's Lack of Standardized Reporting Procedures Affected Its Ability to Monitor NCI's Expenditures

DOE did not have systematic financial management procedures in place for reporting and tracking NCI's program expenditures. DOE's initial financial guidance for the program, which was issued in May 1999, only noted that an accounting procedure overseen by an experienced budget and fiscal official will include regular monthly reports by the laboratories on individual NCI projects. The guidance was silent on the issue of specific reporting requirements, including how expenditures for U.S. and Russian activities should be identified. Although the national laboratories were generally providing cost information on a monthly basis, a DOE budget official told us that this information lacked consistency and uniformity. As a result, the budget official was not confident that the cost information was accurately depicting the breakout of expenditures between U.S. and Russian activities. For example, in May 2000, DOE developed a breakout of the costs and concluded that 65 percent of the

funds had been spent in the United States and 35 percent had been spent in Russia. However, the analysis of Russian expenditures included the funds that were obligated⁶ as well as actual expenditures. According to one DOE official, this analysis overstated expenditures in Russia.

Some national laboratory officials told us that the lack of standardized reporting guidance made it difficult to determine how to account for program expenditures in the United States and Russia or what to include in these cost categories. During the course of our review—and, in part, as a result of our work—DOE established a standardized monthly and quarterly financial report for the NCI program. In January 2001, DOE's NCI budget official distributed guidance directing all of the national laboratories to report NCI project costs by using a standard format for identifying expenditures. Furthermore, in its January 2001 program guidance, DOE defined how funds were to be categorized.

- Expenditures in Russia include the costs of Russian officials traveling to the United States, contract payments to Russian organizations, payments to Russian consultants and trainers in Russia, and equipment and materials bought in the United States for Russia or equipment and material bought in Russia.
- Expenditures in the United States include U.S. labor, U.S. travel to Russia, all laboratory overhead, payments to U.S. consultants and trainers in Russia, payments to all interpreters and/or translator services, and equipment and materials bought in the United States for use in the United States.

DOE Has Limited Oversight Over Laboratories' Expenditures

According to DOE program officials, the Department has exercised limited oversight over the national laboratories' use of NCI program funds. Initial DOE program guidance for the NCI program, dated May 1999, did not specifically address financial management procedures for funds disbursed by DOE to the national laboratories and instead relied on existing reporting mechanisms between DOE and the laboratories. According to DOE officials, once funds are transferred to a laboratory, they can be redirected by the laboratory from one project to another. One national laboratory redirected approximately \$130,000 from two projects dealing with fiber optics and telecommunications to another project. The NCI

⁶ An obligation occurs when a definite commitment has been made or a legal liability is incurred. Funds that have been obligated are not actually spent until the agency makes a payment for goods or services.

program director was not made aware of this transfer until the laboratory requested additional funding from DOE to replenish these projects' funding. On the basis of these experiences, in January 2001, DOE established new guidance stating that the NCI program director must approve the reallocation of funds to other projects.

DOE Has Not Developed a Cost Estimate or Time Frame for the Program's Future Scope and Direction

DOE has not developed a plan, including projected future costs, to gauge the extent to which NCI is meeting its program goals to determine when and under what circumstances it would be appropriate to expand the program beyond the three pilot nuclear cities. In 1999, DOE officials believed the total funding level for NCI could reach \$600 million over a 5-year period. However, the Director of the NCI program told us that because the program had not received expected funding levels during its first years of operation, he is uncertain about future program costs and time frames. DOE's former Assistant Deputy Administrator for Arms Control and Nonproliferation told us that each of the pilot cities is expected to receive funding for several years and that the Department needs to develop an "end point" when assistance is completed for each city. NCI is focusing its initial efforts in these three cities plus a weapons assembly plant that is located at Avangard (in the city of Sarov).⁷

DOE has worked jointly with MINATOM and the nuclear cities to develop strategic plans for each pilot city, which include lists of jointly developed project proposals. However, DOE has not developed performance targets that map out its specific contributions to this downsizing effort over time. DOE has stated that key measurements include the number of civilian jobs created, businesses established or expanded, investment in the closed cities, training for Russians, and percentage of funds spent in Russia. While these performance measures are appropriate in a general sense, DOE has not indicated what it hopes to specifically accomplish in these areas over what period of time. Without such targets, it is difficult to determine whether or not the program is on track to meet its long-term objectives. The deputy director of the NCI program told us that DOE is aware of the number of weapons scientists that Russia needs to find jobs for in the nuclear cities but there is no mutually agreed upon number of scientists that DOE plans to help find jobs for. The NCI program director said that DOE would be better able to plan and leverage its own resources

⁷According to DOE, Zarechnyy, another weapons assembly facility, is the next logical city to be added to the NCI program. However, expanding the program to that city has always been predicated upon congressional authorization, available funding, and MINATOM's concurrence.

if it had more information about how MINATOM is budgeting funds for its own specific defense conversion projects.

DOE's NCI Projects Have Had Limited Impact

The NCI program has had limited success during its first 2 years. According to DOE, NCI's projects are employing about 370 people, including many weapons scientists, primarily on a part-time basis through research sponsored by the U.S. national laboratories. One project has helped create commercial space in several buildings previously used for nuclear weapons assembly work in the city of Sarov. About half of the NCI projects are not designed to directly lead to employment opportunities for weapons scientists, and Russian officials have criticized DOE's funding decisions. The Department has two programs—NCI and the Initiatives for Proliferation Prevention—operating in Russia's nuclear cities that have a common goal. Having two such programs has caused duplication of effort, such as two sets of project review procedures and several similar types of projects.

Most of the Work Created by NCI Projects for Weapons Scientists Is Part-Time Contract Research for National Laboratories

According to DOE, NCI's projects have generated employment for about 370 people, including weapons scientists, in the nuclear cities. About 40 percent of the work has been generated through the Open Computing Center in Sarov. The purpose of the computing center is to help scientists, mathematicians, and software engineers develop self-sustaining civilian activities, including commercial and contract research.⁸ The computing center's director told us that the part-time employees were also working at the weapons design institute in Sarov on weapons-related activities and are receiving salaries from the institute. The employees are working on contract research for the Los Alamos National Laboratory. This work includes several areas of research such as (1) computing and system software development, (2) computer modeling for the oil and gas industry, (3) computer modeling for the strength of materials related to molecular dynamics, and (4) biomolecular modeling. According to a Los Alamos official, while the laboratory has not benefited directly from the research, it has helped enhance the computer-related skills of the center's employees and is making them more attractive to Western businesses.

⁸The Open Computing Center was established in 1999 with support from the NCI program to solve a security problem that arose when a Western computer manufacturer sold 16 high-speed computers to Russia in violation of U.S. export control laws. MINATOM agreed to disassemble the computers and move them from the VNIIEF Institute in Sarov to the Open Computing Center in exchange for financial support for the center from DOE through the NCI program. See *Export Controls: Sales of High Performance Computers to Russia's Nuclear Weapons Laboratories* (GAO/T-NSIAD-97-128).

Figure 5: Russian Weapons Scientists Employed at the Sarov Open Computing Center



The center's director said he hopes that the center will become self-sufficient within 7 years. DOE officials have estimated that, with successful marketing to commercial businesses, the center will be able to employ more than 500 people by 2005. As of December 31, 2000, the NCI program had spent about \$1.2 million on computers, site preparation, contracts with the employees of the center, and other expenses. The center has had some success in attracting business investment. For example, an international bank has contracted with the center to develop electronic banking software on a pilot basis. The bank may contract with the center for additional work if the pilot project proves successful. The bank official responsible for this project said he is optimistic that the bank will be able to develop future work for the scientists. The program also introduced programmers at the Open Computing Center to an engineering software company in the United States that was looking for people to help develop software to analyze fluid dynamics in automobile engines and turbines. The software company worked with NCI and national laboratory staff on a pilot project to test the skills of programmers from the center. The NCI program allocated \$40,000 to pay the salaries of four Russian scientists working on non-defense-related test problems as well as for the national laboratory's expenses. In early 2001, the software company

hosted the scientists in the United States for training. As a result of the training, a commercial contract was signed on March 30, 2001.

Figure 6: Office Building in Which Sarov Open Computing Center Is Located



One NCI Project Has Helped Open Commercial Space at Russian Weapons Facilities

According to DOE, one of the most successful projects involves the conversion of weapons assembly buildings at Avangard into production space for commercial ventures, including the proposed establishment of a kidney dialysis manufacturing facility. DOE has helped facilitate the relationship between a Western business and Avangard and has allocated about \$1.5 million to support this effort. For example, DOE said it has

spent several hundred thousand dollars to make commercial space available to potential Western businesses. In August 2000, the Secretary of Energy traveled to Sarov to dedicate the newly established commercial space as part of a new “technopark.” In addition, the NCI program has continued to help Avangard, MINATOM, and the Western company work together to develop a sustainable commercial relationship. The Western company has been looking for a business partner to help it enter into new promising markets, such as Russia. Avangard has manufactured dialysis machines for several years, and the Western company is hoping to take advantage of those skills while expanding into Russia and parts of Europe. According to DOE, Avangard would devote the majority of its initial efforts to manufacture disposable products that are used for various dialysis treatments.

The NCI program plans to use the remaining project funding to help prepare the buildings for producing the dialysis components, but those funds have not yet been spent. DOE has also allocated \$1.25 million from the Initiatives for Proliferation Prevention program to support production development at the site. In January 2001, an official of the Western company said that he was optimistic about starting production by the end of the year. He expected his company to begin installing manufacturing equipment during the summer of 2001. If the project progresses as planned, the company expects to employ about 150 Avangard weapons assembly employees on a full-time basis. The official said that the number of employees could grow to 1,000 over time.

About One-Half of the NCI Projects Are Not Designed to Provide Jobs for Weapons Scientists

About one-half of the NCI projects have been established to fund a variety of activities in the nuclear cities. These projects include infrastructure improvements, cooperation with the European Bank for Reconstruction and Development to provide small business loans that are available to city residents, business training, marketing, and feasibility studies. In addition, these projects include community development efforts, such as youth exchange programs and health care services. According to DOE, while these projects may increase the potential for job creation in the closed cities, they are not all designed to directly lead to new jobs for weapons scientists. DOE officials believe that community development projects are needed to improve the economic and social conditions in the cities in order to make them more attractive to commercial investors. However, MINATOM and weapons institute officials have criticized DOE’s decision to fund community development activities and small business loans, claiming that they do not lead directly to employment opportunities or provide sustainable jobs for weapons scientists.

DOE has allocated about \$1 million through December 2000 to a dozen separate activities that fall into the category of community development. The activities include school exchange programs, Sister Cities exchange programs, and health care services. According to DOE, community development activities are needed to bolster the cities' ability to provide self-sufficient services, develop municipal capabilities and strengthen citizen and entrepreneurial networks, and build political and economic ties. In addition, DOE officials told us that community development activities are needed to help make the cities more attractive to potential Western investors. However, none of the industry officials whom we talked to during the course of our audit indicated that they would be more likely to invest in the nuclear cities because of municipal and social improvements.

MINATOM officials have stated in the past that while these activities may be worthwhile, they do not support them as part of the NCI program because they will not create jobs. In the May 2000 Joint Steering Committee meeting,⁹ a MINATOM official stated that job creation was the primary goal of the NCI program and the 1998 NCI government-to-government agreement. He noted that MINATOM believed that only activities that create real jobs should be included under the NCI agreement and that community development activities, should they continue, need to be covered by a separate agreement. According to DOE officials, the community development component of NCI was considered by the former DOE Assistant Secretary responsible for the program to be a vital activity.

A July 1999 House Appropriations Committee report accompanying the Energy and Water Development Appropriations Bill, 2000, raised concerns about DOE's expertise in implementing the NCI program. The report stated that DOE should work with other federal agencies that are implementing similar programs in Russia. As a result, DOE has attempted to include other agencies in the program's implementation. For example, DOE's community development activities have worked in tandem with other U.S. government agencies. The U.S. Agency for International Development has granted about \$387,000 to a U.S. nongovernmental organization to carry out community health care projects in Sarov and Snezhinsk. NCI has also given a grant to this organization to implement

⁹ The U.S./Russian Joint Steering Committee, which is made up of senior officials from U.S. and Russian agencies, oversees the NCI program. The Steering Committee meets twice a year to review recent activities and map out future strategies and priorities.

the community health care project in Snezhinsk. These projects are not intended to directly support work by weapons scientists or engineers but to improve the level of health care service in the cities.

One of the NCI program's other major projects has been to enter into a cooperative arrangement with EBRD to extend the bank's Russia Small Business Fund to the nuclear cities. DOE believes that the loan programs are important to diversify the economies of the cities, although the loans are not necessarily assisting weapons scientists. The Department awarded \$1.5 million to EBRD in February 2000 for the bank to set up the programs. As of December 2000, the bank had spent over \$438,000 of the \$1.5 million on salaries for its own staff consultants, to train new loan officers in the cities, and to cover operating expenses. According to the bank, as of February 2001, it had made about 280 loans to businesses in the cities. DOE routinely receives information on the loan program, but that information does not provide details about the background of the loan recipients. However, according to information from EBRD on loans made in Snezhinsk, the recipients are typically not current employees of the weapons institutes and the loans are not necessarily used to start new businesses. Furthermore, the businesses that receive loans are mostly in the retail trading sector, such as clothing and household goods stores. Some MINATOM officials told us that they question the value of the loan programs, noting that the loans are not going to the types of businesses that are appropriate for highly educated weapons scientists. Officials from the weapons institute in Sarov told us that they did not request the loan program and objected to DOE's using NCI funds to start it because it does not play a role in restructuring the workforce. (See app. III for more details about the loan program.)

About One-Third of the NCI Projects Are Designed to Develop Sustainable Commercial Ventures

Eight, or about one-third, of the NCI projects we reviewed are designed to develop sustainable commercial ventures. To date, only one of these has had success in creating jobs; it involves a small company started in Snezhinsk to market and service bar-code technology and other automated devices that are used to identify and inventory property. The Russian company was formed in February 2000 by six former weapons institute employees. According to a national laboratory official, these employees left the institute to form the company. The NCI program allocated \$395,000 to the project in fiscal years 1999 and 2000. According to a national laboratory official, the Russian company has used the funds to pay for office space, equipment, and salaries. It also used NCI funds to enter into one contract to receive training and has entered into agreements to distribute and service bar-code and auto-identification technologies manufactured by three U.S. companies.

DOE has canceled several NCI projects that were intended to create jobs for weapons scientists for a variety of reasons. According to DOE, many projects were designed to “jump-start” the program with the expectation that not all would evolve into large-scale jobs creation projects. Furthermore, several of these projects were subsequently determined to not be viable, have run into difficulties, and have either been canceled or stalled. For example, the program funded one project in Zheleznogorsk to expand the capacity for recycling luminescent tubes that contain mercury. DOE allocated \$250,000 to this project but spent only \$2,000. The national laboratory official responsible for overseeing the project said that MINATOM was not willing to bring the recycling technology out of the restricted part of the city. Because access restrictions prevented DOE from working to expand the recycling capacity within the secure area of the institute, the Department canceled the project.

DOE funded another project to determine the viability of producing canola oil in the Zheleznogorsk region. The oil can be used for cooking and animal feed and can be used industrially to make lubricants, fuels, and soaps. Initial work under the project would have been to determine whether or not the crop could be successfully grown in the area. According to the national laboratory official responsible for overseeing the project, DOE and officials from the weapons institute in Zheleznogorsk were interested in the idea, but the city’s mayor was not. The national laboratory official told us that the mayor was more interested in promoting the production of barley for livestock that could also be used to make beer and vodka to bring in tax revenues for the city. The national laboratory official was denied access to the city when she tried to promote the project. DOE allocated \$302,000 to the project and spent about \$114,000 before canceling it.

Other NCI projects have been canceled or delayed due to a lack of Russian support and cooperation. For example, in the case of one approved project, Russian officials have not provided DOE with business and marketing plans and other financial information, claiming that the information is proprietary or includes trade secrets. According to DOE officials, NCI projects would more likely succeed if Russia demonstrated its support by contributing funds to the projects.

The most successful commercial effort we observed in the nuclear cities involved a major U.S. computer company 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. This commercial venture is discussed in more detail in appendix IV.

NCI Program Faces Numerous Impediments to Success

In addition to the lack of Russian support for some projects, there are numerous other reasons for the limited initial success of the NCI program. These include poor economic conditions in Russia, the remote location and restricted status of the nuclear cities, the lack of an entrepreneurial culture among weapons scientists, and the inadequacy of the NCI program's project selection process. As we reported in November 2000, international aid efforts have had difficulty in promoting economic growth in Russia. The country appears to be a long way from having a competitive market economy, and its transition over the past decade has been more difficult than expected.¹⁰ DOE faces even greater problems in trying to promote economic development in the nuclear cities. The cities are geographically and economically remote. Although the cities have a skilled and well-educated workforce, those residents have depended upon government support for their livelihood and do not generally have experience in business or entrepreneurial ventures.

According to DOE and industry officials, access to the nuclear cities has been a major impediment. The Russian government requires that all visitors apply for an access permit at least 45 days before arriving but does not always grant those requests. DOE provided us with a list of 25 instances since 1999 in which the Russian government denied requests from DOE headquarters staff, national laboratory staff, U.S. embassy personnel, and Members of Congress for access to one or more of the three cities. (See app. V for more detail.) Complications over a request for access even led to the cancellation of a scheduled Joint Steering Committee meeting in November 2000, which the NCI program director considered a major setback to the program. A MINATOM official told us that the access problem is greatly exaggerated, further noting that "hundreds" of officials have visited Russia on behalf of the NCI program. The MINATOM official also told us that access would be even better as more NCI funds reach the nuclear cities.

Notwithstanding the views of MINATOM officials, industry officials told us that the difficulties in obtaining access were a detriment to doing business in the nuclear cities. Several industry representatives told us that the

¹⁰ See *Foreign Assistance: International Efforts to Aid Russia's Transition Have Had Mixed Results* (GAO-01-8, Nov. 1, 2000).

NCI's Projects Were Not Adequately Screened

45-day waiting period would cause serious problems for their commercial ventures in the cities. The EBRD official responsible for managing the loan programs also told us that access problems are an impediment to doing business. Because of access problems, EBRD consultants have had to bring people outside of the cities for training. The official also told us that difficulties with access would make it harder to oversee the loans.

The success of NCI projects has also been limited by the program's failure to rigorously screen projects before approving them. In May 1999, DOE issued a program plan that included a project selection and approval process. NCI program staff were to screen project proposals to determine their suitability with respect to the program's objectives by using a list of criteria developed by the Joint Steering Committee. The criteria included such factors as the number, cost, and sustainability of created jobs, the involvement of industry, and whether the project could enhance Russian weapons technology. The process then called for proposals to be reviewed by (1) one or more of three types of working groups;¹¹ (2) a technical committee comprising government and nongovernment officials; and (3) other U.S. government agencies and offices within DOE with an interest in aid to Russia.

DOE and national laboratory officials have told us, however, that the implementation of the project approval process to date has been inconsistent and "ad-hoc." DOE officials told us that the program did not have documentation to show how approved projects had moved through the review process. According to the NCI program director, projects were approved for funding without a comprehensive review process in order to implement the program quickly and engage the Russians. In addition, although projects are reviewed by DOE and MINATOM through the workings of the Joint Steering Committee, MINATOM officials have not supported several of the major NCI projects, including the EBRD small business loan programs and the community development projects because they did not directly lead to sustainable jobs for weapons scientists. According to DOE officials, DOE and MINATOM have differing views about what the NCI program should be funding. MINATOM believes that only projects that lead directly to jobs creation should be funded while

¹¹DOE envisioned three types of working groups: city working groups that focus on activities particular to individual cities, functional working groups that focus on functional areas (such as business training) relevant to more than one of the cities, and task groups that concentrate on specific projects.

DOE has asserted that many different activities—in addition to jobs creation—need to be addressed as part of the program.

In the National Defense Authorization Act for Fiscal Year 2001, the Congress directed that DOE establish and implement project review procedures for the NCI program before DOE would be allowed to obligate or expend all of its fiscal year 2001 appropriation. The act specified that the procedures shall ensure that any scientific, technical, or commercial NCI project (1) will not enhance Russia's military or weapons of mass destruction capabilities; (2) will not result in the inadvertent transfer or utilization of products or activities under such project for military purposes; (3) will be commercially viable within 3 years; and (4) will be carried out in conjunction with an appropriate commercial, industrial, or nonprofit entity as partner. In response, in January 2001, DOE issued new guidance for the NCI program that includes more detail on the project selection and approval process. For example, the guidelines spell out the process by which DOE will review projects—internally and with interagency assistance—for any military application. The review process is also supposed to confirm that scientific, technical, and commercial projects will have a partner and that they are commercially viable. It is too early to tell how closely DOE will adhere to this project-approval process. In addition, the new guidance states that DOE will give preference, to the extent possible, to those projects with the strongest prospects for early commercial viability and those in which start-up costs are shared with other U.S. government agencies, Russian partners, and/or private entities.

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

The Nuclear Cities Initiative and the IPP program share a common underlying goal—to employ Russia's weapons scientists in nonmilitary work. Unlike the IPP program, NCI has a community development component that is designed to create conditions necessary for attracting investment in the nuclear cities. The operation of these two similar programs in Russia's nuclear cities has led to some duplication of effort, such as two sets of project review procedures and several similar types of projects.

Both the IPP program and NCI operate in and provide funds to Russia's nuclear cities. Since 1994, DOE has spent over \$13 million on about 100 IPP projects in five nuclear cities, including the three nuclear cities participating in the NCI program—Sarov, Snezhinsk, and Zheleznogorsk. According to IPP's Deputy Director, several of the projects have funded the development of promising technologies, such as prosthetic devices and medical implants, nuclear waste clean up technology, and portable monitoring devices to detect nuclear material. He told us that these

projects might be commercialized in the next few years. 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, shifted from one program to another, or have received funding from both programs. For example, in the case of the kidney dialysis equipment project, NCI has funded infrastructure improvements, and IPP has funded a small planning effort and also plans to fund some activities related to the manufacture of disposable products.

Both the NCI and IPP programs reside within DOE's Office of Defense Nuclear Nonproliferation, National Nuclear Security Administration. In addition, the programs have adjoining offices and share staff to perform budget, travel, and secretarial functions. The Directors of the NCI and IPP program told us that, in their opinion, there was nothing wrong with some overlap in projects or in sharing administrative functions. The IPP program director told us that although he did not believe that the two programs were duplicative, there is potential for duplication to occur because both have a common approach for creating jobs in the nuclear cities.

Some of the failures of the NCI commercial development projects may have been avoided if DOE had a common project approval process and had incorporated some of the elements of the IPP project selection process from the outset of the program. In 1999, we recommended that DOE eliminate those IPP projects that did not have commercial potential. Subsequently, DOE implemented our recommendation and strengthened its project selection process. IPP requires that all proposed projects have an industry partner to help ensure the commercial viability of each project. The IPP program has also relied on the U.S. Industry Coalition¹² to help evaluate and develop commercial projects. In contrast, the NCI program has not established a similar relationship with the Coalition or any other industry group nor has it required an industry partner for its projects. On March 21, 2001, DOE solicited the Coalition's support in disseminating information among its members about the Nuclear Cities Initiative.

¹²The U.S. Industry Coalition, Inc., is a nonprofit association of U.S. companies and universities dedicated to the nonproliferation of weapons of mass destruction through the commercialization of technologies for peaceful purposes. The council receives funding from DOE to carry out its responsibilities with respect to the IPP program.

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, the NCI program did not require that projects have industry partners or demonstrate commercial viability until January 2001, when program guidance on the subject was issued. In addition, the program has only recently begun to develop a more systematic process, as IPP has, for obtaining the views of business or industry experts on the commercial viability of projects. According to the Deputy Director of the NCI program, DOE is now developing a contract with a consulting firm that will review proposed projects for commercial viability.

In addition, the NCI program has recently adopted practices established under the IPP program regarding the funding of projects. In January 2001, the NCI program required that 65 percent of all project funds be spent in Russia. The guidance is similar to a congressional restriction on the IPP program, which mandates that no more than 35 percent of IPP funds may be obligated or spent by the national laboratories to carry out or provide oversight of any program activities. Moreover, the IPP program has allocated funds to the national laboratories accompanied by approval letters that specify the exact amount of funding to be allocated (and spent) at the laboratories and in Russia. A similar approval letter procedure has only recently been adopted for the NCI program.

Although the programs have many similarities, the level of access to the nuclear cities granted to DOE officials is strikingly different, depending on which program they are representing. For example, officials of the nuclear city of Snezhinsk do not allow DOE and national laboratory officials access to the restricted weapons institutes under NCI. This restriction has impeded the implementation of a few NCI projects. For example, a U.S. national laboratory official told us that he was not granted access to visit a weapons institute in Snezhinsk to observe the equipment being considered for use in an NCI project related to the development of fiber optics. As a result, this project has been canceled. However, the same U.S. official was allowed access to observe this same equipment 2 years earlier when he visited the site under an IPP-sponsored visit.

European Nuclear Cities Initiative Focuses on Employing Scientists in Russia's Nuclear Cities

The European Nuclear Cities Initiative, a proposed program that is being supported by the Italian Ministry of Foreign Affairs, is designed to create jobs in Russia's nuclear cities. This proposal is expected to be smaller in scope than DOE's NCI, but officials responsible for the effort told us that ENCI should complement and support the U.S. program. We found some significant differences between the two programs. For example, ENCI is expected to (1) target older weapons scientists who are considered to pose a greater proliferation risk than younger scientists who could be more easily assimilated into the Russian economy; (2) start in two nuclear cities; and (3) emphasize environmental and energy-efficiency projects. Furthermore, officials responsible for ENCI told us that it will not emphasize establishing sustainable commercial ventures in the cities. Instead, ENCI proposes to fund projects that utilize Russian weapons scientists' skills to help develop environmental and energy-related technologies that can be used by European companies.

The ENCI proposal is expected to complement DOE's program. It has been developed and promoted primarily by an Italian nongovernmental organization known as the Landau Network-Centro Volta¹³ and by the Italian National Agency for New Technology, Energy and Environment. It has received support from the Italian Ministry of Foreign Affairs. According to a Landau Network-Centro Volta official, ENCI shares the same basic nonproliferation objectives as DOE's program but will be significantly smaller in scope and size. Furthermore, the European proposal has developed an overall approach and set of proposed activities that differ from the DOE program in several ways. For example, ENCI plans to focus on environmental cleanup and energy-efficiency technology projects that Landau officials believe tap into the strengths of the weapons scientists in the two nuclear cities. Italian officials do not believe that the cities possess sufficient commercial potential to develop sustainable business enterprises in the foreseeable future. As a result, they believe that it makes more sense to develop projects that employ nuclear city weapons scientists as contractors to provide technical assistance to help solve environmental and energy problems in Europe. They also believe that over time, it might be possible to attract Western business partners to enter into commercial relationships with the city if the initial projects prove successful.

¹³ The Landau Network-Centro Volta seeks to promote scientific cooperation with institutions and researchers from the former Soviet Union, Eastern Europe, and Asia.

Program Funding Levels Are Uncertain

According to officials from Italy and the European Commission,¹⁴ ENCI will start in two cities—Sarov and Snezhinsk. However, funding for ENCI is uncertain. Italian officials estimated that \$50 million will be needed to implement the program over the next 5 years from various donors, including individual countries as well as the European Commission. An Italian Ministry of Foreign Affairs official told us that Italy is considering funding one project in 2001 at a cost of between \$500,000 and \$800,000.

A European Commission official told us that funding levels would probably be modest because some member states do not perceive that unemployed Russian weapons scientists pose a serious proliferation threat. He noted that many European countries were more concerned about the threat posed by nuclear materials in Russia and are more inclined to fund programs that would ensure greater accountability and control over these materials. Furthermore, this official said that member states of the European Commission want more details about the ENCI proposal before they are willing to make a decision about funding for the program.

In December 2000, the Italian Ministry of Foreign Affairs—in collaboration with the Landau Network-Centro Volta and the Italian National Agency for New Technology, Energy and the Environment—prepared a list of 34 projects proposed by representatives from Sarov and Snezhinsk. These projects are focused on innovative technologies and energy and environmental issues. Some of these proposed projects are designed to

- develop environmental centers in Sarov and Snezhinsk,
- develop renewable energy sources,
- investigate advanced technological components for fuel cells, and
- create energy-efficiency centers in Sarov and Snezhinsk.

The projects are expected to last from 1 to 3 years with costs ranging from about \$69,000 to over \$1.8 million. Each proposed project assumes that Russia will fund part of the project. Job creation estimates are included in each project proposal and range from 20 to 50 per project. These projects will be submitted to European Commission members for review and are expected to be discussed at an April 2001 ENCI working group meeting.

¹⁴ The European Commission is an organization that, among other things, manages foreign assistance programs for its 15 member states.

Italian officials told us that they hope that the Commission would provide funding for some of these projects after the meeting takes place.

DOE and Russian Officials Express Support for ENCI

DOE officials believe that ENCI will support the goals of the Nuclear Cities Initiative. DOE's NCI program director said that it is important to increase other countries' participation in this effort and believes that both programs can work together in the nuclear cities. Although the director noted that the programs have different strategies for creating jobs for weapons scientists, he believes that both are complementary.

The U.S. government and the European Commission have started to coordinate their assistance efforts in the nuclear cities. In June 2000, the State Department and DOE jointly sent a letter to the Commission encouraging initiatives that (1) complement efforts to promote nuclear nonproliferation, (2) help downsize Russia's nuclear weapons complex, and (3) enhance scientific and technical cooperation with scientists in the closed nuclear cities. The Departments noted that in December 1999, several U.S. government representatives participated in an international forum to discuss ENCI. ENCI was viewed as potentially augmenting ongoing U.S. and other international activities, including the Initiatives for Proliferation Prevention program and the International Science and Technology Center's activities focused on the nuclear cities.

MINATOM officials told us they would welcome assistance through ENCI. They stated that the effort to employ weapons scientists in the nuclear cities is a great challenge and believe that ENCI can contribute to accelerating the pace of Russia's downsizing effort. In a July 2000 letter addressed to the European Commission, MINATOM's first deputy minister stated that Russia supports the efforts of the Commission to help find jobs for weapons scientists. He noted that Russia was ready to begin taking steps to pave the way so that ENCI could begin working in the nuclear cities.

Conclusions

DOE's effort to help Russia create sustainable commercial jobs for its weapons scientists and help downsize its nuclear weapons complex is clearly in our national security interests. It also poses a daunting challenge. The nuclear cities are geographically and economically isolated, access is restricted for security reasons, and weapons scientists are not accustomed to working for commercial businesses. Thus, Western businesses are reluctant to invest in the nuclear cities. However, the successful collaboration of a major U.S. computer firm in the Russian nuclear city of Sarov, without U.S. government assistance, is an example

of what can be accomplished over time if the skills of Russia's weapons scientists are properly matched with the needs of business.

Although DOE has had some modest successes with helping Russia create jobs for its weapons scientists and downsize its nuclear weapons complex, we believe that DOE needs to rethink its strategy. A disproportionate percentage of program funds is being spent in the United States—about 70 percent—most of which are going to the U.S. national laboratories instead of to Russia. This is also a major irritant to Russian officials who told us that if DOE is serious about creating jobs in the nuclear cities, a larger percentage of program funds should be spent in Russia. A conference report on DOE's fiscal year 2001 appropriations has directed that no more than 49 percent of Nuclear Cities Initiative funds be spent in the United States and DOE has incorporated this goal into its program guidance. DOE will have to more effectively monitor and control program spending to meet this goal. We are encouraged that one U.S. national laboratory has negotiated lower overhead rates in order to put more resources in Russia and that DOE has taken steps, as a result of our review, to systematically track U.S. and Russian program expenditures. However, DOE has not developed the quantifiable program goals and milestones that are needed to track progress and make decisions about future program expansion to other nuclear cities and the level of resources needed to continue the program.

About one-half of the NCI projects are not designed to create businesses or lead to sustainable employment but rather focus on infrastructure, community development, and other activities. In our view, DOE needs to concentrate its limited program funding on those activities that will most realistically lead to sustainable employment for weapons scientists. Attempting to change the social fabric of the nuclear cities through community development projects, thereby making the cities more attractive to potential investors, may not be a realistic or affordable goal. Furthermore, industry representatives told us that the outcome of these types of projects would have little impact on a company's decision to invest in the nuclear cities. Indeed, MINATOM and weapons institute officials from Sarov have questioned the value of community development projects because they do not create sustainable jobs in the nuclear cities.

While we believe that the above changes are necessary to improve the implementation of NCI, in our view, a more fundamental question needs to be addressed by DOE. Does the Department need two separate programs operating in Russia's nuclear cities with the same underlying goals and, in some cases, the same types of projects? The IPP program and NCI share a

common goal—the employment of Russian weapons scientists in alternative, nonmilitary scientific or commercial activities. Combining the two programs could alleviate many of the concerns we have with the implementation of NCI. For example, the IPP program already has established limits on the amount of funds to be spent in the United States and Russia as well as a strengthened project review and selection process that focuses on the commercialization of projects and jobs creation. Furthermore, efficiencies might be gained by combining the administrative structures of both programs, particularly given that the overhead rates at most national laboratories are relatively high. While we are encouraged that DOE has already taken some steps to reduce laboratory costs, there may be additional opportunities for cost savings in this area. Ultimately, the success of DOE's efforts to create jobs for Russia's weapons scientists depends on industry's willingness to invest in the nuclear cities and elsewhere throughout Russia. We believe that there is a limit to what U.S. government assistance can do in this regard. It is instructive to note that the proposed ENCI limits and targets its assistance because of the difficulty involved in creating sustainable commercial businesses in the nuclear cities. We also believe that this is an appropriate time for the Department to take a closer look at the operations of both its programs and determine how they could work more efficiently and effectively as part of a more consolidated effort. This determination should include an analysis of what changes in both programs' authorizing legislation would be required.

Recommendations for Executive Action

We recommend that the Administrator, National Nuclear Security Administration, improve efforts targeted at the nuclear cities by

- evaluating all of the ongoing NCI projects, particularly those that focus on community development activities, and eliminate those that do not support DOE's stated objectives of creating jobs in the nuclear cities and downsizing the Russian nuclear weapons complex;
- establishing quantifiable goals and milestones for jobs creation and downsizing the weapons complex that will more clearly gauge progress in the nuclear cities and use this information to help assess future program expansion plans and potential costs; and
- strengthening efforts to reduce national laboratories' costs to implement the program in an effort to place more NCI funds in Russia.

In addition, the Nuclear Cities Initiative and the Initiatives for Proliferation Prevention program share a common goal and, in many cases, are implementing similar types of projects. In order to maximize limited program resources, we also recommend that the Administrator

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- determine whether the two programs should be consolidated into one effort—including a determination of what changes in authorizing legislation would be necessary—with a view toward achieving potential cost savings and other programmatic and administrative efficiencies.

Agency Comments and Our Evaluation

We provided the Department of Energy with copies of a draft of this report for review and comment. DOE's written comments are presented in appendix VII. DOE concurred with our recommendations and provided technical comments that were incorporated in the report as appropriate. DOE provided additional comments on the following issues: (1) job creation and complex downsizing, (2) economic diversification, (3) the similarities between NCI and the IPP program, and (4) program metrics and project review.

DOE noted that our report focused on job creation as the primary measure of NCI success or as the metric for individual activities. In DOE's view, this reflects an inadequate appreciation of the goals of the program. The program's goal is not simply funding the employment of weapons scientists but also downsizing Russia's weapons complex through economic diversification. The outcome of this approach, DOE contends, is sustainable alternative nonweapons jobs that ultimately move scientists out of the weapons facilities. We recognize that Congress has identified the objectives of the NCI program as being both job creation and downsizing Russia's nuclear weapons complex. Although this report focuses more on job creation, we have identified, where appropriate, the downsizing of Russia's weapons complex as another objective of the program. We have focused on the job creation objective for a number of reasons. First, it is highlighted in the government-to-government agreement between the United States and Russia which states that the purpose of the NCI program is to create a framework for cooperation in facilitating civilian production that will provide new jobs for displaced workers in the nuclear cities. Second, the Russian officials we met with told us that they are judging the NCI program by one standard—the creation of sustainable jobs. These Russian officials have criticized community development projects because these projects do not lead directly to employment opportunities or provide sustainable jobs for weapons scientists. In addition, the industry representatives we talked to said that the outcomes of the community development projects would have little impact on their company's decision to invest in the nuclear cities. We continue to believe that DOE needs to concentrate its limited program funding on those projects that will most realistically lead to sustainable employment for weapons scientists.

Regarding economic diversification, DOE stated that MINATOM would prefer that funding be provided directly for major projects through a top down approach that reflects central planning. According to DOE, successful economic diversification efforts in the United States have occurred based on active partnerships among government, industry, and the community, which support entrepreneurship and “growth from below”—a goal endorsed by the NCI program. In our view, DOE’s premise that economic diversification approaches in Russia can be modeled after U.S. experiences may be misleading. The economies and social and political structures of the two countries are not comparable. As we noted in our report (1) international aid efforts have had difficulty promoting economic growth in Russia, (2) the country appears to be a long way from having a competitive market economy, and (3) Russia’s transition experience over the past decade has been more difficult than expected. Regardless of the approach that is taken to stimulate economic development in the nuclear cities, we continue to believe that DOE faces a daunting challenge in meeting the ambitious goals of the NCI program. We also continue to question, as we did in our 1999 report, whether DOE possesses the expertise needed to develop market-based economies in a formerly closed society.

DOE also noted that our discussion of duplication between NCI and IPP reflects an incomplete understanding of the differing, but complementary, goals of the program. DOE noted that IPP is an older program that focuses on the commercialization of technology inside the weapons institutes of the nuclear cities, while NCI focuses only in the municipal areas of the nuclear cities. In DOE’s view, it is not surprising that program managers at the national laboratories might seek funding for the same proposed activity from NCI and IPP. According to DOE, scientists all over the world try to maximize their chances of receiving grants by applying to multiple sources, and such activity does not make NCI and IPP duplicative or automatic candidates for administrative consolidation. While we recognize that differences exist in the implementation of both programs, both programs share a common underlying goal—the employment of Russian weapons scientists in sustainable, alternative, nonmilitary scientific or commercial activities. Therefore, we continue to question whether DOE needs two separate programs with two sets of similar project review procedures funding numerous similar types of projects in the nuclear cities. As noted in the report, we found that some NCI projects have (1) been proposed for funding under both programs, (2) shifted from one program to another, or (3) received funding from both programs. Combining the two programs could also alleviate many of the concerns we have with NCI’s implementation such as strengthening the project

selection and review process. Furthermore, we continue to believe that efficiencies might be gained by combining both programs.

Finally, DOE noted that the Nuclear Cities Initiative is less than 2-1/2 years old and that project review processes and program metrics need time to mature and be fully implemented. DOE stated that new project review procedures have been instituted to ensure effective coordination and that the program's performance is being measured. While we recognize in the report that new procedures have recently been put into place, it is unclear to us why it took DOE over 2 years to develop and implement these procedures when similar procedures already existed under the IPP program. As noted in the report, some of the failures of the NCI commercial development projects might have been avoided if DOE had a common project approval process and had incorporated some of the elements of the IPP project selection process from the outset of the program. Concerning NCI's program metrics, we recognize in the report that DOE has performance measures, but we continue to believe that these measures require greater specificity. For example, without specific targets, such as the number of scientists that DOE plans to help find jobs for, it is difficult to determine whether the program is on track to meet its long-term objectives. DOE has concurred with our recommendation to establish quantifiable milestones that will more clearly gauge the NCI program's progress in the nuclear cities.

Scope and Methodology

To determine the amount of NCI program funds spent in the United States and Russia, we obtained data from DOE's headquarters and the U.S. national laboratories. Our task was complicated because DOE and the national laboratories were not systematically tracking these types of data. As a result, we developed, in cooperation with DOE's Nuclear Cities Initiative budget officer, a standardized format and agreed-upon definitions for capturing this information for each laboratory by various cost components, such as salary and benefits, overhead, and travel. The format also was used to help identify program expenditures in the United States and Russia. We reviewed the data submissions from the laboratories to ensure that the program expenditures were grouped by the appropriate expenditure categories. We had numerous discussions with DOE and several national laboratories' financial officers to ensure that the data were consistent and conformed with agreed-upon definitions of what comprised U.S. and Russian costs. In cooperation with the NCI program office, we reviewed all of the cost data submitted by the national laboratories to ensure that expenditures were consistently categorized. In several instances, we worked directly with national laboratory program

and finance officials to clarify and/or supplement cost data they had provided us with.

To assess the NCI projects and their impact, we reviewed all of the projects that had been implemented by DOE. We developed a list of projects from information provided by DOE and the U.S. national laboratories. We made some judgments in order to arrive at a final list of projects to review. For example, we excluded activities involving the development of strategic plans, workshops, and other support activities because, while these efforts support the program, we did not consider them to be projects in their own right. In addition, we decided to consider all of the community development activities as one project because those activities involved relatively small expenditures of funds. The NCI program staff concurred with these and other judgments we made about the projects. (See app. VI for a list of projects reviewed.)

To assess the impact of the NCI projects, we used, whenever possible, the information contained in DOE's NCI database to determine the extent to which each project focused on critical nonproliferation objectives, such as the number of weapons scientists engaged in the project and its potential commercialization benefits. However, we found that the database did not always contain current information. We also met or spoke with the principal investigator for each project or a representative who was familiar with the project. We discussed how projects were meeting these objectives and what role the investigator played in meeting these objectives. We met or spoke with officials from the following national laboratories to discuss NCI projects: Argonne National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Sandia National Laboratory, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, National Energy Technology Laboratory, Westinghouse Savannah River Company, and the Kansas City Plant. We also met with representatives from DOE to discuss those projects that were being managed by DOE's headquarters. During the course of our work, we also met with or had discussions with officials from the Department of Commerce, the Department of State, the U.S. Agency for International Development, the U.S. Industry Coalition, Inc., the U.S. Civilian Research and Development Foundation, and the European Bank for Reconstruction and Development.

In several instances, we contacted industry officials to follow up on the status of commercialization activities and obtain their views about trying to start businesses in the nuclear cities. For example, we discussed selected projects and related commercial activities with officials from

ADAPCO, Fresenius Medical Care, Credit Suisse First Boston (Europe), Motorola, Oracle, Intel Corporation, and Delphi Automotive Systems. We toured the All-Russian Scientific Research Institute of Experimental Physics (VNIIEF) Software Technology Laboratory in Sarov, which is the company that a Western firm contracts with for software development.

We visited Russia in September 2000 to meet with MINATOM officials in Moscow, including the first deputy minister. We traveled to Sarov to meet with representatives from VNIIEF and Avangard, the weapons assembly facility that is located in Sarov. During our visit to Sarov, we asked to visit the Avangard facility, but our request was denied. While in Sarov, we visited the Open Computing Center and met with numerous weapons scientists who were working there. We also visited the Analytical Center for Nonproliferation (one of the projects) and VNIIEF Conversia, the organization that seeks to develop commercial ventures in the city. We also met with the deputy mayor of Sarov to learn more about the economic and social conditions in that city. We also met with representatives from the nuclear city of Snezhinsk during our visit to Moscow.

To obtain information about the status of the European Nuclear Cities Initiative, we visited Rome, Italy, and Brussels, Belgium, in January 2001. While in Rome, we met with officials from Italy's Ministry of Foreign Affairs, the Landau Network-Centro Volta, and the Italian National Agency for New Technology, Energy and the Environment. In Brussels, we met with representatives from the European Commission's Security Policy and External Relations Directorate. We conducted our work from August 2000 through April 2001 in accordance with generally accepted government auditing standards.

As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies of this report to the Honorable Spencer Abraham, Secretary of Energy; John A. Gordon, Administrator, National Nuclear Security Administration, the Honorable Mitchell E. Daniels, Director, Office of Management and Budget; and interested congressional committees. We will make copies available to others upon request.

If you have any questions concerning this report, I can be reached at (202) 512-3841. Major contributors to this report include Gene Aloise, Ross Campbell, Glen Levis, and Joseph O. McBride.

A handwritten signature in black ink that reads "Gary L. Jones". The signature is written in a cursive style with a large, stylized "G" and "J".

(Ms.) Gary Jones
Director, Natural Resources
and Environment

Appendix I: Role of Russia's Nuclear Cities in Weapons Design and Development

This appendix provides information on Russia's nuclear cities and their role in developing nuclear weapons.

Table 1: Role of Russia's Nuclear Cities in Weapons Design and Development

Name	Nuclear role
Sarov ^a	Nuclear weapons design and assembly, plutonium storage
Zarechnyy	Nuclear weapons assembly and disassembly, plutonium and highly enriched uranium storage
Novouralsk	Uranium enrichment, highly enriched uranium storage and blending
Lesnoy	Nuclear weapons assembly and disassembly, plutonium storage
Ozersk	Mayak Fuel Storage Site: fuel fabrication, mixed oxide fuel, plutonium production reactors, reprocessing, waste management
Snezhinsk	Nuclear weapons design, plutonium and highly enriched uranium storage
Trekhgornyy	Nuclear weapons assembly and disassembly, plutonium and highly enriched uranium storage
Seversk	Uranium enrichment and reprocessing, plutonium production reactors, waste management
Zheleznogorsk	Reprocessing, plutonium production reactors, waste management
Zelenogorsk	Fuel fabrication (military), uranium enrichment

^aAvangard, a weapons assembly and disassembly facility, is located in Sarov.

Source: Department of Energy.

Appendix II: NCI's Cumulative Expenditures as of December 2000

This appendix presents detailed information about the cumulative costs incurred, as of December 2000, by the national laboratories and the Department of Energy's headquarters, to implement the Nuclear Cities Initiative program.

Table 2: NCI's Cumulative Expenditures by DOE and National Laboratories as of December 2000

Organizations	Labor ^a	Travel ^b	Material purchased in the United States ^c	Material purchased for Russia ^c	Other costs ^d	Overhead ^e	Total	Percentage of total
ANL	\$107,409	\$19,031	\$25,461	\$0	\$81	\$40,716	\$192,698	1
BNL	40,000	9,500	1,700	0	14,500	46,200	111,900	1
KCP	7,323	11,595	19,145	0	0	30,215	68,278	1
LANL	560,756	246,180	52,298	1,794,965	69,545	599,367	3,323,111	21
LLNL	1,273,729	448,027	84,811	646,117	231,721	2,023,487	4,707,892	29
NETL	0	27,680	285,680	0	0	0	313,360	2
ORNL	560,300	223,900	21,200	110,000	0	90,600	1,006,000	6
PNNL	796,200	124,400	504,300	767,400	14,200	1,174,400	3,380,900	21
SNL	253,000	108,200	117,500	0	66,900	327,100	872,700	5
WSRC	18,595	121,789	113,787	171,747	22,250	79,061	527,229	3
DOE HQ	0	0	495,612	966,406	0	0	1,462,018	9
Total	\$3,617,312	\$1,340,302	\$1,721,494	\$4,456,635	\$419,197	\$4,411,146	\$15,966,086	98^g

Legend:

- ANL = Argonne National Laboratory
- BNL = Brookhaven National Laboratory
- DOE HQ = Department of Energy's headquarters
- KCP = Kansas City Plant
- LANL = Los Alamos National Laboratory
- LLNL = Lawrence Livermore National Laboratory
- NETL = National Energy Technology Laboratory
- ORNL = Oak Ridge National Laboratory
- PNNL = Pacific Northwest National Laboratory
- SNL = Sandia National Laboratories
- WSRC = Westinghouse Savannah River Company

Note: This table provides information on total expenditures associated with the NCI program through December 31, 2000. This table breaks out costs differently than figures 3 and 4 in the report. For example, this table combines all travel costs and does not break these costs out by expenditures in the United States or Russia. Furthermore, all overhead charges for labor, travel, contracts, and materials purchased are combined as one figure for each organization.

**Appendix II: NCI's Cumulative Expenditures
as of December 2000**

^a Includes salaries, wages, fringe benefits, and pensions that are directly chargeable to the NCI program. DOE's headquarters employees' salaries are not charged directly to the program but are funded through DOE's Office of Nonproliferation and National Security's program direction account. DOE estimated that salaries and expenses for headquarters employees, including contractors, assigned to the NCI program totaled \$1,245,322 for fiscal year 2000.

^b Includes both travel and per diem costs—foreign and domestic—of laboratory officials and travel of Russian officials to the United States. DOE's headquarters' travel costs are funded through DOE's Office of Nonproliferation and National Security's program direction account and totaled \$106,330 in fiscal year 2000.

^c Includes directly applicable purchase orders, contracts (both foreign and domestic), and consulting services.

^d Includes the costs of certain centralized services, such as document translation, translators/interpreters, in-country support, videoconferences, training, publications, and the costs of hosting delegations.

^e Includes charges for organizational overhead, general and administrative expenses, and service assessments. Overhead costs are also allocated for processing travel arrangements for both U.S. and Russian personnel.

^f Less than 1 percent.

^g Total does not equal 100 percent because of rounding.

Source: GAO's presentation of data from DOE.

Appendix III: DOE's Small Business Loan Program in Russia's Nuclear Cities

In February 2000, DOE granted \$1.5 million to the European Bank for Reconstruction and Development (EBRD) to establish small-loan programs in the three nuclear cities. EBRD is using local branches of Sberbank, which is the largest commercial bank in Russia, to implement the loan program in the cities. As of the end of December 2000, EBRD had spent about \$440,000 of the \$1.5 million. About 74 percent of those expenditures paid for the salaries of the EBRD employees who set up the loan programs and act as consultants. The remaining expenditures were used to train and employ 10 new loan officers hired from within the cities, train other potential loan officers, and cover standard operating expenses, such as office rent, communications, and travel.

EBRD requested NCI funds to cover the administrative costs of the loan programs for the first 18 months of operation. Thereafter, the expectation is that the programs will be self-sustaining on the basis of the proceeds from loan repayments. According to the EBRD representative responsible for overseeing the loan programs, the bank is likely to request an extension from DOE if it has not spent the \$1.5 million by the end of the 18-month period.

The new loan departments in the Sberbank branches may borrow from EBRD's existing \$300 million Russian Small Business Fund. While EBRD has not set aside loan capital specifically for the three cities, business owners in Sarov, Snezhinsk, and Zheleznogorsk are now able to work with local loan officers to compete with other Russian businesses for micro loans (up to \$30,000) and small loans (up to \$125,000) from EBRD. Applicants can receive both a micro and small loan at the same time.

As of the end of February 2001, EBRD had issued 279 loans totaling over \$1,080,000. Nearly all of the loans were micro loans, and the average size was \$3,879. EBRD reported that none of the loans were in arrears more than 30 days. The EBRD representative responsible for the program has projected that the level of loan activity will increase from about 30 loans per month in late 2000 to 130 per month by June 2002. If that level of activity is reached, the bank estimates that it will have issued over 1,600 loans totaling about \$9 million by June 2002. The representative also told us in February 2001 that she expected a total of 18 loan officers to be employed in the cities in the near future.

DOE does not have good information on whether loan recipients were former weapons institute employees. What the Department has learned about the loan recipients in Snezhinsk—which it believes is representative of the three cities—suggests that most of the loans have gone to small

retail and wholesale businesses, including food and household goods merchants. Information supplied by EBRD for loans in Snezhinsk through July 2000 showed that about one-third of the recipients were former institute engineers, physicists, or computer specialists, including some who left the institute in the early 1990s. According to the EBRD representative, the bank does not target loans to specific types of businesses, nor is EBRD concerned about placing limits on who is employed in the businesses that receive loans. The bank is interested in helping to create a sound economy in the cities that will include businesses that might employ spouses or children of weapons scientists and not just weapons scientists themselves. As EBRD has sufficient loan funds, it does not see any reason to ration these funds to a specific group while denying access to others, given that any economic activity in the cities is a benefit. The representative also said that EBRD probably would not have gone into Sarov, Snezhinsk, or Zheleznogorsk without NCI support.

A former NCI staff person who was responsible for overseeing the grant to EBRD wrote that because virtually all inhabitants of the cities are employees of the institutes or dependents of employees, loans to small retail businesses are helping to foster entrepreneurial skills among institute employees or their dependents. In addition, the loan programs are helping to diversify the economy of the cities. Russian officials were critical of the loan program. According to a Deputy Director at VNIIEF, there was no coordination with the institute on the decision for NCI to support the loan program. He also said that the EBRD loans do not play a role in restructuring the VNIIEF workforce.

The First Deputy Director of MINATOM told us that in his view, the EBRD loan program is inefficient. He noted that the loans are small and the interest rates high (about 38 percent). The bank loans result in a very fast turnover of capital and do not result in production facilities that create self-sustaining enterprises. In his view, butcher shops and flower shops are good, but they do not resolve the fundamental problem of promoting self-sufficiency for weapons scientists.

Appendix IV: Successful Commercial Venture Established in Sarov Without U.S. Government Assistance

During the course of our review, we found that a major U.S. computer company employs former weapons scientists in Sarov and has done so without U.S. government assistance. According to the company official responsible for the work in Sarov, in the early 1990s, a Russian-speaking employee of the company who was familiar with the skills available in the nuclear cities pursued the idea of starting an operation in Russia. A representative of the U.S. company met with officials from Sarov and determined that the company could benefit by taking advantage of the scientists' skills in mathematics and attractive salary scale. Over the past 7 years, the number of former weapons scientists under contract to the U.S. company has grown from less than 10 to about 100. Although the software operation in Sarov is partly owned by the weapons institute in that city—the All-Russian Scientific Research Institute of Experimental Physics—the scientists are no longer employed by the weapons institute. 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.

The official who oversees the work in Sarov also told us that other technology firms have expressed an interest in working in the closed cities but have not made the commitment. He said that, while his company has been very pleased with the productivity of the operation in Sarov, it is difficult for Western companies to work in Russia because of language problems, restricted access, and the lack of a relationship with the Russian government. For example, gaining access to Sarov on a regular basis has been difficult for his company, although it has become easier. He believes that the NCI program can help Western businesses overcome these obstacles by, among other things, keeping channels of communication open with MINATOM and nuclear city officials. At the same time, he suggested that the program should concentrate its efforts on projects that will play to the strengths of the Russians. For example, he believes that projects that attempt to link the research and analytical skills of the scientists with the needs of Western companies will be more likely to succeed than projects that attempt to start new commercial ventures in the closed cities.

Appendix V: Denials of Access Requests to Three of Russia's Nuclear Cities

This appendix presents information on 25 instances since 1999 in which the Russian government denied requests for access to nuclear cities made by DOE staff and others. According to DOE officials, some requests were denied more than once, while a significant number of requests were approved at a later date.

Table 3: Denials of Access Requests to Russia's Nuclear Cities

Proposed departure dates	Destination	Traveler(s)
Feb. 2001	Sarov	NCI and national laboratory staff
Feb. 2001	Zheleznogorsk	NCI and national laboratory staff
Nov. 2000	Snezhinsk	Senior DOE managers
Nov. 2000	Sarov	NCI and national laboratory staff
Nov. 2000	Zheleznogorsk	U.S. Embassy official
Oct. 2000	Sarov	National laboratory staff
Aug. 2000	Sarov	NCI and national laboratory staff, U.S. Embassy staff, and press reporter
June 2000	Zheleznogorsk	NCI and national laboratory staff and a subcontractor
June 2000	Snezhinsk	National laboratory staff
June 2000	Sarov	Representative of American Association for the Advancement of Science
June 2000	Zheleznogorsk	NCI and national laboratory staff
May 2000	Zheleznogorsk	DOE headquarters and national laboratory staff
Mar. 2000	Zheleznogorsk	DOE headquarters and national laboratory staff and members of the Zheleznogorsk Strategic Planning Team
Mar. 2000	Zheleznogorsk	NCI and national laboratory staff and a subcontractor
Feb. 2000	Sarov	Commander-in-Chief of Strategic Command, DOE senior managers
Feb. 2000	Zheleznogorsk	NCI and national laboratory staff and a subcontractor
Jan. 2000	Zheleznogorsk and Snezhinsk	National laboratory staff
Jan. 2000	Zheleznogorsk	International Development Center Working Group members from national laboratory and its subcontractors
Nov. 1999	Sarov	NCI Sarov Working Group members and university professor
Oct. 1999	Zheleznogorsk	NCI and national laboratory staff and press members
Oct. 1999	Zheleznogorsk	NCI Zheleznogorsk Working Group members
Oct. 1999	Snezhinsk	NCI Snezhinsk Working Group members and private company representative
Sept. 1999	Snezhinsk	National laboratory staff
Fall 1999	Sarov	U.S. Senator
Spring 1999	Snezhinsk	U.S. Member of House of Representatives

Note: Working Groups may include staff from the NCI program, national laboratories, and nongovernmental entities, such as industry representatives.

Source: DOE.

Appendix VI: NCI Projects Reviewed by GAO

Table 4: NCI Projects Reviewed by GAO

Purpose	Status	Location	Allocated funding through December 2000^a	Responsible DOE entity
Demonstrate programming skills of Open Computing Center staff to potential private customer	Active	Sarov	\$40,000	Argonne
Develop analytical centers to conduct research on nonproliferation issues	Active	Sarov/Snezhinsk	439,100	DOE headquarters
Implement numerous community development projects ^b	Active	All three cities	1,077,159	DOE headquarters
Establish small business loan programs through the European Bank for Reconstruction and Development	Active	All three cities	1,500,000	DOE headquarters
Attempt to match Western businesses with production staff from Avangard assembly plant	Active	Sarov/Avangard	100,000	Kansas City Plant
Prepare public information documents and presentations on nuclear cities	Active	All three cities	150,000	Kansas City Plant
Establish Sarov Open Computing Center	Active	Sarov	4,338,000	Los Alamos
Develop infrastructure for production of kidney dialysis equipment	Active	Sarov/Avangard	1,530,000	Lawrence Livermore
Modernize fiber optic production to meet international standards	Canceled	Snezhinsk	120,000	Lawrence Livermore
Develop oil well perforators for potential commercialization	Active	Snezhinsk	167,000	Lawrence Livermore
Establish Snezhinsk Open Computing Center	Active	Snezhinsk	2,621,500	Lawrence Livermore
Upgrade telecommunications service	Active	All three cities	820,000	Lawrence Livermore/Sandia
Prepare "roadmap" that explores viability of fuel cell industry in Russia	Completed	Sarov and Snezhinsk	263,000	National Energy Technology
Establish self-supporting company for barcoding and other automated technologies	Active	Snezhinsk	395,000	Oak Ridge
Develop agricultural products from canola oil	Canceled	Zheleznogorsk	302,000	Oak Ridge
Expand the local capacity for recycling mercury lamps to meet Russian environmental laws	Canceled	Zheleznogorsk	250,000	Oak Ridge
Assess skills and training needed to improve employment opportunities for residents	Completed	Zheleznogorsk	150,000	Oak Ridge
Market analysis for a bottle manufacturing plant	Canceled	Snezhinsk	200,000	Pacific Northwest
Establish International Development Centers to promote business opportunities in cities	Active	Snezhinsk/ Zheleznogorsk	2,000,000	Pacific Northwest
Develop commercial production of medical bandages	Active	Zheleznogorsk	275,000	Sandia
Explore feasibility of establishing rare	Active	Zheleznogorsk	300,000	Sandia

Appendix VI: NCI Projects Reviewed by GAO

Purpose	Status	Location	Allocated funding through December 2000 ^a	Responsible DOE entity
earth metals foundry				
Provide business management training to institute employees and city residents	Active	Sarov	17,850	Savannah River Site
Work with U.S. university to develop Telemedicine Center in Russia	Active	Sarov	269,600	Savannah River Site
Provide laparoscopy equipment for Telemedicine Center	Active	Sarov	281,300	Savannah River Site
Staff from Open Computing Center will perform contract research for national laboratory	Active	Sarov	20,000	Savannah River Site
Total allocated funding			\$17,626,509	

Note: According to DOE, the allocated amounts for each project include an estimate of overhead costs.

^aThe amount of funds allocated refers to the NCI funds designated for each project, not the amount of funds spent.

^bThe community development projects include such activities as school exchange programs, health care services, and Sister Cities exchange programs.

Appendix VII: Comments From the Department of Energy



Department of Energy
National Nuclear Security Administration
Washington, DC 20585

April 6, 2001

Ms. Gary L. Jones
Director
Natural Resources and Environment
General Accounting Office
Washington, DC 20548

Dear Ms. Jones:

The National Nuclear Security Administration, Office of Defense Nuclear Nonproliferation, has reviewed the General Accounting Office (GAO) draft report, GAO-01-429, entitled "Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenges."

I am pleased that GAO concluded that "DOE's effort to help Russia create sustainable commercial jobs for its weapons scientists and help downsize its nuclear weapons complex is clearly in our national security interests." I also agree with your assessment that the Nuclear Cities Initiative (NCI) "poses a daunting challenge" in its implementation. NCI fills a unique role in the suite of U.S. Government nonproliferation programs and should be recognized for its achievements. It is the only program working with the Ministry of Atomic Energy on weapons complex downsizing and closure. It complements, but does not duplicate, other programs, such as the Initiatives for Proliferation Prevention, the U.S. Civilian Research and Development Foundation, and the International Science and Technology Center.

NCI is a new program, barely two and a half years old. It has already achieved a major impact. To date, NCI has formalized a Government-to-Government Agreement with Russia; developed an effective mechanism for U.S./Russian and U.S. interagency coordination; achieved real successes in the cities, such as the Open Computing Centers, the International Development Centers, and the Avangard Technopark; and funded projects that have the potential to become vehicles for significant and sustained job creation. Recognizing the difficulties encountered and the cost involved in weapons complex downsizing in the U.S., and the challenges faced in Russia, the NCI has done a creditable job of managing both start-up and implementation. As the program matures, issues identified through self-examination and by GAO will continue to be addressed.

This office appreciates the opportunity to have reviewed the draft report. Specific comments are attached.

Sincerely,

Kenneth E. Baker
Acting Deputy Administrator for
Defense Nuclear Nonproliferation



Printed with soy ink on recycled paper

Comments on
GAO Draft Report
"NUCLEAR NONPROLIFERATION:
DOE's Efforts to Assist Weapons Scientists in
Russia's Nuclear Cities Face Challenges
(GAO-01-429)"

General Comments

DOE appreciates the opportunity to review the draft General Accounting Office (GAO) report, "Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenges."

Job Creation, Complex Downsizing and Economic Diversification

The report focuses on job creation as the primary measure of NCI program success, or as the metric of success for individual activities. This reflects an inadequate appreciation of the goals of the program and the U.S. experience with downsizing its own nuclear weapons complex. Unlike other U.S. programs in Russia, the goal of NCI is not simply funding employment of weapons scientists. Such an approach, while useful, is only a short-term fix. The goal of NCI is nuclear weapons complex downsizing through economic diversification in these closed cities. The outcome of this approach is sustainable alternative non-weapons jobs, within a functioning city economy, that ultimately move the scientists out of the weapons facilities.

NCI support for the creation of a Technopark at Avangard, carving out a 500,000 sq.ft. location for commercial activities and contributing to the irreversibility of downsizing at this weapons assembly/disassembly facility, is an example of an infrastructure activity unique to NCI with a longer-term potential for economic diversification leading to job creation.

The infrastructure necessary to promote economic diversification includes internet access, telecommunications capability, business training and financing, municipal governance and appropriate transportation capacity. All of these activities and facilities have been effectively and usefully supported by NCI.

The International Development Centers (IDCs), sponsored by NCI in Snezhinsk and Zheleznogorsk, are good examples of programs that improve the business climate in the city making them more attractive to investors. NCI has documented that these facilities are being used both by residents interested in developing businesses and by potential investors. For example, through training on Project Expert software to assist in proposal formulation, the IDC enabled Zheleznogorsk entrepreneurs to realize the equivalent of \$17 million in conversion grants from the Russian Government. Because of this success, MinAtom has asked the IDCs to play a role in the administration of its conversion programs.

The GAO report cites MinAtom's official dissatisfaction with the amount of NCI funds spent in Russia. MinAtom, based on its Soviet experience, would prefer that funding be provided directly to major projects, a top down approach that reflects the central planning institutional habit. In the United States, economic diversification, where it has been successful, has been based on an active partnership among government, industry and the community. This approach supports entrepreneurship and growth from below, which are goals the NCI program supports.

NCI and IPP

The discussion of duplication between NCI and IPP reflects an incomplete understanding of the differing, but complementary, goals of the two programs. The difference is not that NCI has a community development component. NCI is seeking to accelerate the reduction of the Russia's nuclear weapons complex – its physical ability to manufacture weapons. The program has converted machine shops and processing facilities from weapons work to civilian use, reduced the footprint of one major Russian nuclear complex, and taken high-performance U.S. origin computers from weapons-design work and moved them to civilian activities. This work makes an important, direct contribution to U.S. national security by helping to downsize Russia's remaining nuclear weapons manufacturing infrastructure.

The programs also differ in scope and methodology. IPP focuses on commercialization of technology inside the weapons institutes. Although narrower than NCI in its focus on technology commercialization, IPP is broader in its focus on areas outside the Russian Federation, and on chemical and biological as well as nuclear facilities. NCI has a Government-to-Government Agreement that, among other things, specifies that the program will carry out work only in the municipal areas of the cities, protects it from taxation, and establishes a formal relationship with MinAtom.

It is not surprising that program managers at the national laboratories, like scientists everywhere, might seek funding for the same proposed activity from NCI and IPP. Scientists the world over try to maximize their chances of receiving grants by applying to multiple sources. Such activity does not in itself make NCI and IPP duplicative or automatic candidates for administrative consolidation. And it certainly isn't under the control of the NCI program office. While there may be opportunity for the programs to learn from each other, this has already occurred to a great extent.

Program Metrics and Project Review

NCI is a very new program, less than two and a half years old. It does not need a new strategy as much as it needs the time to mature and fully implement the management processes that have been put in place. As the report indirectly acknowledges, both through its own efforts, through the model of other programs such as IPP, and through

suggestions from GAO, NCI now has instituted the necessary laboratory guidance and project review procedures to ensure effective coordination of program activities.

Moreover, the NCI program plan specifies the metrics that are being used to measure program performance. Performance assessment is a critical component of NCI program management to ensure program goals are being met. These metrics include:

- Facility Closure (number of buildings, square footage, etc.)
- Infrastructure Upgraded or Created
- Jobs Created
- Businesses Established or Expanded
- Credits and Investment Provided to Local Businesses
- External Financing and Leveraged Funds
- Training Courses Provided and Number of People Trained
- Number and Types of Commercial Firms Investing in the Cities
- Percentage of Project Funds Spent in Russia
- Services Provided by the International Development Centers
- Other Development Programs Attached to the Cities
- Russian Monetary and In-Kind Contributions

Recommendations

We recommend that the Administrator, National Nuclear Security Administration improve efforts targeted at the nuclear cities by

Recommendation 1.

Evaluating all of the ongoing NCI projects, particularly those that focus on community development activities, and eliminate those that do not support the Department's stated objectives of creating jobs in the nuclear cities and downsizing the Russian nuclear weapons complex;

Management Position

Concur

Evaluation of all of the ongoing NCI projects is appropriate, however not simply for the purpose of eliminating projects. Evaluation of projects will be for the purpose of enhancing those projects that are supporting the program goals, and correcting those which are not, reserving the option of eliminating those that cannot be redirected to support the program goals.

Recommendation 2.

Establishing quantifiable goals and milestones for jobs creation and downsizing the weapons complex that will more clearly gauge progress in the nuclear cities and use this information to help assess future program expansion plans and potential costs;

Management Position

Concur

A number of quantifiable goals and milestones already exist. The program will review and extend these as directed in the recommendation.

Recommendation 3.

Strengthening efforts to reduce national laboratory costs to implement the program in an effort to place more NCI funds in Russia;

Management Position

Concur

The NNSA will work to increase non-governmental and business participation, thus reducing national laboratory costs to implement the program. This will help to place more NCI funds in Russia.

In addition, the Nuclear Cities Initiative and the Initiatives for Proliferation Prevention program share a common goal and in many cases are implementing similar types of projects. In order to maximize limited program resources, we also recommend that the Administrator

Recommendation 4.

Determine whether the two programs should be consolidated into one effort—including a determination of what changes in authorizing legislation would be necessary—with a view toward achieving potential cost savings and other programmatic and administrative efficiencies.

Management Position

Concur

NNSA will review the NCI and IPP programs for consolidation with a view toward achieving potential cost savings and other programmatic and administrative efficiencies.

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