
GAO

Report to the Chairman and to the
Ranking Member, Subcommittee on
Foreign Operations, Committee on
Appropriations, U.S. Senate

May 2001

WEAPONS OF MASS DESTRUCTION

State Department Oversight of Science Centers Program



G A O

Accountability * Integrity * Reliability



United States General Accounting Office
Washington, DC 20548

May 10, 2001

The Honorable Mitch McConnell
Chairman
The Honorable Patrick J. Leahy
Ranking Member
Subcommittee on Foreign Operations
Committee on Appropriations
United States Senate

Since 1994, the United States has appropriated \$227 million to support two multilateral science centers in Russia and Ukraine that pay scientists of the former Soviet Union who once developed nuclear, chemical, and biological weapons and missile systems to conduct peaceful research. By employing scientists through the science centers, the United States seeks to reduce proliferation risks associated with underemployed, highly trained scientists who could be tempted to sell their expertise to terrorist groups or countries of concern such as Iran, Iraq, or North Korea. Accordingly, the program has employed thousands of weapons scientists in a variety of research areas, including projects aimed at developing new anticancer drugs, improving nuclear safety, and enhancing environmental cleanup techniques. The State Department plays an active role in selecting the research projects for funding that meet program objectives and assuring adequate program oversight.

The Senate report accompanying the Senate Foreign Operations, Export Financing, and Related Programs appropriation bill for fiscal year 2001 directed GAO to examine the State Department's oversight of the science center program. Accordingly, we reviewed (1) the selection procedures State uses to fund projects that meet program objectives and (2) the monitoring procedures State uses to verify that scientists are working on the peaceful research they are paid to produce.

To address these issues, we examined State Department records and spoke with officials of State's Bureau of Nonproliferation responsible for overseeing U.S. involvement in this program. We also spoke with officials from other agencies that participate in selecting projects to fund. We visited the International Science and Technology Center in Russia and the Science and Technology Center in Ukraine to interview officials and review their files to determine how the centers were implementing the program. In addition, we visited nine research institutes located in Russia and Ukraine that are participating in the program and interviewed

scientists involved in 35 projects that had received \$7.4 million from the United States. Our analysis focused on State Department-funded projects and not the program in its entirety.

Results in Brief

The State Department has designed an interagency review process to select and fund research proposals submitted by weapons scientists to the science centers in Russia and Ukraine. The review process is intended to screen out proposals that may directly or indirectly support weapons development, evaluate the proposals' scientific merit, and target proposals employing predominantly senior weapons scientists (those of greatest proliferation concern). The overall goal of this process is to select projects that reduce proliferation risks to the United States and employ as many senior scientists as possible. However, the Department does not have complete information on the total number and location of senior scientists and has not been granted access to senior scientists at critical biological research institutes under the Russian Ministry of Defense. During 2000, about 6,500 of an estimated 30,000 to 75,000 senior weapons scientists in the former Soviet Union worked on U.S.-funded projects.

The State Department does not directly monitor the activities or results of the work of scientists participating in U.S.-funded science center projects. Instead, the Department relies on the mostly Russian and Ukrainian specialists at the science centers, overseen by managers from the United States, the European Union, Japan, and Canada, to conduct routine monitoring of the senior scientists' progress and the Department of Defense to conduct financial and technical audits. Based on our in-country review of 35 research projects at nine institutes in Russia and Ukraine, we found that the science centers were following their monitoring processes and taking actions to address audit deficiencies. While the monitoring process helps the State Department oversee the activities of the senior scientists working on U.S.-funded projects, the terms of the project agreements do not allow auditors to track what the scientists are doing while they are not working on the projects. This is particularly relevant since, for example, in 2000, 75 percent of the senior scientists worked 4 ½ months or less on U.S.-funded projects. Some senior scientists worked as little as a few days on U.S.-funded projects over the course of the entire year. Consequently, the Department knows little about the scientists' activities outside the program.

Background

During the Cold War, the Soviet Union established several hundred research institutes that were dedicated to the research, development, and production of weapons of mass destruction. Although precise figures are not available, science center officials estimate that at the time of the Soviet Union's collapse, from 30,000 to 75,000 highly trained senior weapons scientists worked at these institutes. These figures do not include the thousands of less experienced junior scientists and technicians who also worked in these institutes. After the collapse of the Soviet Union in 1991, many of these scientists suffered significant cuts in pay and lost their government-supported work. By early 1992, the United States and other countries were concerned that senior weapons scientists struggling to support their families could be tempted to sell their expertise to terrorists or countries of concern such as Iraq, Iran, and North Korea.

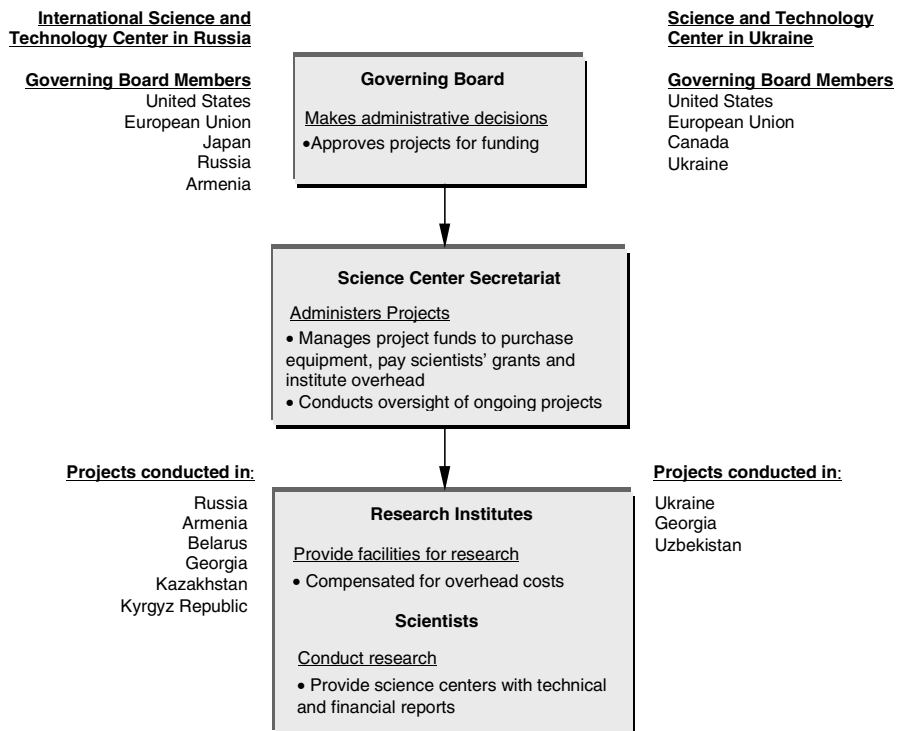
To address this threat, the United States, the European Union, Japan, and Russia signed an agreement in 1992 establishing the International Science and Technology Center in Moscow. A year later, the United States, Sweden, Canada, and Ukraine signed an agreement establishing the Science and Technology Center in Ukraine, located in the city of Kiev.¹ The science centers in Russia and Ukraine began funding research projects in 1994 and 1995, respectively. In addition, the science centers have recently begun supporting the weapons scientists' long-term transition to peaceful research by helping them identify and develop the commercial potential of their research, providing some business training, and helping fund patent applications.

While the science centers operate independently of each other, they are very similar in structure and procedures (see fig. 1). Each science center has a governing board that meets two or three times a year to make administrative decisions, which includes formally approving project funding. Each science center also has an executive director and secretariat that carries out these decisions by conducting the center's day-to-day operations and administering the funded projects. The science centers' senior management consists mostly of representatives from the United States and the other funding parties (the European Union, Japan, and Canada). However, almost all of the secretariat's staff who are responsible

¹ After Sweden's accession to the European Union, the European Union became a member of the science center in Ukraine in 1998.

for project implementation and oversight are Russian and Ukrainian nationals hired by the funding parties and the host government of Russia or Ukraine.

Figure 1: Science Centers' Structure



Note: During 2000, Armenia held a rotating seat on the Russian Center's Governing Board as a representative of itself and four other recipient countries – Belarus, Georgia, Kazakhstan, and the Kyrgyz Republic.

Source: GAO analysis of International Science and Technology Center in Russia and Science and Technology Center in Ukraine documents.

As of December 31, 2001, the United States had funded 590 projects conducted at 431 research institutes, mostly within Russia and Ukraine, but also in Armenia, Georgia, Kazakhstan, Uzbekistan, and the Kyrgyz Republic. The projects range in length from 6 months to more than 3 years and involve basic and applied research in such areas as developing anticancer drugs, devising techniques to enhance environmental cleanup, and ensuring nuclear reactor safety. The projects employ teams of senior weapons scientists, junior scientists, and technicians according to the

detailed workplans included in the project agreements. They receive cash payments for their work that are sent directly from the science centers to their personal bank accounts. According to science center officials, the average daily grant payment for senior weapons scientists is \$20-\$22 per day, tax free, compared to an average daily wage for all workers of about \$4 in Russia or about \$2 in Ukraine.

While most of a project's funds are spent for the scientists' and technicians' salaries, the United States also pays for other costs associated with the project, as specified in the project agreement. These costs usually include the purchasing of computer equipment and some laboratory equipment, such as chemicals and glassware. In addition, the United States pays for senior scientists' travel to international conferences so that they can present their work and meet with their western counterparts. Also, the institutes receive payment for overhead costs, such as electricity and heat (not to exceed 10 percent of the project's total cost).

As table 1 shows, the United States has provided more funds for projects at both centers than any other source.² Since 1994, \$227 million has been appropriated specifically for the science center program, of which \$133.9 million had been used to fund approved projects as of March 31, 2001.³ In addition, U.S. agencies such as the Departments of Defense, Agriculture, Energy, and Health and Human Services have used \$25.4 million in funds from other appropriations to support projects through the science center program.⁴ Finally, private sector firms from the United States, the European Union, Japan, and Canada have funded projects of commercial interest to them that they helped develop with senior weapons scientists.

² The funding parties also cover the operating expenses of the science centers. For 2001, total operating expenses at both centers are expected to amount to about \$6.3 million. The United States pays about one-third of these costs at the center in Russia and about three-quarters of these costs at the center in Ukraine.

³ U.S. funds for the science centers were appropriated to the Department of Defense for fiscal year 1994-95 and to the Department of State since fiscal year 1996.

⁴ We did not review the selection and oversight process for projects supported by these funds.

Table 1: Funding for Projects at the Science Centers, by Source, 1994 Through March 2001

(Dollars in millions)

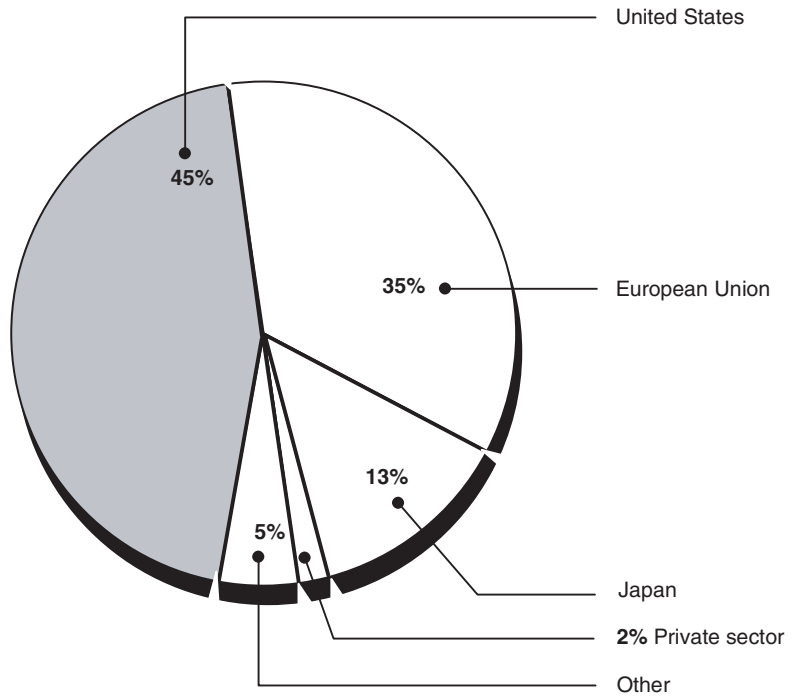
Source	Center in Russia	Center in Ukraine	Total
United States, science center appropriation	\$104.9	\$29.0	\$133.9
United States – other appropriations	21.7	3.7	25.4
European Union	98.3	6.3	104.6
Japan	36.4	0.7	37.1
Canada	0.0	1.9	1.9
Private sector	5.7	3.6	9.3
Other countries	16.2	0.1	16.3
Total	\$283.2	\$45.3	\$328.5

Note: Other countries include Norway, Republic of Korea, and Switzerland.

Sources: International Science and Technology Center in Russia and Science and Technology Center in Ukraine.

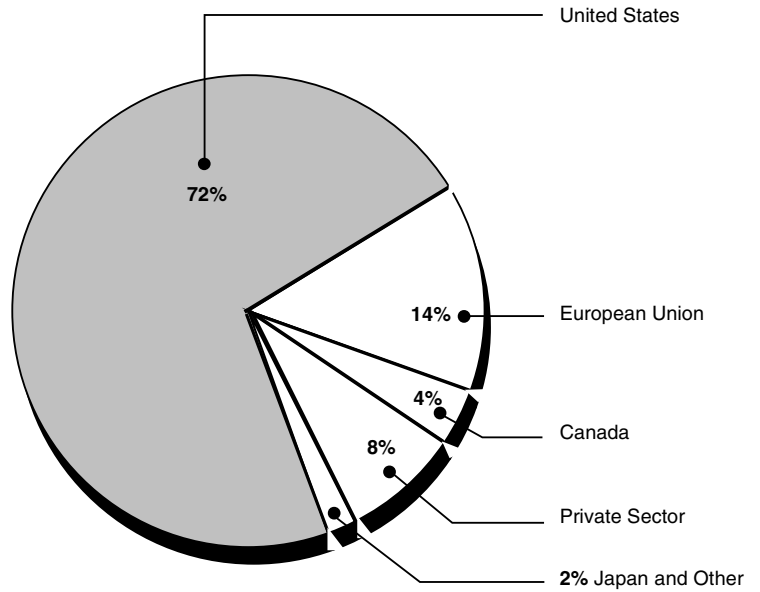
As figures 2 and 3 show, the United States has provided about 45 percent of the funding for projects at the science center in Russia and about 72 percent of the funding for projects at the science center in Ukraine since 1994.

Figure 2: Funding for Projects Through the Science Center in Russia, by Donor, 1994 – 2000



Source: International Science and Technology Center, Russia.

Figure 3: Funding for Projects Through the Science Center in Ukraine, by Donor, 1995-2000



Source: Science and Technology Center in Ukraine.

In addition to the science center program, the Department of Energy (DOE) funds research by weapons scientists through two similar programs. As of December 2000, DOE had obligated about \$110 million for the Initiatives for Proliferation Prevention program and about \$16 million for the Nuclear Cities Initiative. Like the science centers program, Initiatives for Proliferation Prevention pays scientists directly for peaceful research in several countries of the former Soviet Union, particularly nuclear weapons scientists. However, the program is also designed to commercialize technologies that utilize the scientists' expertise.⁵ The objectives of the Nuclear Cities Initiative are to create nonmilitary job opportunities for weapons scientists in Russia's closed nuclear cities and to help Russia accelerate the downsizing of its nuclear weapons complex.⁶

⁵ See *Nuclear Nonproliferation: Concerns with DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists* (RCED-99-54, Feb. 19, 1999).

⁶ See *Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenges* (GAO-01-429, May 3, 2001).

Unlike the science center program, the Nuclear Cities Initiative does not pay scientists directly.

State Department Leads Project Selection Process

One mechanism the State Department uses to meet the program's nonproliferation objectives is its leading role in selecting which projects will receive funding. The project selection process begins after the science centers send the proposals they receive from scientists to the State Department for review. An interagency process involving the Departments of State, Defense, and Energy reviews about 1,000 project proposals during the course of a year for scientific merit and potential policy and proliferation concerns. The State Department's selection is limited to those projects approved by the national government where the scientists work and, in some instances, the State Department has not been granted access to scientists at critical biological research institutes. Since 1994, the State Department has selected for funding 590 projects that employed about 9,700 senior scientists. However, the State Department does not know how much of the total population of senior scientists it has reached because estimates of the total number of scientists vary widely.

Project Review and Approval Process

The State Department's selection process begins when scientists submit project proposals through their research institutes to their government for approval and certification of the senior weapons scientists' expertise. The State Department selects from those project proposals that have been approved by the national government where the scientists work.⁷ Although State Department and science center officials stated that most project proposals were approved by the national governments, not all research institutes in the former Soviet Union have had scientists put forth a project proposal to one of the science centers. For example, four biological weapons institutes under the Russian Ministry of Defense have not submitted project proposals to the science center in Russia. This effectively denies the State Department access to the senior scientists at these institutes, an issue of potential concern, since Russia's intentions regarding its inherited biological weapons capability remain unclear.⁸

⁷ The agreements establishing the science centers require host government concurrence of project proposals.

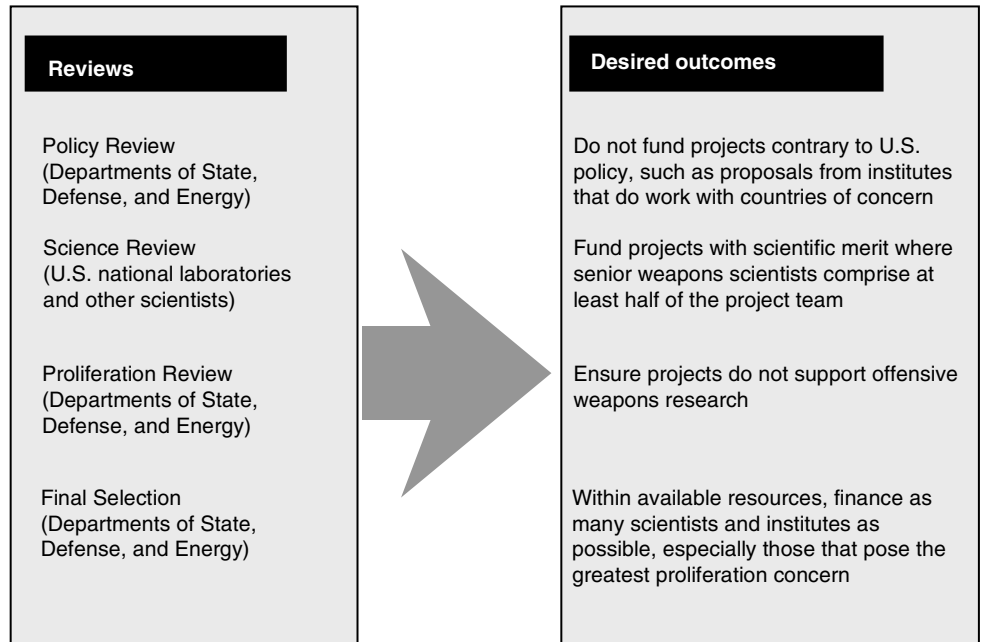
⁸ See *Biological Weapons: Effort to Reduce Former Soviet Threat Offers Benefits, Poses New Risks* (NSIAD-00-138, Apr. 28, 2000).

Project proposals approved by their government are then sent to one of the science center secretariats to be forwarded to the United States for review.⁹ The other funding parties also receive project proposals from the science centers and conduct their own, independent selection process.¹⁰ After project proposals arrive from the science centers, the State Department distributes them to the various participants in the interagency review process, including the Departments of Defense and Energy, and U.S. scientists from private companies and universities. As shown in figure 4, projects undergo a variety of reviews to ensure that the State Department funds projects that meet nonproliferation objectives and program intent.

⁹ Before a project proposal arrives at the State Department, it must also be certified by the science center that it contains a workplan and other required information.

¹⁰ The United States is the only funding party at both centers that reviews every proposal.

Figure 4: Project Selection Process



Source: GAO analysis of information from State Department.

Policy Review

The State Department chairs an interagency group, including the Departments of Defense and Energy, that conducts a policy review of all project proposals. According to State Department officials, this interagency policy review group assesses whether the proposed project contains elements that contradict U.S. policy, such as work being conducted with institutes in Belarus (where there are human rights concerns) or with institutes that are working with Iranian scientists in areas of proliferation concern. The policy group also coordinates the project proposals with other U.S. government programs that may involve the same institute or scientists. This process relies on the reviewers' knowledge and experience with specific institutes and scientists and their expertise on policy issues. According to State Department officials, weapons scientists submit few proposals that are contrary to U.S. policy.

Science Review

State Department officials and science advisers from the U.S. national laboratories and other scientists also review the proposals for scientific merit to ensure that projects employ mostly senior scientists carrying out meaningful work. The science advisers forward proposals to two or three

other U.S. scientists who specialize in the proposed area of work to obtain their views on the scientific implications of the work, including what they know about the scientists who submitted the proposal. Based on this review and their own experience, the advisers develop a consensus opinion on the merits of the proposed work and whether the United States should fund it. The interagency group recommends rejecting projects where less than half of the scientists are former senior weapons scientists.¹¹ According to State Department officials, the Department focuses its funding efforts on projects where the majority of participants are senior scientists whose expertise represents a more significant proliferation threat than junior scientists or technicians. However, the State Department cannot independently verify the weapons experience of the senior scientists it has employed. The State Department relies on the scientists' national governments to certify that the senior weapons scientists listed as participants in a project proposal actually have sufficient expertise to pose a proliferation risk.

According to State Department officials, the group also considers the commercialization potential of the proposals as part of the review process. According to State Department and science center officials, although commercialization is not a primary goal, their ability to promote the sustainability of the program through the commercial application of scientific research is limited by the inherent challenges of finding commercial applications for any scientific research. In addition, the political and economic situation in Russia, Ukraine, and the other countries participating in the science centers remains very uncertain and thus deters foreign investors.

Proliferation Review

Every project proposal is also reviewed for potential proliferation concerns. The State Department chairs an interagency group, including representatives from the Departments of Defense and Energy and other national security agencies, that examines each proposal to ensure that the projects the United States funds have only peaceful applications. For example, according to State Department officials, a proposal to develop a rocket that could launch several satellites at once was rejected on the grounds that this same technology could also be used to launch multiple warheads. Careful examination of the proposed work is particularly critical in the biological area, where the division between offensive and

¹¹ The United States co-funds projects with other donors where less than half of the participants are senior weapons scientists.

defensive research is often difficult to determine. The proliferation review group also weighs the risks that financing certain projects could help sustain a weapons institute infrastructure in the former Soviet Union by keeping institutes in operation that might have curtailed their research functions for lack of funds.

Final Selection

After proposals are reviewed for potential policy, science, and proliferation concerns, officials from the Departments of State, Defense, and Energy meet to develop the official U.S. position on which project proposals to fund. During final project selection, the interagency group considers the information and recommendations developed during the other reviews, supplemented by past experience with institutes and scientists, to reach consensus on each project. The group also weighs other considerations. For example, State Department and science center staff said that they try to provide funds for projects at as many institutes as possible. A project with relatively weak scientific merit might receive funding if it is at an institute of high interest to the United States due to proliferation concerns. When the group reaches consensus on which projects to fund, it passes these instructions on to the U.S. representatives on the centers' governing boards. Representatives from the funding parties on each board then jointly decide which projects will receive funding.

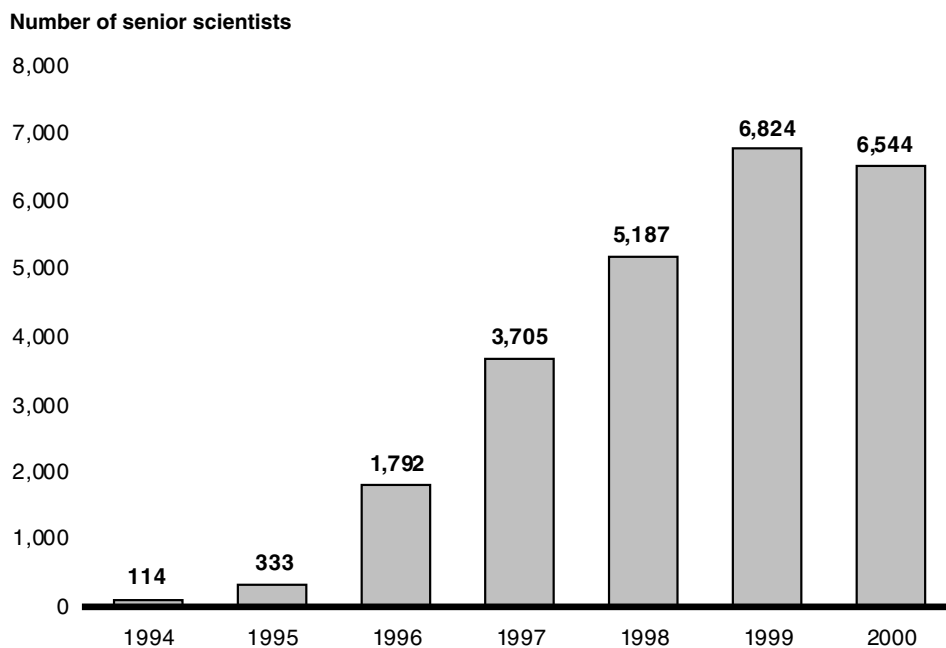
The next step is for a member of the science center's staff to work with the project team to fine-tune the official project agreement. The staff member and the project team will revise the project's workplan and make any modifications required by the funding party. For example, in some cases the State Department has required project teams to add a U.S.-based collaborator, agree to additional oversight, or change the project's budget to allow scientists to travel to the West more frequently during the course of the project. The funding parties are not bound to make any payments related to a project until the final project agreement has their approval and has been signed by the science center's executive director. Once the project agreement has been signed, the project can begin.

Funding Levels and Scientists Employed

According to State Department officials, they cannot fund all of the project proposals that meet the State Department's selection criteria due to funding constraints. For example, in preparation for the March 2001 meeting of the governing board for the center in Russia, the Department reviewed 148 proposals and found that 92 met U.S. funding criteria. However, the State Department only funded the 31 proposals with the highest number of senior scientists, greatest scientific merit, and/or the involvement of institutes of particular proliferation concern.

From 1994 through the end of 2000, the United States had funded 590 projects that employed about 9,700 senior scientists. Figure 5 shows the number of senior scientists who worked on one or more U.S.-funded projects during the course of each year. These figures increased steadily from 1994 through 1999 and decreased slightly during 2000.¹² About 6,500 senior scientists worked on U.S.-funded projects during 2000. Since 1994, more than half of the total number of people employed by U.S.-funded projects have been senior scientists.

Figure 5: Number of Senior Scientists on State Department-funded Projects



Note: Figure includes projects fully or partially funded by the State Department.

Source: Science centers in Russia and Ukraine.

Although the State Department knows how many scientists it has employed through the projects it has funded, it does not know what

¹² This figure shows the number of senior scientists employed with funds specifically appropriated for the science center program. It does not include scientists funded by other donors' support. Since many scientists work on projects that last more than one year, the number of scientists employed during each year cannot be added together.

portion of the target population of senior weapons scientists it has reached. The estimated number of senior weapons scientists in the Soviet Union at the time of its collapse varies from 30,000 to 75,000 scientists. During the past decade, an unknown number of senior weapons scientists left their research institutes to pursue other forms of employment, retired, or died. At some of the research institutes we visited, the institute directors told us that about half of their staff left within 2 years of the collapse, although they stated most who left were junior scientists, technicians, and support staff. Given these uncertainties, the State Department can only estimate how much of the total population of senior scientists it has reached. For example, the 9,700 senior scientists employed by U.S.-funded projects to date could represent anywhere from 12 percent to 32 percent of the target population. According to the science centers, funding from all sources, including the United States, has employed about 21,000 senior scientists to date.

State Department Relies on Science Center Staff and Outside Auditors to Monitor the Activities of Project Scientists

The State Department does not directly monitor the activities or results of the work of scientists who are participating in U.S.-funded research projects. Instead, the Department relies on the mostly Russian and Ukrainian technical specialists and accountants at the science centers, overseen by managers from the United States, the European Union, Japan, and Canada, to monitor scientists' progress in completing their research. The State Department also uses Department of Defense and outside auditors to conduct reviews of a sample of U.S.-funded projects. For the 35 projects we reviewed at nine institutes in Russia and Ukraine, the science centers were following their monitoring procedure. However, several factors limit the ability of the State Department to monitor the activities of scientists working on U.S.-funded projects.

Science Center Staff Conduct Routine Monitoring of Projects

The State Department first relies on the mostly Russian and Ukrainian staff at the science centers to ensure that scientists are working on the research they are paid to produce. The science center staff do not observe the scientists on a day-to-day basis but rather (1) conduct on-site technical and financial monitoring at least once during each project, (2) review financial and technical reports submitted by the scientists, and (3) have frequent contacts with project scientists and receive input from U.S. and other western scientists who collaborate on the projects. For the 35 projects we reviewed, the science centers were following this monitoring procedure.

Under the terms of the science center project agreements, science center staff have access to the locations where the research is conducted and to the personnel, equipment, and documentation associated with the projects. At least once during the course of a project, science center technical specialists and accountants spend a day at the institute to confirm that the research is progressing according to the project agreement by, among other things,

- conducting confidential interviews with individual scientists to discuss their involvement in the project;
- verifying that the amount of time scientists claim on their timesheets matches the financial reports submitted to the science centers; and
- discussing and observing project accomplishments such as results of experiments, prototypes of new technology, and computer simulations and databases.

For the 35 projects we examined in detail, we found that the science center staff had generally followed their on-site monitoring procedures. The science centers had reports in their project files that documented the on-site monitoring. In addition, scientists we met with at the institutes described the on-site monitoring, including the questions asked during the confidential interviews. At one institute in Ukraine, we observed the science center staff conducting confidential interviews as part of on-site monitoring.

The project agreements require the research institutes to submit quarterly financial reports and quarterly, annual, and final technical reports to the science centers. Only after performing routine checks of the financial reports do the science centers deposit the payments into the scientists' individual bank accounts. The science centers also examine the technical reports to ensure that the project is achieving the technical results specified in the project agreement and determine whether the project is on schedule. For the 35 projects we selected, we verified that the science centers had received and analyzed the financial and technical reports required under the project agreements. In addition, scientists we spoke with at the research institutes also confirmed that they prepare and submit the reports according to the terms of the project agreements.

In addition to the monitoring procedures provided under the project agreements, the science center staff have informal contact with scientists on the project team about once a week, which allows them to check on the status of projects on an ongoing basis. These frequent contacts occur when scientists purchase equipment through the science centers, make

travel arrangements to participate in international conferences, or come to the science centers to use computers or submit reports in person. Each U.S.-funded project also has a U.S. or western collaborator, either a government agency or private company, that works with the scientists on the research. For example, collaborators attend international conferences with the scientists, visit the institutes to observe the project results, host visits by scientists to the United States, and sometimes conduct part of the research. The science centers seek feedback on the projects' technical progress from the collaborators, who often have a high degree of expertise in the project area. When possible, the science centers also participate in meetings between the scientists and collaborators. Scientists at the research institutes we visited confirmed that they have frequent contact with the science center staff and collaborators.

State Department Uses External Audits to Provide an Additional Level of Oversight

The State Department annually selects a number of U.S.-funded projects to be audited by the Defense Contract Audit Agency of the Department of Defense. During 1999 and 2000, the agency conducted 84 audits on behalf of the State Department. The auditors review financial reports submitted to the science centers and visit the institutes to interview selected scientists, examine timesheet completion procedures and individual scientists' timesheets, and check the inventory of equipment purchased under the project. Based on these procedures, they determine, among other things, whether the scientists' time records are reliable and maintained according to the terms of the project agreement and whether the weapons scientists working on the project are the same as those identified in the workplan. Technical auditors from U.S. industry or other government agencies accompanied the Defense Contract Audit Agency on 44 of the 84 audits conducted in 1999 and 2000. The technical auditors provided the scientific expertise necessary to evaluate the scientists' technical performance and determine whether the amount of time the scientists claim they were working was commensurate with their technical performance, as documented in their scientific logbooks and research results. Because the technical auditors have the expertise to evaluate projects' technical progress, the State Department wants technical auditors to accompany the Defense Contract Audit Agency on all future audits of science center projects.

The science centers also undergo an annual external audit of their financial statements and project monitoring procedures. These external audits, conducted by international accounting firms hired by the science centers, include visits to research institutes to evaluate the science centers' monitoring procedures and make recommendations regarding the

Science Centers Address Deficiencies Uncovered Through Monitoring

ability of the science centers to monitor the amount of time that scientists spend on the science center projects.

According to State Department and science center officials, the science centers take action to address deficiencies uncovered through monitoring. Science center officials stated that the problems they have uncovered through monitoring have been generally minor, for example, errors in conforming to science centers' accounting requirements. At the science center in Ukraine, officials stated that the most serious violation they had uncovered was a scientist who was charging time to a project while he was in the hospital. They calculated how much he had been overpaid, and he paid the money back.

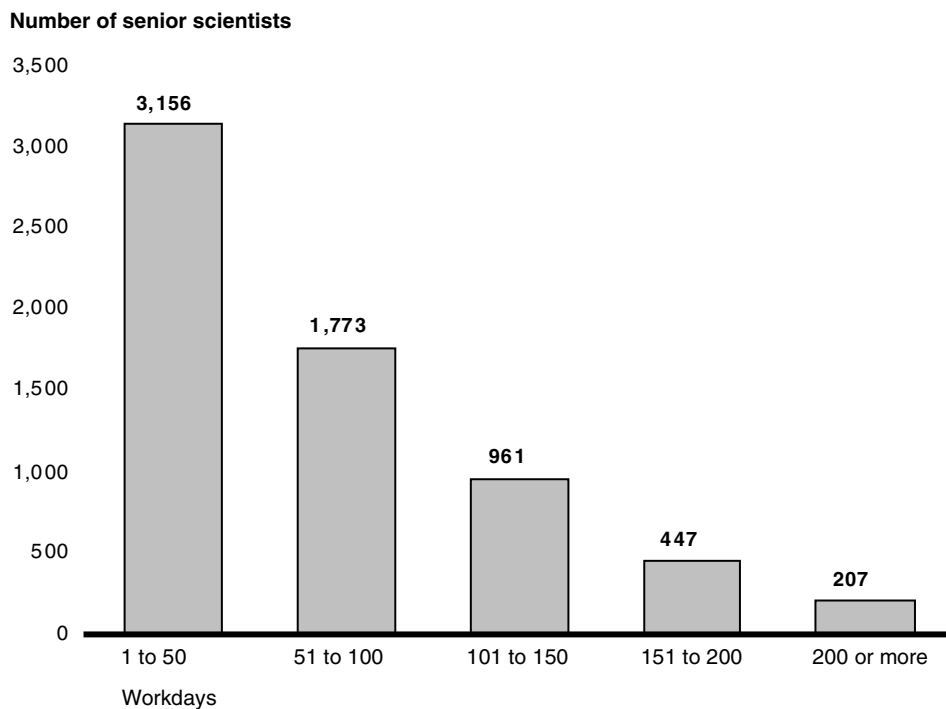
External audits have found deficiencies in the timekeeping practices for a number of projects. For example, one audit found that some scientists had claimed more than the maximum amount of time they are allowed per year (220 days) and recommended additional procedures to prevent such occurrences in the future. The Defense Contract Audit Agency initially found some scientists were charging the science centers the amount of time that had been budgeted in the project workplan rather than the actual amount of time they had worked. Usually, the scientists told the auditors that they had worked more than amount of time they had claimed on their timesheets. For many projects, the technical auditors confirmed that the scientists were probably underreporting their time spent on the projects. However, the technical auditors for two projects at an institute in Russia found that some scientists could not provide sufficient evidence that they had worked on the projects for the time they had charged. The State Department temporarily ceased funding additional projects at this institute until the problem was resolved. Overall, according to the Defense Contract Audit Agency, the science centers have implemented procedures to reinforce correct timekeeping practices among project scientists, and the problems have lessened.

Monitoring Has Limitations

The scope of State Department's monitoring of scientists is limited to the implementation of science center projects. Under the terms of the project agreements, the science centers and external auditors only monitor scientists while they are working on science center projects; they cannot track what the scientists are doing while they are not working on the projects or after the projects end. Furthermore, the project agreements do not prohibit the scientists from continuing to work on research for their institutes including, in Russia, research related to nuclear weapons. Although scientists may volunteer information about their other research

activities, the State Department has no formal way to monitor what other research these scientists are performing or for whom they are performing it. This limitation is particularly relevant for scientists who work only part-time on science center projects. As shown in figure 6, during 2000 very few senior scientists worked full-time (defined by both science centers as 220 working days per calendar year). Seventy-five percent worked 4 ½ months (100 days) or less on a science center project during 2000, and some worked just a few days during the year.

Figure 6: Number of Days Senior Scientists Worked on U.S.-funded Projects, Calendar Year 2000



Source: Science centers in Russia and Ukraine.

In addition, the project agreements only provide the science centers and external auditors access to institutes' records related to projects funded by the science centers. The lack of access to records related to what the scientists are doing while they are not working on science center projects limits the ability of the science centers and external auditors to independently confirm the information that the scientists do provide about their activities. For example, monitoring cannot confirm whether

scientists are receiving pay from other sources for the time they claim they are working on science center projects.

Finally, the project agreements require that auditors and science center staff provide the institutes with 20 to 35 days advance notice before making visits to conduct on-site monitoring. According to State Department and Defense Contract Audit Agency officials, the advance notice limits the element of surprise and gives project scientists the opportunity to cover up deficiencies in their adherence to the project agreements.

Agency Comments

In written comments provided on a draft of this report, the Department of State concurred with the report's major findings. However, the Department provided additional information to clarify specific sections of the draft report. Specifically, the Department agreed with our finding that it relied on Russian and Ukrainian specialists to monitor the science center projects. However, the Department stated that it is confident that the specialists' monitoring efforts comply with western standards and that the majority of these individuals are former Soviet weapons scientists who are now committed to the mission and nonproliferation objectives of the science centers. The Department also agreed with our finding that there are no reliable estimates on the total population of senior weapons scientists. However, the Department stated that anecdotal evidence suggests that the United States and other funding parties have engaged about half of the population of senior weapons scientists. Finally, the Department stated that while it would be impractical for the United States to keep track of the activities of the weapons scientists when they are not working for the science centers, the Department cited examples of how it maintains contact with current and past participants to varying degrees. The Department's comments are presented in appendix I.

Scope and Methodology

To review the State Department's project selection process, we met with officials from the Departments of State and Defense and the Department of Energy's national laboratories who participate in the process. We also attended one meeting of the science advisers. We discussed the program's scope and limitations with officials from the Departments of State and Defense and the U.S. national laboratories, as well as with U.S. representatives on the governing boards of both science centers. We also discussed these issues with the senior management at both centers. In addition, we reviewed the science centers' agreements, statutes, and annual reports. The statistical data were compiled from reports obtained from the Chief Financial Officers at both centers.

To examine the monitoring procedures used to check whether scientists are working on the peaceful research they are paid to produce, we first met with State Department officials to discuss what monitoring procedures were in place. We then examined each component of the monitoring process in detail, as follows:

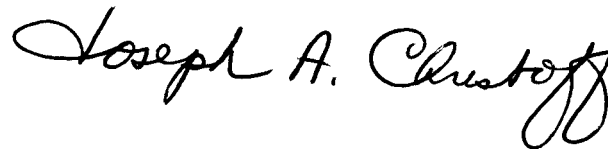
- We met with auditors from the Defense Contract Audit Agency and science advisers from the national laboratories to learn how they conduct their monitoring activities. We then reviewed the Defense Contract Audit Agency's reports on its audits of U.S.-funded science center projects conducted during 1999 and 2000.
- We reviewed the reports prepared by the external auditors for both science centers and met with representatives from the firm that conducted the most recent audit of the center in Russia.
- We visited the science centers in Russia and Ukraine and met with officials at all levels of these organizations including the Executive Directors, Deputy Executive Directors, Chief Financial Officers, technical specialists, and members of the financial staff to discuss how they conduct technical and financial monitoring of projects. We compared these discussions with the centers' written guidance. We also reviewed in detail the project documentation, including financial, technical, and monitoring reports, for 35 projects that had received U.S. funds.
- To verify that the monitoring process detailed in science center documents was actually taking place, we visited the following nine institutes in Russia and Ukraine where the 35 projects had recently been completed or were currently underway:
 - Paton Electric Welding Institute, Kiev, Ukraine (nuclear, chemical, and missile)
 - Institute of Semiconductor Physics, Kiev, Ukraine (nuclear and missile)
 - Frantsevich Institute for Problems of Materials Science, Kiev, Ukraine (nuclear and missile)
 - Moscow Engineering Physics Institute, Moscow, Russia (nuclear)
 - All-Russia Research Institute of Automatics, Moscow, Russia (nuclear)
 - State Scientific Research Institute of Organic Chemistry and Technology, Moscow, Russia (chemical)
 - State Scientific Institute of Immunological Engineering, Lyubuchany, Russia (biological)
 - State Research Center for Applied Microbiology, Obolensk, Russia (biological)
 - Central Aerohydrodynamic Institute, Zhukovsky, Russia (aeronautics/missile)

In selecting the 35 projects, we chose institutes that collectively did work in the four areas of proliferation concern. During our visits, we met with the institutes' directors and members of each project team. In many cases, we also toured the facilities where they conducted their work. Although we only selected projects to review that had received U.S. funds, in some cases other donors had also provided financial support.

We performed our work from December 2000 through April 2001 in accordance with generally accepted government auditing standards.

We are sending copies of this report to interested congressional committees and the Honorable Colin Powell, Secretary of State. Copies will also be made available to others upon request.

If you or your staff have any questions about this report, please contact me on (202) 512-4128. Another GAO contact and staff acknowledgments are listed in appendix II.

A handwritten signature in black ink that reads "Joseph A. Christoff". The signature is written in a cursive style with a large, stylized initial "J" and a long, sweeping tail on the "f".

Joseph A. Christoff, Director
International Affairs and Trade

Appendix I: Comments From the Department of State



United States Department of State

Chief Financial Officer

Washington, D.C. 20520-7427

APR 27 2001

Dear Ms. Westin:

We appreciate the opportunity to review your draft report, "WEAPONS OF MASS DESTRUCTION: State Department Oversight of Science Centers Program," GAO- 01-582, GAO Job Code 320010.

The enclosed Department of State comments are provided for incorporation with this letter as an appendix to the final report.

If you have any questions concerning this response, please contact Andrew A. Hood, Senior Coordinator--Science Centers Program, Office of Proliferation and Threat Reduction, Bureau of Nonproliferation, at (202) 736-7190.

Sincerely,


Larry J. Eisenhart
Acting

Enclosure:

As stated.

cc: GAO/IAT - Ms. Glod
State/OIG - Mr. Atkins
State/NP/PTR - Mr. Hood

Ms. Susan S. Westin,
Managing Director,
International Affairs and Trade,
U.S. General Accounting Office.

Department of State Comments on GAO Draft Report:
WEAPONS OF MASS DESTRUCTION: State Department Oversight
of Science Centers Program,
GAO-01-582, GAO Job Code 320010

Our review of the draft GAO report finds it technically accurate in most areas evaluated, and concurs with its major findings. However, the following comments are intended to clarify some of the issues (in bold type herein) raised in the report that -- if not portrayed accurately -- cast a negative tone on the State Department's and Science Centers' ability to effectively engage former Soviet weapons of mass destruction (WMD) scientists and confidently oversee U.S.-funded Science Center activities.

Majority of day-to-day project monitoring is performed by Russian and Ukrainian staff at the centers, not by the State Department. Currently, there is roughly one western senior project manager (U.S., Europe, Japan, ROK) to every two Russian senior project managers at the International Science and Technology Center (ISTC); the nine Science and Technology Center in Ukraine (STCU) project management staff are all Ukrainians. Further, the majority of these individuals are former Soviet weapons scientists who are now committed to the mission and nonproliferation objectives of the Science Centers. The cost-effectiveness of the Science Centers program to the United States is based on the ability of the science centers to employ local Russian and Ukrainian staff. To increase the non-NIS project management staff at either of the centers would entail a large increase in the administrative expense of the centers, to the detriment of engaging more WMD scientists through U.S.-funded projects.

More importantly, we are confident that the Russian, Ukrainian, and other NIS personnel are performing their assigned monitoring responsibilities and that there is adequate monitoring of all the Science Center projects for the following reasons:

- The local nationals follow financial and technical project monitoring procedures that are based on western practices; an external, western auditing corporation verifies compliance to these procedures each year;
- The majority of the two centers' Russian, Ukrainian, and other nationals from the newly independent states (NIS) are

supervised and overseen by U.S., European, Canadian, and Japanese managers (Eight of the ten senior management positions at the ISTC are held by U.S., EU, or Japanese staff);

- U.S.-contracted Defense Contract Auditing Agency (DCAA) financial and technical audits of selected U.S.-funded projects covers a sufficiently large sample to provide a high level of confidence that all U.S. funded projects are following the approved Project Agreement and workplan.
- Although the project monitoring/audit procedures call for 20-day advance notification of a visit (35 days for ISTC projects within the Russian closed nuclear cities), some element of surprise is maintained. For example, DCAA auditors are free to interview any of the project participants or request an inspection of project records or equipment while on site and without prior notification to institute officials.
- U.S. and European personnel fill the chief financial and procurement officer positions of both centers, ensuring that the control over project finances and Center-conducted project audits rest in non-NIS hands.
- All U.S.-funded projects have a U.S. scientific collaborator involved. Although the degree to which the U.S. collaborator is involved in a project varies, the State Department, in cooperation with the science centers, has been modifying the collaborator responsibilities to strengthen and improve the role of the U.S. collaborator as an active participant and monitor of the project.
- State Department officials, State-funded science advisors, and other USG officials/experts regularly make informal visits to Science Center projects to review progress. In addition, several scientifically qualified State Department officers participate in DCAA audits.

State Department does not have complete information on the percentage of weapon scientists engaged. The United States national security community has never established a definitive estimate of the total FSU WMD scientific population. This complicates our ability to objectively measure the percentage of this population being reached by the Science Centers. We believe, however, that the funds from the U.S., European Union,

Canada, Japan, South Korea, Norway, and Sweden have engaged a significant percentage of that population. Perhaps most important, it was never the mission of the centers to engage directly every single eligible scientist in Russia or the NIS. The centers have never been funded to this extent.

- The report states that U.S.-funded projects alone have engaged 9,700 senior weapon scientists since the Science Centers' inception, and currently engage 6,500 scientists as of March 1, 2001.
- Including the other funding parties contributions, the two science centers have engaged over 21,000 senior weapon scientists and nearly 40,000 weapons scientists and technicians overall.
- While there is no reliable U.S. estimate on the total FSU WMD scientific population, anecdotal evidence from Science Center contacts suggests that the two centers have engaged about one-half of that population. In addition, analysis of a number of high-priority institutes shows that 50% or more of the scientific staff is engaged in ISTC projects.
- This means we have provided a key outlet for scientific endeavor which, combined with other assistance as Russia's government advises, can keep the bulk of scientific talent in Russia occupied.

State Department's selection of projects, and consequently with the associated scientists, is limited to those approved by the scientists' national government. The State Department also has not been granted access to weapon scientists at key Russian Ministry of Defense biological research institutes. The national approval, or "host, government concurrence", is required by the multilateral ISTC and STCU Establishing Agreements. Host government concurrence is a critical element in maintaining the cooperation and participation of the NIS members in the centers; it ensures that proposed projects conform to the host government's legal requirements concerning technology transfer and protection of state secrets. Also, because the host governments do not vote on project approvals or funding, this step ensures that governments have a reasonable opportunity to review projects.

While the Russian Ministry of Defense (MOD) has not yet granted access to the cited biological institutes, the U.S. Department of Defense has the lead on this issue, engaging the

Russian MOD in a series of exchanges and site visits. Should DOD succeed in gaining U.S. access to the MOD biological institutes, the ISTC is in a good position to exploit that achievement by providing a platform for cooperative research relationships with the scientists in these MOD biological institutes.

State Department does not have complete information on the activities of these WMD scientists outside of their Science Center activities. The mandate of the Science Centers Program is to engage WMD scientists in peaceful research activities and aid in their integration into the international scientific and commercial market communities. This mandate, codified in the ISTC and STCU Establishing Agreements, limits the practical involvement of the Science Centers in the WMD scientists' life to those times the scientist is receiving ISTC/STCU grants or is otherwise participating in ISTC/STCU activities. Through its valorization efforts and other activities, the Science Centers maintain contact with many alumni of the program. However, resources are not available to carry out an active outreach program with tens of thousands of scientists when they are not involved in an ISTC or STCU project/activity. It would require a renegotiation of the multilateral agreements with the other Parties (including the NIS members) and an enormous expansion of the Science Centers staff and operating budgets.

Furthermore, the State Department does maintain contact with current and past Science Center participants to varying degrees:

- According to the ISTC and STCU Agreements, the financing Parties have audit rights and access privileges to a project's documentation and scientists for 2 years after a project is completed. The U.S. has exercised this right through its DCAA-contracted audits.
- The vast majority of NIS institutes continue to maintain voluntary relationships with the Science Centers, and the U.S. government officials connected with the Science Centers program maintain contact with, and make periodic visits to, these institutes. This continuing contact provides many opportunities for discussions about the status and activities of the scientists at a particular institute, even if those scientists are not actively participating in a current Science Center activity.
- The Science Centers do not strive to fully employ all participating scientists; rather, the Science Centers try

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to engage as large and varied a population of WMD scientists as possible. To fully employ all former Soviet WMD scientists would be impractical from a scientific research point of view (i.e., not all scientific skills are needed 100% of the time), and prohibitively expensive from a Science Center and U.S. Science Center Program point of view. Nonetheless, the ISTC has reported that in 2000 alone, over 21,000 scientists and technicians worked for over 1.24 million person-days, or the equivalent of 5,670 person-years.

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Diana Glod, (202) 512-8945

Acknowledgments

In addition to the person named above, Joe Cook, Dave Maurer, and Valérie Nowak made key contributions to this report.

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