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May 2013

NUCLEAR NONPROLIFERATION

IAEA Has Made Progress in Implementing Critical Programs but Continues to Face Challenges

GAO-13-139

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GAO Highlights

Highlights of GAO-13-139, a report to congressional requesters

Why GAO Did This Study

IAEA plays a crucial role in supporting U.S. nuclear nonproliferation goals through its safeguards and nuclear security programs. The Department of State (State) coordinates the United States' financial and policy relationship with IAEA. IAEA's safeguards program is designed to detect and deter the diversion of nuclear material for non-peaceful purposes, while the agency's nuclear security program assists countries in improving the physical protection of their nuclear material and facilities. IAEA plans to create an international fuel bank to guarantee the supply of fuel for civilian nuclear power programs. GAO was asked to examine (1) any challenges that IAEA faces in carrying out its safeguards program, (2) any limitations regarding the nuclear security program, and (3) the status of IAEA's planned nuclear fuel bank. GAO reviewed relevant documents and interviewed officials from IAEA and U.S. federal agencies, 15 nuclear nonproliferation experts, and representatives from 16 countries.

What GAO Recommends

GAO recommends, among other things, that State work with IAEA to (1) clearly define and communicate how IAEA will implement the state-level concept, (2) evaluate the nuclear security program's long-term resource needs, and (3) prepare a plan for the long-term operation and funding of IAEA's fuel bank. State agreed with several of the recommendations and disagreed with two, including the one on the nuclear security program's long-term resource needs. GAO continues to believe that implementing all of these recommendations would enhance the efficiency and effectiveness of IAEA's programs.

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What GAO Found

The International Atomic Energy Agency (IAEA) has taken several steps to strengthen its safeguards program since GAO's 2005 report, including increasing the number of countries that are subject to a broader range of safeguards measures, upgrading its analytical laboratories, and producing its first long-term strategic plan. However, the agency faces two critical challenges in further improving the effectiveness and efficiency of the safeguards program. First, several countries have raised concerns about IAEA's plans to expand implementation of what it calls the "state-level concept" to all countries with safeguards agreements by 2014. The state-level concept is an approach in which the agency considers a broad range of information about a country's nuclear capabilities and tailors its safeguards activities in each country accordingly. IAEA officials told GAO that broader implementation of this approach would allow the agency to better allocate resources by reducing safeguards activities where there is no indication of undeclared nuclear activities and to focus its efforts on any issues of safeguards concern. However, IAEA has not clearly defined and communicated how it will implement the state-level concept. As a result, several countries are concerned that the state-level concept may be applied in a subjective, potentially discriminatory manner or that it could allow IAEA to be too intrusive into their civilian nuclear operations. Second, the agency has not quantified the resources it may need to fully implement the state-level concept—making it difficult to determine its long-term costs and benefits.

IAEA has continued to support countries' efforts to improve the security of their nuclear material and facilities, but three key issues limit the agency's ability to ensure that its nuclear security resources are used efficiently and effectively. First, IAEA's nuclear security program relies heavily on extra-budgetary contributions from donor countries, which makes it difficult to plan and implement projects, in part because these funds vary from year to year. Second, IAEA has not conducted a needs-based assessment of the resources required beyond its 2-year budget cycle, which also hinders its ability to ensure that resources are directed to the greatest security needs. Third, the extent to which IAEA is meeting its nuclear security goals is unclear because IAEA does not systematically report on the results of measures used to assess the performance of the agency's nuclear security program.

IAEA is making progress in establishing an international nuclear fuel bank by 2014 that is intended to provide eligible countries with a guaranteed supply of low enriched uranium (LEU) for civilian nuclear power programs in the event of a supply disruption. IAEA's fuel bank is not intended to provide a routine supply of LEU. However, several experts and foreign officials told GAO that the fuel bank's value is uncertain, causing some foreign officials to call it "a solution looking for a problem." For example, the fuel bank may never be used, in part because there are already several stable suppliers on the international nuclear fuel market. In addition, IAEA does not have a plan in place for the long-term operation and funding of the bank, although agency officials told GAO they intend to complete such a plan in 2013. Furthermore, the IAEA bank is one of several guaranteed, multilateral fuel supply options—including banks established by the United States and Russia—for countries seeking an assured supply of nuclear fuel.

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Abbreviations

DOE	Department of Energy
HEU	highly enriched uranium
IAEA	International Atomic Energy Agency
IPPAS	International Physical Protection Advisory Service
LEU	low enriched uranium
NNSA	National Nuclear Security Administration
NPT	Treaty on the Nonproliferation of Nuclear Weapons
USEC	United States Enrichment Corporation
U.S. Mission	U.S. Mission to the United Nations System Organizations in Vienna

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May 16, 2013

The Honorable Thomas R. Carper
Chairman
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Ron Johnson
Ranking Member
Subcommittee on Financial and Contracting Oversight
Committee on Homeland Security and Governmental Affairs
United States Senate

For more than half a century, the International Atomic Energy Agency (IAEA) has played a crucial role in supporting the nuclear nonproliferation goals of the United States and the international community through its safeguards and nuclear security programs.[1] IAEA's safeguards role—to detect and deter the diversion of nuclear material for non-peaceful purposes—is particularly relevant in light of major challenges that IAEA continues to face with Iran, Syria, and North Korea. IAEA has found these three countries to be in non-compliance with their obligations under their safeguards agreements with the agency, which are pursuant to the Treaty on the Nonproliferation of Nuclear Weapons (NPT). As a result, IAEA cannot provide assurance that there are no undeclared nuclear activities in these three countries. The NPT, which came into force in 1970, requires non-nuclear weapon states that are party to the treaty—countries that had not manufactured and detonated a nuclear device before January 1, 1967—to agree not to acquire nuclear weapons.[2] The NPT also requires these countries to subject all nuclear material used in

[1] IAEA is an autonomous international organization affiliated with the United Nations, established in Vienna, Austria, in 1957. The agency has the dual role of promoting the peaceful uses of nuclear energy by transferring nuclear science and technology through its nuclear science and applications and technical cooperation programs, and verifying, through its safeguards program, that nuclear material subject to safeguards is not diverted to nuclear weapons or other proscribed purposes.

[2] Under Article II of the NPT, each non-nuclear weapon state party agrees, among other things, not to receive any transfer whatsoever of nuclear weapons or other nuclear explosive devices; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

peaceful activities to IAEA safeguards.[3] As of April 2013, 184 non-nuclear weapon states and 5 nuclear weapon states—China, France, Russia, the United Kingdom, and the United States—were parties to the NPT.[4]

In implementing the safeguards agreements required by Article III of the NPT, IAEA carries out several important safeguards activities to deter the proliferation of nuclear weapons and to ensure that nuclear material and facilities are used exclusively for peaceful purposes. As of December 2011, IAEA reported that 1,209 nuclear facilities and other locations outside such facilities containing significant quantities of nuclear material were subject to safeguards activities.[5] To carry out its safeguards activities, IAEA inspectors and analysts collaborate to verify that the quantities of nuclear material that non-nuclear weapon states have formally declared to the agency are correct and complete and have not been diverted for the manufacture of nuclear weapons, other nuclear explosive devices, or for unknown purposes. Most countries have negotiated an agreement with IAEA known as a comprehensive safeguards agreement, which covers all of their civilian nuclear activities and serves as the basis for the agency's safeguards activities. Specifically, IAEA's safeguards activities include on-site inspections, environmental sampling,[6] remote monitoring, analysis of commercial satellite imagery, and analysis of publicly available (open source) documents. In addition, the agency installs containment and surveillance measures, such as video cameras, to detect the movement of nuclear

[3] Under Article III of the NPT, each non-nuclear weapon state party agrees, among other things, to accept IAEA safeguards on all source or special fissionable material in all peaceful nuclear activities within the territory of such state, under its jurisdiction, or carried out under its control anywhere.

[4] Under Article IV of the NPT, all parties undertake, among other things, to facilitate the exchange of peaceful nuclear technology. Parties in a position to do so must cooperate in contributing to the development of nuclear energy for peaceful purposes, especially in the territories of non-nuclear weapon states. Under Article I, each nuclear weapon state undertakes, among other things, not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices.

[5] These nuclear facilities and other locations outside facilities included, among other things, power reactors, reprocessing plants, and enrichment plants and were located in 107 countries, plus Taiwan. As a United Nations-affiliated organization, IAEA does not officially recognize Taiwan as a state; however, IAEA applies safeguards there.

[6] IAEA inspectors collect environmental samples from nuclear facilities and other locations, and IAEA's safeguards analytical laboratories analyze these samples to detect traces, if any, of undeclared nuclear material.

material and any tampering with agency equipment; as of November 2012, IAEA had installed 27,000 tamper-proof seals and about 1,200 cameras at nuclear facilities around the world. Pursuant to their safeguards agreements with IAEA, individual countries are obligated to implement specific safeguards activities, which vary from country to country based on the amount and type of nuclear material a country possesses and the type of nuclear facilities and fuel cycle activities a country operates. However, IAEA relies on the cooperation of individual countries for certain safeguards activities that are not legal obligations under safeguards agreements, such as granting IAEA permission to conduct remote monitoring, which may be domestically sensitive. On an annual basis, IAEA draws a conclusion for each country about whether a country is compliant with its safeguards agreement. Specifically, IAEA draws a conclusion for a given year regarding whether a country's declared nuclear material remained in peaceful activities and, where applicable, that there are no indications of undeclared nuclear material or activities.

In addition to its safeguards activities, IAEA's nuclear security work also plays an important role internationally. IAEA's nuclear security program—which assists countries in enhancing the physical protection, control, and accounting of their nuclear and radiological material and nuclear facilities—has assumed a higher profile since the September 11, 2001, terrorist attacks on the United States. Whereas IAEA's nuclear security program was previously housed within the Department of Safeguards, in 2002 IAEA created its Office of Nuclear Security within the Department of Nuclear Safety and Security. Since then, IAEA's role in nuclear security has grown, in concert with increased international efforts to strengthen nuclear security. For example, in March 2012, world leaders from more than 50 countries and international organizations met in Seoul, South Korea, for the second Nuclear Security Summit, where they renewed their political commitment to work toward strengthening nuclear security. To assist countries in strengthening nuclear security, IAEA offers, among other things, a variety of training courses that draw upon international obligations, recommendations, guidelines, and best practices.

To complement the agency's efforts in its safeguards and nuclear security programs, IAEA's Board of Governors—which provides overall policy direction and oversight—approved the creation of an international nuclear fuel bank in December 2010. This fuel bank is intended to provide a

guaranteed supply of low enriched uranium (LEU) for civilian nuclear power in the event of a supply disruption; it is not intended to provide a routine supply.[7] As such, the establishment of an IAEA-owned and operated nuclear fuel bank is also intended to offer countries an alternative to developing their own indigenous fuel supplies, as the use of sensitive nuclear fuel enrichment technologies to develop fuel could also be used for a clandestine nuclear weapons program. Kazakhstan has volunteered to serve as the host state of the fuel bank.

In 2011, IAEA reported a regular budget of $433.1 million, of which the United States contributed $111.1 million, making it the largest contributor.[8] IAEA also reported receiving $317.3 million in 2011 in extra-budgetary cash contributions that a number of countries provided on a voluntary basis, in addition to their contributions to the agency's regular budget. According to the Department of State (State), the United States contributed $78 million in extra-budgetary cash contributions to the agency's various programs that year. The United States has a strong interest in IAEA's safeguards and nuclear security activities, as well as its implementation of the international nuclear fuel bank. We last reviewed IAEA's safeguards and nuclear security programs in 2005 and found a number of issues that limited the effectiveness and efficiency of the agency's efforts.[9] We recommended, among other things, that State—which coordinates the United States' financial and policy relationship with IAEA—work with IAEA to consider (1) eliminating or reducing the number of agreements that limit IAEA's authority to implement strengthened safeguards measures in countries with small quantities of nuclear material, (2) developing a systematic process that forecasts safeguards budgetary requirements and resources for the long-term, and (3) establishing better measures to evaluate the effectiveness of nuclear security activities. State agreed with these recommendations and has worked with IAEA to implement some of them. In this context, you asked

[7] LEU is uranium that contains the isotope uranium 235 in a concentration of less than 20 percent and greater than 0.7 percent. Most commercial reactor fuel is enriched to between 3 percent and 5 percent or less of uranium 235.

[8] Throughout this report, we used the exchange rate of $1.3893 = €1.00, as listed in IAEA's annual report for 2011, to convert IAEA budget figures from euros to U.S. dollars.

[9] GAO, *Nuclear Nonproliferation: IAEA Has Strengthened Its Safeguards and Nuclear Security Programs*, *but Weaknesses Need to Be Addressed*, GAO-06-93 (Washington, D.C.: Oct. 7, 2005).

us to update information on the IAEA safeguards and nuclear security programs, as well as provide information regarding the status of the international nuclear fuel bank program. Accordingly, our objectives were to examine (1) changes that have occurred since 2005 and challenges, if any, that IAEA faces in carrying out its safeguards program; (2) changes that have occurred since 2005 and limitations, if any, regarding IAEA's nuclear security program; and (3) the status of IAEA's planned nuclear fuel bank.

To address these objectives, we reviewed documents from IAEA, including the agency's biennial program and budget documents, annual reports, and long- and medium-term strategic plans. We also interviewed IAEA officials in Vienna, Austria, who are knowledgeable about the agency's safeguards, nuclear security, and fuel bank programs. In addition, we collected documents from and interviewed officials from State, the Department of Energy's National Nuclear Security Administration (NNSA),[10] and national laboratories. We also interviewed officials from a nonprobability sample of 16 countries—Brazil, Canada, Chile, China, France, Germany, India, Israel, Japan, Pakistan, Russia, South Korea, Turkey, the United Arab Emirates, the United Kingdom, and the United States—to obtain their views on all three programs.[11] We selected this diverse range of countries based on a number of factors, including, among other things, their civilian nuclear power capabilities, geographic location, and NPT status as nuclear weapon or non-nuclear weapon states. We also interviewed a nonprobability sample of 15 nuclear nonproliferation experts, including 4 former senior IAEA officials, for their knowledge of IAEA's safeguards, nuclear security, and/or fuel bank programs. We selected these experts based on several factors, including their recent prior work at IAEA, their relevant work at academic institutions or nongovernmental organizations, or referrals from other

[10] NNSA is a separate, semi-autonomous agency within the Department of Energy, with responsibility for the United States' nuclear weapons and nonproliferation programs, among other things. NNSA conducts its activities at headquarters and at research and development laboratories, production plants, and other facilities. NNSA also provides technical assistance to IAEA's safeguards and nuclear security programs.

[11] Results from nonprobability samples cannot be used to make inferences about a population, because in a nonprobability sample, some elements of the population being studied have no chance or an unknown chance of being selected as part of the sample. However, the results of such a sample can provide examples of individual countries' views of the three IAEA programs.

nuclear nonproliferation experts.[12] Throughout this report, we distinguish between statements made by the U.S. Mission to the United Nations System Organizations in Vienna (U.S. Mission) and the 15 other countries (foreign missions), and we use the term "some" when referring to two or three experts or countries and "several" when referring to four or more experts or countries. To assess the reliability of budget data related to IAEA's safeguards, nuclear security, and fuel bank programs, we compared data from different published sources, including the *Federal Register*, and we met with IAEA and U.S. officials to discuss these data in detail. Based on this work, we determined that data provided by IAEA and State to be sufficiently reliable for presenting funding information for the safeguards, nuclear security, and fuel bank programs. Appendix I provides a more detailed discussion of our objectives, scope, and methodology.

We conducted this performance audit from January 2012 to April 2013 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

This section outlines IAEA's structure, budget, and the safeguards, nuclear security, and fuel bank programs.

IAEA Structure

IAEA's governing bodies include the General Conference, composed of representatives of 159 countries that contribute to IAEA's budget (member countries)[13] and the 35-member Board of Governors, of which the United States is a de facto permanent member. A Secretariat, headed

[12] Although the information from such a sample cannot be generalized to all such experts, it can provide illustrative examples.

[13] Throughout this report, we use the term "countries" to refer to states recognized by the United Nations. Although nearly all of IAEA's 159 member countries are party to the NPT and are thus subject to its safeguards requirements, IAEA membership is not a prerequisite for a country being a party to the NPT, nor is being a party to the NPT a requirement for membership in the agency. IAEA may implement safeguards in member and non-member countries that are party to the NPT.

by the Director General, is responsible for implementing the policies and programs of the General Conference and Board of Governors. U.S. policy regarding the agency is developed by an interagency process chaired by State. The U.S. Mission works closely with State in Washington, D.C., to promote the effective functioning of the agency, including management reform.

IAEA Budget

IAEA funds its programs primarily through (1) its regular budget, for which all member countries are assessed,[14] and (2) extra-budgetary cash contributions. In 2011, IAEA reported that its regular budget was $433.1 million, of which the safeguards program budget comprised $166.1 million and the nuclear security program comprised $5.3 million. The agency also receives extra-budgetary cash contributions from certain member countries, particularly the United States, and other donors on a voluntary basis, in addition to the agency's regular budget and to meet critical needs.[15] For example, in 2011, IAEA reported that the safeguards program received $39.3 million, and the nuclear security program received $25 million, in extra-budgetary cash contributions. Of these amounts, the United States made extra-budgetary cash contributions of $24.8 million and $13.4 million to these programs, respectively. (See table 1.) The agency has not used any regular budget funding for the fuel bank program but has received $159.4 million in extra-budgetary cash contributions and pledges toward the establishment of the fuel bank, of which the U.S. government contributed nearly $50 million in 2008, the largest single-country donation to the fuel bank.

[14] Assessed contributions are payments made as part of the obligations that countries undertake as members of the United Nations. The current payment structure for assessed contributions to IAEA is based on the United Nations scale of assessment, adjusted for membership, with a maximum rate (25 percent) and a minimum rate (.001 percent). The scale for IAEA also includes a slight premium to cover the costs of the nuclear safeguards program. For 2012, the U.S. assessment scale rate for IAEA was 25.6 percent.

[15] In addition, a number of member countries make in-kind contributions, such as equipment and expert services, to the agency's various programs on a voluntary basis. For instance, according to State, the United States provided $12.7 million in in-kind assistance to IAEA's safeguards program in 2011, including $2.3 million for environmental sample analysis.

Table 1: IAEA Safeguards and Nuclear Security Programs Budget for 2011

Dollars in millions

Program	Regular budget, as reported by IAEA	Extra-budgetary cash contributions, as reported by IAEA	U.S. extra-budgetary cash contributions, as reported by State
Safeguards program	$166.1	$39.3	$24.8[a]
Nuclear security program	$5.3	$25.0	$13.4[b]

Source: GAO presentation of IAEA and State budget data.

Note: Regular budget and extra-budgetary cash contributions were calculated at the average exchange rate used by the United Nations in 2011 of $1.3893 to €1.00.

[a] This figure includes extra-budgetary cash contributions from State ($24.2 million) and NNSA ($0.6 million).

[b] This figure includes extra-budgetary cash contributions from State ($7.0 million), NNSA ($6.1 million), and the Department of Homeland Security ($0.3 million).

IAEA has operated under a "zero-real-growth" budget policy environment for over 27 years,[16] which has generally caused IAEA's programs to experience minimal budgetary growth from year to year and to seek efficiencies on an ongoing basis. For example, IAEA reported in 2011 that inspectors spent fewer days in the field for certain safeguards activities, and the frequency of inspections was reduced, compared with the prior year. According to IAEA officials, those cost savings were offset by other measures to optimize safeguards activities, such as through remote monitoring or unannounced, random inspections.

Safeguards Program

IAEA derives its authority to establish and administer safeguards from its statute, the NPT and regional nonproliferation treaties, bilateral commitments between countries, and project agreements with countries. Article III of the NPT binds each of the treaty's 184 non-nuclear weapon state parties to conclude an agreement with IAEA that applies safeguards to all source and special fissionable material in all peaceful nuclear

[16] In 1985, the United Nations imposed a policy of "zero real growth" in an effort to stem the upward growth of budgets and to improve the efficiency of the United Nations system across the board. The term "zero real growth" is defined as no growth in the budget beyond that needed to compensate for inflation.

activities within the state's territory, under its jurisdiction, or carried out anywhere under its control.[17]

IAEA's safeguards objectives, as traditionally applied, are to account for the amount of special fissionable material necessary to produce a nuclear weapon, and the time it might take a country to divert this material from peaceful use and produce a nuclear weapon. IAEA attempts to meet these objectives by using a set of activities by which it seeks to verify that nuclear material subject to safeguards is not diverted to nuclear weapons, other proscribed purposes, or for unknown purposes. For example, IAEA inspectors visit a facility at certain intervals to ensure that any diversion of nuclear material is detected before a country using that material has had time to produce a nuclear weapon. IAEA also uses "material accounting" measures to verify quantities of nuclear material declared to the agency and any changes in the quantities over time.

The safeguards program has evolved over the past two decades as IAEA has made several efforts to strengthen its effectiveness and efficiency. Starting in the early 1990s, in response to the 1991 discovery of a clandestine nuclear weapons program in Iraq, IAEA made a radical departure from its past practice of generally verifying only the peaceful use of a country's declared nuclear material at declared facilities; at that time, IAEA expanded its safeguards efforts to detect potentially undeclared nuclear activities as well. Specifically, through its Department of Safeguards, the agency began exercising its existing authority under safeguards agreements with individual countries to obtain additional information about their nuclear and nuclear-related activities. However, IAEA recognized that these additional measures were not adequate. As a result, in 1997 the Board of Governors approved what it called the "Model Additional Protocol" (Additional Protocol)—which, when ratified or otherwise brought into force by a country, requires that country to provide the agency with a broader range of information on its nuclear and nuclear-related activities. It also gives the agency's inspectors access to an expanded range of declared activities and locations, including buildings at nuclear sites, and locations where undeclared activities may be suspected. A country agrees separately to an Additional Protocol,

[17] Source material includes natural uranium, depleted uranium, and thorium; special fissionable material includes plutonium-239, uranium-233, and enriched uranium.

which supplements the country's existing safeguards agreement with IAEA.

At the time of our 2005 report, IAEA's safeguards program was in the process of strengthening its capability to independently evaluate all aspects of a country's nuclear activities through broader inspector access, collecting and analyzing environmental and nuclear material samples to verify that countries' nuclear material declarations are correct and complete, and analyzing open source information.[18] In addition, we reported that IAEA was trying to improve the efficiency of its efforts by applying a broader analytical approach—called "integrated safeguards"—that could result in reduced inspections in those countries that had a proven record of compliance with their safeguards obligations. The concept of the integrated safeguards approach was for inspectors to expand on the traditional material accountancy approach by being "less checklist-oriented" and more analytical and, therefore, comprehensive in their country evaluations. IAEA's implementation of integrated safeguards, however, is applicable only to countries that have both a comprehensive safeguards agreement and an Additional Protocol in force and for which IAEA has been able to draw a "broader conclusion." A broader conclusion means that, for a given year, a country has demonstrated that all declared nuclear material remained in peaceful activities and there are no indications of undeclared nuclear activities. In our 2005 report, we also found that another safeguards protocol that applies to countries with small quantities of nuclear material—called the small quantities protocol—limited IAEA's ability to detect undeclared nuclear material or activities.[19] Specifically, this protocol holds in abeyance certain safeguards measures as long as a country meets specific eligibility requirements. Countries may request that the small quantities protocol, which is subject to Board of Governors approval, supplement their comprehensive safeguards agreement.

[18] GAO-06-93.

[19] Under the small quantities protocol, the reference to small quantities of nuclear material means, among other things, up to 1 kilogram of special fissionable material, 10 metric tons of natural uranium and depleted uranium with an enrichment level above 0.5 percent, 20 metric tons of natural uranium and depleted uranium with an enrichment level of 0.5 percent or below, and 20 metric tons of thorium.

Nuclear Security Program

According to IAEA's *Nuclear Security Plan 2010-2013*, the risk that nuclear or other radioactive material could be used in malicious acts remains high and is regarded as a serious threat to international peace and security. For example, since the creation of IAEA's Incident and Trafficking Database in 1995 (formerly called the Illicit Trafficking Database), member countries have reported over 2,300 incidents involving nuclear and other radioactive materials detected outside of regulatory control, including incidents of illicit trafficking. IAEA also projects a net increase in the number of nuclear reactors in operation by 2030. As a result, IAEA has augmented its efforts for countries that request its assistance in protecting their nuclear and radiological materials and facilities.[20] As we previously reported, in the hands of terrorists, these materials could be used to produce a simple and crude but potentially dangerous weapon, known as a dirty bomb, by packaging explosives with the radioactive material for dispersal. Through its Office of Nuclear Security, IAEA provides advisory services to member countries to establish the necessary infrastructure to protect nuclear and other radioactive materials from theft and diversion, protect nuclear installations and transport against sabotage and other malicious acts, and combat illicit trafficking in nuclear and other radioactive materials. IAEA also disseminates information about procedures for dealing effectively with nuclear threats through international conferences, training courses, and security guidance publications. In addition, IAEA assists member countries in implementing nuclear security measures at major public events, such as the 2011 Pan American Games in Mexico and the 2012 European Football Championship in Poland and Ukraine.

Fuel Bank Program

IAEA's international nuclear fuel bank is a relatively new program, in contrast to the safeguards and nuclear security programs. The purpose of the fuel bank is not to provide a routine supply of LEU fuel but to guarantee an international supply for civilian nuclear power in the event of

[20] Radiological material—encapsulated in steel or titanium and called a sealed source—is commonly found in equipment used by hospitals and medical facilities to treat cancer patients, among other things. See GAO, *Nuclear Nonproliferation: Additional Actions Needed to Improve Security of Radiological Sources at U.S. Medical Facilities*, GAO-12-925 (Washington, D.C.: Sept. 10, 2012). Radiation detection equipment is installed at border crossings and ports of entry, such as seaports and land border crossings to prevent nuclear smuggling. See GAO, *Combating Nuclear Smuggling: DHS Has Developed Plans for Its Global Nuclear Detection Architecture, but Challenges Remain in Deploying Equipment*, GAO-12-941T (Washington, D.C.: July 26, 2012).

a supply disruption. As specified by the agency's Board of Governors, the fuel may be purchased on a non-discriminatory, non-political basis by IAEA member countries that are meeting their nonproliferation obligations with the agency. These obligations include having a comprehensive safeguards agreement in force. The fuel bank is also meant to provide countries with a "credible alternative" to the pursuit of sensitive nuclear fuel enrichment activities that employ the same technology that can be used to produce nuclear material for nuclear weapons. One of the Board of Governors' conditions for the fuel bank is that it not disrupt the international nuclear fuel market. Funding for the fuel bank has come from private and public sources. In addition to the U.S. government's extra-budgetary cash contribution of nearly $50 million, a Washington, D.C.-based nongovernmental organization—the Nuclear Threat Initiative—has provided $50 million,[21] and other donors have collectively contributed or pledged nearly $60 million.[22] In December 2010, IAEA's Board of Governors approved the establishment of the fuel bank with the support of 28 of the 35 board members, including the United States.

IAEA Has Strengthened Its Safeguards Program in Recent Years, but Challenges May Limit Efforts to Further Improve Effectiveness

IAEA has taken four key steps to strengthen its safeguards program since we last reported on this in 2005: (1) successfully encouraged more countries to bring an Additional Protocol into force, giving IAEA expanded authority and tools to detect undeclared nuclear activities; (2) increased the number of countries subject to a broader range of safeguards measures; (3) started to upgrade its safeguards analytical laboratories in Austria with new equipment and facilities; and (4) produced its first long-term strategic plan for the Department of Safeguards to formally identify program objectives and goals. IAEA plans to further improve the effectiveness and efficiency of the safeguards program by expanding implementation of the "state-level concept" to all countries with safeguards agreements by 2014. The state-level concept is an approach in which the agency considers a broad range of information about a country's nuclear capabilities and tailors its safeguards activities in each country accordingly. However, several member countries have raised

[21] The Nuclear Threat Initiative is a nongovernmental organization focused on strengthening global security by preventing the spread of nuclear, biological, and chemical weapons.

[22] As of April 1, 2013, IAEA reported that the agency had received contributions or pledges to IAEA's nuclear fuel bank from the European Union ($34.7 million), Kuwait ($10 million), the United Arab Emirates ($10 million), and Norway ($5 million).

concerns about the state-level concept that may hinder broader implementation. In addition, the agency has not quantified the resources that it may need to expand implementation of the state-level concept, making it difficult to determine the associated long-term costs and benefits.

More Countries Have Concluded an Additional Protocol, Giving IAEA Expanded Authority

Since 2005, 46 more countries have brought an Additional Protocol into force, which gives IAEA greater authority and tools to search for undeclared nuclear facilities and activities. Specifically, 119 countries had concluded an Additional Protocol as of the end of December 2012, compared with 73 countries at the end of December 2005.[23] Moreover, since our 2005 report, the United States and Russia were the last of the five nuclear weapon states to bring an Additional Protocol into force, which agency officials told us has helped make IAEA's outreach efforts to encourage other countries to conclude an Additional Protocol more effective and credible.[24] As a result of more countries bringing an Additional Protocol into force, IAEA has significantly increased the number of countries for which the agency has been able to draw broader conclusions about both declared and undeclared activities over the past 7 years. In 2011, IAEA drew broader conclusions for 58 non-nuclear weapon states, and evaluations regarding the absence of undeclared nuclear material were still ongoing for the other 51 countries that had both comprehensive safeguards agreements and Additional Protocols in force at that time.[25] By comparison, at the end of 2005, IAEA had drawn broader conclusions for 24 non-nuclear weapon states and had such evaluations in progress for 46 other countries. A broader conclusion refers to the agency's determination that, for a given year, a country has demonstrated that all declared nuclear material remained in peaceful

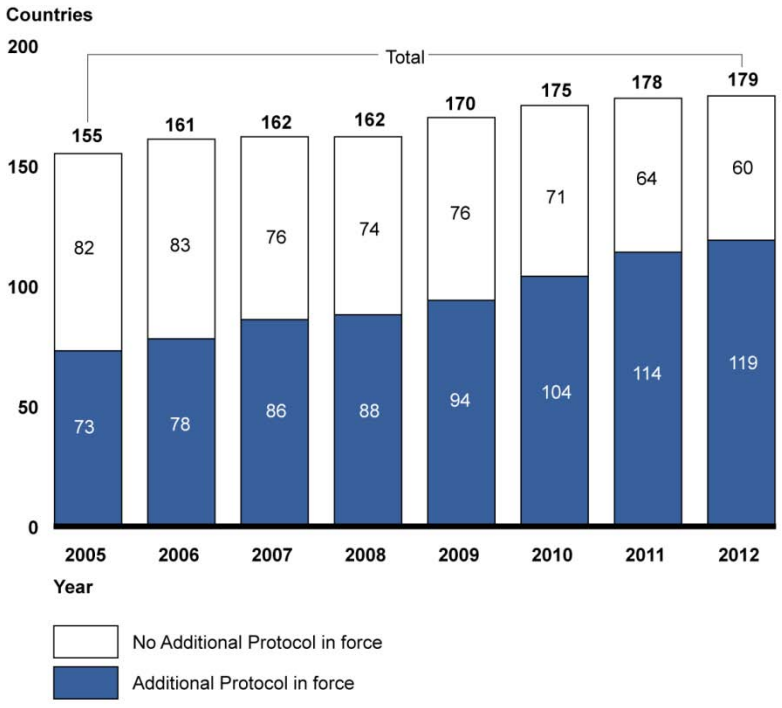
[23] In addition, Taiwan has implemented the measures of the Model Additional Protocol since October 1999. As noted earlier, IAEA does not officially recognize Taiwan as a state but applies safeguards there.

[24] For more information on U.S. efforts regarding the Additional Protocol, see *Managing Sensitive Information: Actions Needed to Prevent Unintended Public Disclosures of U.S. Nuclear Sites and Activities*, GA0-10-251 (Washington, D.C.: Dec. 15, 2009).

[25] IAEA typically takes several years to reach an initial broader conclusion for a given country and thereafter reevaluates the conclusion on an annual basis. Although the five nuclear weapon states have Additional Protocols in force, IAEA cannot draw broader conclusions for the nuclear weapon states because they have more limited safeguards agreements in force, rather than comprehensive safeguards agreements.

activities and there are no indications of undeclared nuclear activities. IAEA can draw a broader conclusion only for those countries that have both a comprehensive safeguards agreement and an Additional Protocol in force. By contrast, without an Additional Protocol in force, the agency cannot provide credible assurances regarding the absence of undeclared nuclear material and activities in the country as a whole. In such cases, IAEA reports its conclusion for a given year only with respect to whether declared nuclear material remained in peaceful activities. Figure 1 shows the number of countries with or without an Additional Protocol in force, by year, from 2005 through 2012. Appendix II lists the status of countries with safeguards agreements and an Additional Protocol in force as of the end of December 2012.

Figure 1: Countries with or without an Additional Protocol in Force, from 2005 through 2012



Source: GAO presentation of IAEA data.

Note: The total number of countries with or without an Additional Protocol in force from 2005 through 2012 reflects the number of countries that had safeguards agreements in force with IAEA during those years. Data do not include North Korea, as IAEA has not been able to conduct all necessary safeguards activities in that country since 1994. Data also do not include Taiwan, although Taiwan has had a safeguards agreement in force since 1969 and has implemented the measures of the Model Additional Protocol since October 1999.

To encourage more countries to bring an Additional Protocol into force, the agency continued to implement a plan of action, developed in 2001 and updated every year, by intensifying its efforts to conclude Additional Protocols, especially with countries that have significant nuclear activities. In particular, IAEA has continued its efforts to hold training events and workshops at the national, regional, and international levels with countries to explain what their obligations would be under an Additional Protocol. For example, the agency held four outreach events in 2011, including a regional seminar for southeast Asian countries with significant nuclear activities and a number of bilateral briefings in New York and Geneva.

While universal adoption of the Additional Protocol remains a goal for the agency, many countries have not brought it into force. According to a public statement by the Head of IAEA's Department of Safeguards, of the 60 countries with safeguards agreements that have not concluded an Additional Protocol as of December 2012, 7 are engaged in significant nuclear activities: Algeria, Argentina, Brazil, Egypt, Iran, Syria, and Venezuela. Of those seven countries, Algeria received approval from IAEA's Board of Governors for an Additional Protocol in September 2004 but has not signed it or brought it into force, Iran signed an Additional Protocol in December 2003 but has not brought it into force, and the other countries have taken no official action concerning an Additional Protocol.[26] As we reported in 2005, some countries may be hesitant to conclude an Additional Protocol due to (1) concerns about the financial costs associated with it; (2) an unwillingness to submit to an intrusive inspection regime; (3) their inadequate regulatory systems to collect information on all nuclear-related activities; or (4) political factors, such as the policies of neighboring countries or the time needed for national legislatures to approve an Additional Protocol. For instance, Brazil has continued to take the position that an Additional Protocol does not need to be universally applied to all countries and that inspections and IAEA requests for information are overly intrusive. Brazil has also stated that it will not undertake further nonproliferation obligations, including adoption of the Additional Protocol, until progress has been made by nuclear weapon states on disarmament. In addition, Egypt will not bring an Additional Protocol into force until Israel signs the NPT, concludes a comprehensive safeguards agreement, and implements an Additional Protocol.

[26] GAO-06-93.

IAEA Has Increased the Number of Countries That Are Subject to a Broader Range of Safeguards Measures

Since our 2005 report, IAEA has (1) tightened the terms and conditions of a protocol brought by many countries into force concerning small quantities of nuclear material and (2) increased the number of countries that have comprehensive safeguards agreements in force. As a result, the agency has increased the number of countries to which it applies a broader range of safeguards measures. Specifically, in September 2005, IAEA's Board of Governors approved revisions to the text of the small quantities protocol that, when in force, holds in abeyance certain safeguards measures as long as a country meets specific eligibility requirements. As revised in 2005, the small quantities protocol is no longer available to a country with either an existing or planned nuclear facility, and it has reduced the number of safeguards measures held in abeyance. For example, the revised small quantities protocol obligates countries to make initial declarations to IAEA on the nuclear materials they hold, no matter how small, and reinstates the agency's right to conduct ad hoc and special inspections. Since 2005, IAEA has worked with countries to voluntarily amend or rescind their original small quantities protocols to increase the agency's ability to detect undeclared nuclear material or activities. As of the end of December 2012, 46 countries had brought the revised small quantities protocol into force, including 34 countries that amended their original small quantities protocols to reflect the revised text; 4 countries had rescinded their original small quantities protocols; and 52 countries still had the original small quantities protocol in force. (App. II lists the status of countries with small quantities protocols in force as of December 2012.) By contrast, as of July 2005, 76 countries had the original small quantities protocols in force.

In addition, IAEA has continued to promote the importance of comprehensive safeguards agreements through seminars, briefings, and other outreach efforts—resulting in 24 more countries bringing such agreements into force since our 2005 report. Specifically, as of December 2012, 171 of the 184 non-nuclear weapon state parties to the NPT had brought comprehensive safeguards agreements into force,[27] compared with 147 countries at the end of 2005. The NPT requires non-nuclear weapon states to conclude comprehensive safeguards agreements within

[27] The 13 non-nuclear weapon states that had not brought comprehensive safeguards agreements into force as of the end of December 2012 were: Benin, Cape Verde, Djibouti, Equatorial Guinea, Eritrea, Guinea, Guinea-Bissau, Liberia, Micronesia, Sao Tomé & Principe, Somalia, Timor-Leste, and Vanuatu.

18 months of becoming a party to it.[28] However, as we previously reported, IAEA officials have indicated that several countries have not yet brought such agreements into force because they consider it to be a low priority compared with other national priorities or because of other factors.

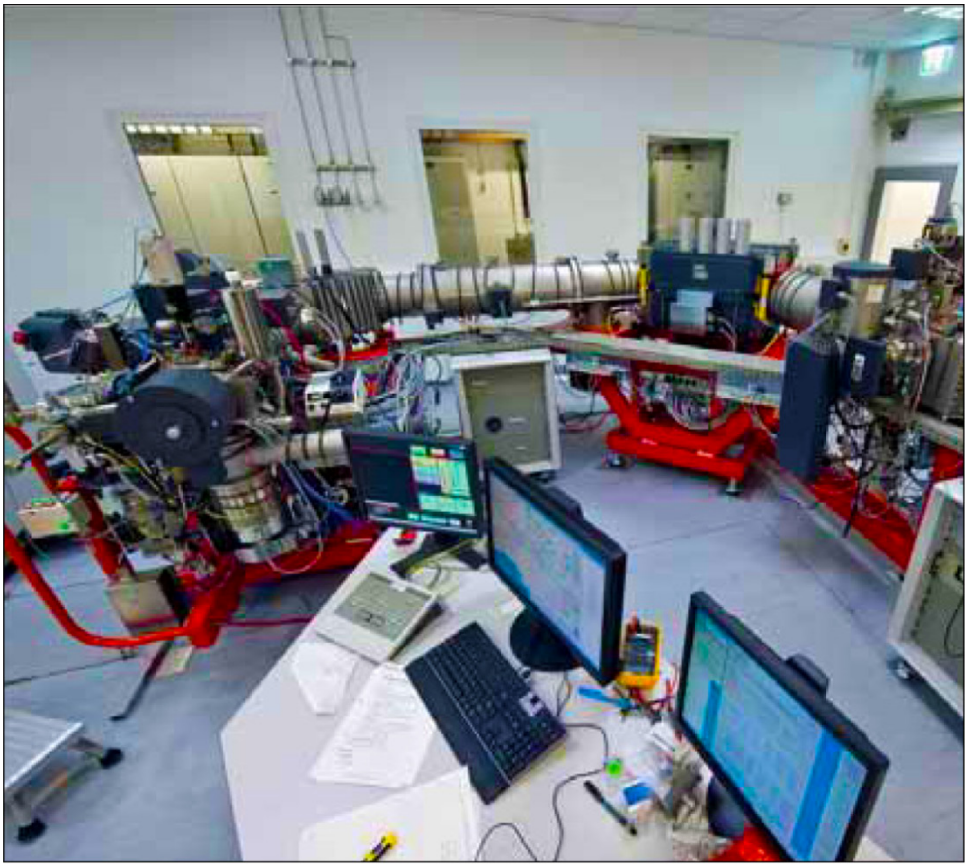
IAEA Has Started to Upgrade Its Safeguards Analytical Laboratories

To strengthen its capabilities to provide independent and timely analysis of environmental and nuclear material samples, IAEA embarked on an estimated $112 million project in 2007 to upgrade its safeguards analytical laboratories in Seibersdorf, Austria, with new equipment and facilities. These improvements are expected to result in higher-quality and faster analyses of samples collected by IAEA inspectors, particularly as the agency anticipates that its workload will rise with a projected expansion of civilian nuclear power in the next 30 years. As one of its measures to verify that countries' nuclear material declarations are correct and complete, the agency relies on its facilities in Seibersdorf and other laboratories in a global network to analyze hundreds of samples annually. The modernization of IAEA's Seibersdorf laboratories is the largest capital improvement project the agency has ever undertaken. IAEA's public statements indicate that the project has involved forecasting and defining analytical and infrastructure needs, designing the laboratories, and site infrastructure and security improvements. In the first phase of this two-phase project, the agency expanded its Environmental Sample Laboratory in 2011 and installed additional equipment to enhance its ability to detect undeclared nuclear material or activities. According to IAEA, this equipment is capable of finding "a needle in a haystack" by measuring minute particles of uranium found in environmental samples. Figure 2 shows the upgraded equipment in service at IAEA's newly expanded Environmental Sample Laboratory. In addition, when we visited the laboratory in June 2012, IAEA officials told us that the newly expanded facilities will significantly help prevent potential contamination of samples, which was a concern at the older facilities due to cramped

[28] For nuclear weapon states and for countries that are not party to the NPT, IAEA has more limited safeguards agreements. In particular, the agency has limited information concerning nuclear activities in North Korea, which withdrew from the NPT in January 2003. In addition, IAEA has limited information and authority concerning nuclear activities in the five nuclear weapon states (China, France, Russia, the United Kingdom, and the United States) and three countries that are not parties to the NPT (India, Israel, and Pakistan). Specifically, safeguards are implemented in selected nuclear facilities in the five nuclear weapon states, and the three non-NPT party countries have only item-specific safeguards agreements in force and no Additional Protocol in force.

workspace and inadequate air filtration. In the project's second phase, construction for a new facility to house IAEA's Nuclear Material Laboratory in Seibersdorf began in 2012 and is scheduled for completion in 2014.

Figure 2: Upgraded Equipment at IAEA's Environmental Sample Laboratory in Seibersdorf, Austria



Source: © May 2011 Klaus Gaggl, IAEA.

Although the project is being partially funded by the agency's regular budget ($32 million through 2013), IAEA also solicited and received significant extra-budgetary contributions from several member countries and the European Commission. As of early December 2012, the United States was the biggest donor, having contributed $21.0 million, and other

donors had collectively pledged or contributed $30.1 million.[29] At that time, the agency planned to receive another $11.9 million in funding and still needed to raise $17.3 million to complete the project. Some experts told us the agency had made a compelling case for the project by demonstrating the need to member countries to replace facilities and equipment that were outdated and deteriorating, putting the agency's ability to provide independent and timely analysis at risk.

In addition to modernizing its Seibersdorf facilities, IAEA has continued its efforts to increase the number of laboratories it has qualified to be part of its global Network of Analytical Laboratories. The expansion of the network is intended to improve the agency's capacity to handle environmental and nuclear material samples and reduce processing times. The agency typically relies on two network laboratories to analyze a given sample to ensure accuracy, based on consistent results. In 2005, we reported that the network was being used beyond its capacity, resulting in untimely processing and reporting of results—averaging 2 to 3 months and sometimes taking as long as 6 months. At that time, in addition to the agency's own laboratories, there were 15 laboratories in 7 member countries (including the United States) and the European Commission in the network. As of July 2012, the network had expanded to comprise 19 laboratories in 8 member countries and the European Commission, in addition to the agency's own laboratories. IAEA also reported, as of July 2012, that it was in the process of reviewing qualifications for additional laboratories in Argentina, Belgium, China, Finland, France, Germany, Hungary, South Korea, and the United States to join the network.

Safeguards Department Produced Its First Long-Term Strategic Plan

In August 2010, after conducting an 18-month internal review, IAEA's Department of Safeguards produced a long-term strategic plan for the safeguards program for 2012 through 2023. To date, this represents the first long-term strategic planning effort by any IAEA department. While the agency as a whole does not have a long-term strategic plan in place, officials from State and Brookhaven National Laboratory credited the Department of Safeguards for developing what they described as a

[29] As of early December 2012, the other donors were Canada, the Czech Republic, France, Germany, Greece, Ireland, Israel, Japan, Kazakhstan, Netherlands, Norway, South Korea, Spain, United Arab Emirates, the United Kingdom, and the European Commission.

forward-thinking plan.[30] According to a report by one expert we interviewed, "The exercise is unprecedented for the Agency and virtually unheard of in [United Nations]-related organizations."

IAEA has not publicly released the full long-term safeguards plan, therefore we did not evaluate it. However, agency officials have made presentations and released a 10-page summary of the plan. The summary identifies three objectives, seven strategies and goals, and dozens of supporting activities covering (1) the conceptual framework for safeguards implementation, (2) legal authority, (3) technical capabilities, (4) cooperation and partnerships, (5) human resources, (6) financial resources, and (7) communication. For example, to support the financial resources strategy and the goal of maintaining member countries' confidence in the cost-effective implementation of the safeguards program, the plan states that the department will

- assess budgetary needs and seek sufficient and predictable funds and prepare for unexpected expenses;
- optimize the use of financial resources and seek further efficiencies through, for example, cost-benefit analyses to guide decision-making; and
- monitor and measure performance toward the achievement of desired results and increased transparency and accountability in reporting to member countries.

According to IAEA presentations, the expected benefits of the long-term safeguards plan include promoting strategic thinking and preparing the department for future challenges; unifying departmental planning, monitoring, and evaluation activities under one framework; supporting internal decision-making concerning priorities and resource allocation; and providing better information to member countries. Agency documents also indicate that the department will adjust the long-term safeguards plan every 2 years, if necessary, following a review of the external environment and a risk reassessment. In addition, the department is to update the long-term safeguards plan every 6 years, based on a

[30] Among other things, the Department of Energy's Brookhaven National Laboratory manages U.S. technical assistance to IAEA's safeguards program.

performance assessment, and will provide input to the development of the next agency-wide, medium-term strategy.

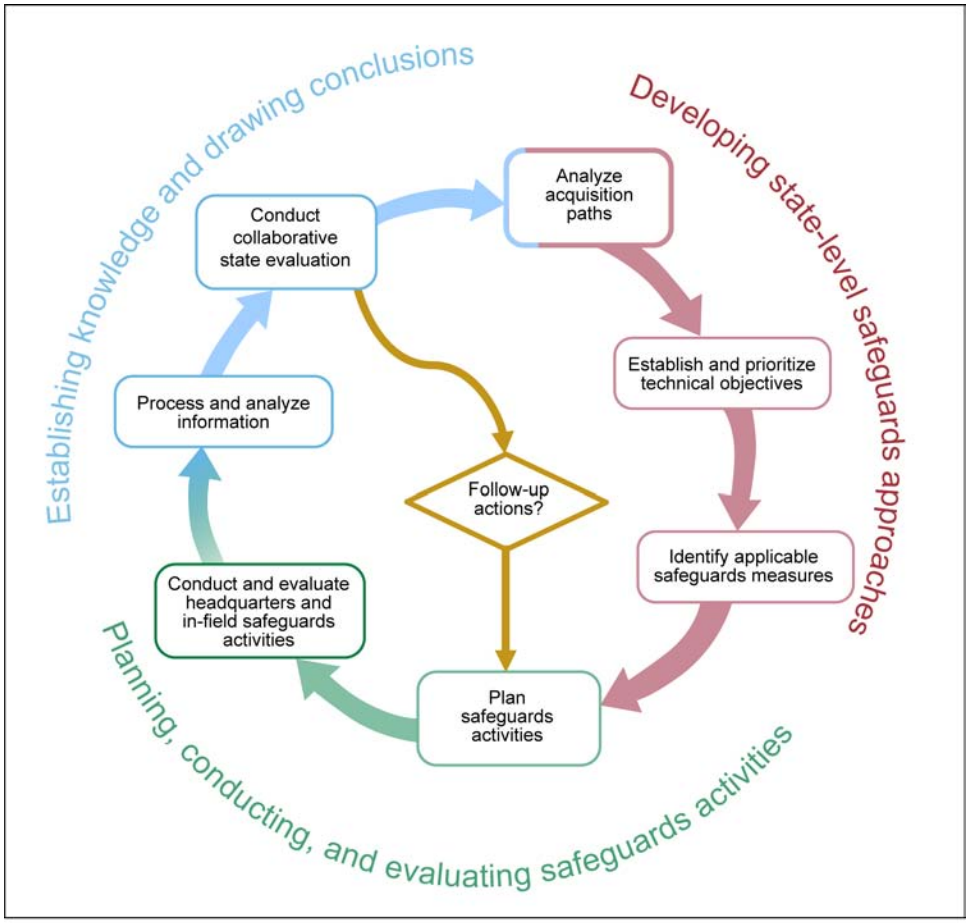
IAEA Plans to Expand Implementation of the State-Level Concept by 2014 to Better Allocate Safeguards Resources

IAEA plans to further strengthen the effectiveness and efficiency of its safeguards program by expanding the implementation of an approach called the state-level concept to all countries with safeguards agreements. According to IAEA documents and officials, this next phase in the evolution of safeguards would allow the agency to apply a tailored set of safeguards activities and allocate resources for each country as appropriate, based on a range of factors about countries' nuclear activities and capabilities as a whole. Such factors include a country's nuclear fuel cycle facilities, knowledge and expertise, legal framework, domestic safeguards authority, and past research and development. The agency first introduced the state-level concept about 10 years ago under integrated safeguards—an approach that encouraged inspectors to be more analytical and comprehensive in their country evaluations. Since that time, IAEA has implemented the state-level concept only in those countries that have both a comprehensive safeguards agreement and an Additional Protocol in force and for which the agency has drawn a broader conclusion that all nuclear material remains in peaceful activities. As of mid-2012, the agency reported it had implemented state-level approaches for 53 such countries, plus Taiwan. However, IAEA documents indicate that broader implementation of the state-level concept would yield greater efficiencies in allocating more resources to any issues of safeguards concern. Consequently, the agency plans to apply the state-level concept to all countries under safeguards, regardless of whether they have a comprehensive safeguards agreement and Additional Protocol in force, by 2014.

Agency documents also indicate that broader implementation of the state-level concept will affect IAEA's planning, conduct, and evaluation of safeguards activities for each country. Specifically, IAEA indicates it will consider a complete range of factors about countries' nuclear activities to determine the way in which the agency implements safeguards activities for each country and allocates resources in the field, where inspections are conducted, and at IAEA headquarters, where open-source, remote monitoring, and other analysis is conducted. For example, IAEA officials told us that the agency's safeguards approach might differ for a country with few nuclear facilities and a strong domestic safeguards authority, compared with the approach used for a country with many facilities and a weaker safeguards authority. Ultimately, IAEA officials told us that broader implementation of the state-level concept would allow the agency

to better allocate resources by reducing safeguards activities in those countries for which the agency has been able to establish a complete picture of nuclear activities, including a determination that there is no indication of undeclared activities, thus allowing the agency to focus greater efforts and resources on any issues of safeguards concern. Furthermore, in contrast to the annual evaluation process used in the past—including under the integrated safeguards approach—the agency's evaluations of a country under broader implementation of the state-level concept would be continuous and ongoing, and the safeguards approaches in a given country would be modified accordingly. According to agency documents, this approach would ensure the agency's conclusions remain soundly based and up-to-date. Figure 3 shows IAEA's process for evaluating countries' safeguards compliance using the state-level concept.

Figure 3: IAEA's Process for Evaluating Countries' Safeguards Compliance Using the State-Level Concept



Source: IAEA.

According to public statements by the Head of IAEA's Department of Safeguards over the past 2 years, it is necessary to broaden implementation of the state-level concept because past safeguards approaches have been insufficient to detect undeclared activities, such as a clandestine nuclear weapons program in Iraq and covert supply

networks in Libya.[31] In addition, the absence of an Additional Protocol in force in countries such as Iran and Syria has restricted the agency's ability to look beyond declared facilities and activities, preventing the agency from drawing a conclusion on whether there is undeclared nuclear material or activities in those countries. The Head of Safeguards has also publicly stated that past safeguards approaches have been too "narrow, prescriptive, and criteria-driven"—based on the nature and quantity of nuclear material and focused on specific safeguards activities for different types of facilities within a given country—rather than looking at the country more comprehensively. As a result, the Head of Safeguards has said, "satisfying the criteria" is in danger of becoming the objective, rather than addressing the underlying purpose of the work—to determine whether there is any indication of nuclear proliferation. According to this senior IAEA official, previous cases of safeguards violations or clandestine nuclear weapons development occurred in countries believed to have limited nuclear fuel cycles and involved previously exempted or undeclared nuclear material.[32] Given these previous cases, the Head of Safeguards has stated, the quantity of nuclear material in a country's possession, or even the size of its fuel cycle, is not necessarily a sufficient indicator of proliferation risk. Instead, IAEA needs to implement safeguards in a more adaptable, less predictable manner that considers the country's activities as a whole.

In addition to improving the effectiveness of its safeguards program, IAEA officials told us that broader implementation of the state-level concept would improve the program's efficiency by reducing routine inspections where IAEA has found no indication of undeclared activities and by directing resources to any issues of safeguards concern. State-level concept proponents told us that even those countries where the integrated safeguards approach has been applied in recent years could benefit from a further reduced inspection burden, assuming those

[31] Herman Nackaerts, Deputy Director General and Head of the Department of Safeguards, IAEA, "The Future of Safeguards: Adapting to Change," June 7, 2011, and "IAEA Safeguards: Cooperation as the Key to Change," presented at the Institute of Nuclear Materials Management's 52nd annual meeting, July 18, 2011, and published in the *Journal of Nuclear Materials Management*, Fall 2011.

[32] A country is considered to have a limited nuclear fuel cycle if it does not possess all the capabilities of the fuel cycle, particularly the more sensitive capabilities of uranium enrichment and reprocessing, which could potentially be used for nuclear weapons development.

countries remain compliant with their safeguards obligations. In particular, Japan, Germany, and Canada have traditionally comprised the bulk of IAEA safeguards inspections, in terms of time and cost, based on the number and type of declared nuclear facilities in those countries. The number of inspections has declined in those three countries under integrated safeguards since our 2005 report; for example, inspections in Canada declined from a peak of 1,337 person-days of inspection[33] in 2004 to 436 person-days of inspection in 2011. Japan, Germany, and Canada have expressed their support for the state-level concept.

Several Countries Have Raised Concerns That May Hinder Broader Implementation of the State-Level Concept

Several member countries, including the United States, support IAEA's plans to broaden implementation of the state-level concept, but other member countries—including some countries with significant nuclear activities—have raised concerns that the agency has not clearly defined and communicated how the state-level concept will be implemented or how it will stay within bounds of the agency's existing legal authorities. Consequently, if these concerns are not resolved, IAEA may not be able to implement the state-level concept in all countries with safeguards agreements by 2014. For example:

- Officials from some foreign missions in Vienna, Austria, told us that they believe the state-level concept does not have objective criteria and therefore IAEA could implement it in an inconsistent, subjective, and potentially discriminatory manner. For instance, officials from one foreign mission told us that IAEA needs to better explain its vision for the state-level concept in a clear, transparent, and specific manner to obtain broader acceptance among member countries. Officials from another foreign mission told us that they are concerned about IAEA's ability to draw safeguards conclusions without clearly defined criteria in place under the state-level concept.

- Officials from several foreign missions also told us that a number of countries are concerned that the state-level concept may give the agency too much latitude in gathering information or allow the agency to be too intrusive into a country's civilian nuclear operations. For

[33] IAEA defines a person-day of inspection as a day during which a single inspector has access to a facility for a total of not more than 8 hours. This definition does not necessarily coincide with a calendar day, so if an inspection requires only a small portion of a calendar day, it still constitutes one person-day of inspection. This metric also does not include an inspector's travel time to or from a facility.

example, officials from one foreign mission stated that it is important for IAEA to rely on verifiable information that is relevant only to safeguards, whereas IAEA has stated that it would use "all available sources of information" about a given country. Officials from another foreign mission emphasized that the state-level concept cannot be "a blank check for the agency to do whatever it wants" in a country and that it is important for the agency to avoid unnecessarily disrupting nuclear power plant operations in a country "just because the agency has ill-defined criteria."

- Officials from one foreign mission also observed that a lack of clarity about the state-level concept could undermine the agency's efforts to encourage more countries to conclude an Additional Protocol because those countries may be suspicious of how the agency would use the additional access and information granted by an Additional Protocol.

As of April 2013, IAEA had not developed the criteria or communicated specific details to countries about how the state-level concept would be implemented. Furthermore, IAEA officials told us they did not intend to communicate specific implementation details to countries. Officials from State, which coordinates the United States' financial and policy relationship with IAEA, told us that IAEA has been transparent in developing the state-level concept and has repeatedly informed the Board of Governors about its progress. In addition, State maintains that, as a matter of principle, IAEA's implementation of safeguards should remain impartial, objective, based on relevant information, and rooted in the agency's existing legal framework. Nonetheless, due to the concerns raised by several countries, the General Conference passed a resolution in September 2012 that included a request for IAEA's Secretariat to report to the Board of Governors on the conceptualization and development of the state-level concept. A senior IAEA official told us that the agency expects to report to the Board of Governors in 2013. In the meantime, according to agency officials, IAEA has continued its efforts to communicate the state-level concept with countries and other stakeholders through multiple forums, including conferences, presentations, and bilateral discussions. During our review, we also observed that IAEA modified its description of the state-level concept to address concerns. For example, in the agency's annual report for 2010, a paragraph describing safeguards conclusions states that "the safeguards system being implemented is described as 'information-driven.'" Since that time, IAEA has moved away from the term "information-driven safeguards" to avoid language that could suggest inappropriate information-gathering. In addition, IAEA officials have emphasized that

they are putting in place guidance to ensure consistency under the state-level concept in how the agency (1) evaluates individual countries' nuclear activities and (2) implements appropriate safeguards in each country. To ensure that IAEA's evaluations of individual countries' nuclear activities under the state-level concept are sound and independent of individual analysts' judgment, officials from the Department of Energy's Lawrence Livermore National Laboratory told us that IAEA's internal review process appears to be placing greater emphasis on information-sharing, collaboration, and rigorous review than in the past.[34] Nonetheless, IAEA officials stated that no matter how they articulate what the state-level concept is, certain countries may never support it.

IAEA Has Not Quantified the Long-Term Costs and Benefits of Broadly Implementing the State-Level Concept

IAEA reports annually on its progress in utilizing various resources to strengthen the safeguards program, but the agency has not quantified the additional human capital, technological, or other resources that may be needed to broaden implementation of the state-level concept. As a result, it is difficult to determine the long-term costs and benefits associated with the state-level concept, and the agency may not be able to build the necessary political and, potentially, financial support to implement the state-level concept in all countries with safeguards agreements by 2014. For example, in recent annual reports and other documents, IAEA has reported progress in training its inspectors and analysts and integrating its information systems to enhance the agency's ability to evaluate a full range of information about countries' nuclear activities and to draw soundly based conclusions about countries' compliance with their safeguards obligations. However, the agency has not quantified the extent to which this integration has already been achieved or detailed how and when it will address any remaining expertise, technology, or other resource gaps. Similarly, IAEA reports annually on the number of cameras, unattended radiation monitors, and other remote monitoring systems it operates for safeguards activities; however, the agency does not indicate the cost or specific benefits associated with these items. A senior IAEA official told us that it is difficult, if not impossible, to quantify the long-term benefits of implementing the state-level concept, but that it

[34] Lawrence Livermore National Laboratory is one of the Department of Energy's national laboratories that conduct various research and development and other activities. Among other things, Lawrence Livermore advises NNSA on matters pertaining to IAEA and is part of IAEA's international network of safeguards analytical laboratories, which analyzes nuclear material samples collected by IAEA inspectors.

should result in (1) reduced safeguards activities in countries with little or no issues of safeguards significance and (2) increased efforts in countries with any such issues. This official added that IAEA's safeguards activities for an individual country may change as issues and circumstances change from year to year.

Nonetheless, we and others have previously reported on the need for IAEA to identify costs and manage budget requirements. In IAEA's financial statements for 2011, the agency's external auditor also found that IAEA "has not been able to identify savings in a transparent and comprehensible manner" in the 10 years since the agency took additional steps to strengthen its safeguards program with the integrated safeguards approach. The external auditor stated that to measure improvements, the resources needed to launch and operate a project—as well as the benefits for member countries and the agency—should be measurable. In 2005, we also reported that IAEA does not have a process in place to systematically evaluate its safeguards resource requirements over the long-term because the agency's budget process and research and development plan (a document now called the development and implementation support program for nuclear verification) are designed to forecast resource needs on a 2-year basis.[35] At that time, we recommended that State work with the agency to develop a systematic process to forecast long-term safeguards budget requirements beyond the 2-year budget cycle. State agreed with our recommendation, and IAEA has taken some steps to address it. During this review, we observed that the Department of Safeguards' current development and implementation support program document for 2012-2013 identifies 24 specific projects that the department wants to undertake and fund in the current, 2-year budget cycle, mostly through member countries' extra-budgetary contributions. These projects are intended to meet specific objectives identified in the department's *Long-Term Strategic Plan 2012-2023* and, according to a senior IAEA official, they involve tasks that are not addressed through the agency's routine safeguards activities. However, the document does not identify monetary values for these various projects or take a longer-term approach to quantify the resources needed to broaden implementation of the state-level concept.

[35] GAO-06-93.

Given the current zero-real-growth budget policy environment, IAEA officials stated that the state-level concept may not yield overall financial savings but would allow the more effective use of resources by shifting existing resources toward any issues of safeguards concern. Nonetheless, without a clear and concise assessment of the resources and the associated long-term costs and benefits, including trade-offs—such as reduced inspections for increased analytical capabilities—member countries and the international community at large may have difficulty understanding the benefits of the state-level concept. Furthermore, if the agency conducted an assessment of its long-term resource needs and determined that full implementation of the state-level concept warrants a greater investment than the current budget provides, the agency could present a credible foundation from which to request additional resources from member countries.

IAEA Has Continued to Support Nuclear Security, but Three Key Issues Limit the Agency's Ability to Ensure That Its Resources Are Used Efficiently and Effectively

Since our last report in 2005, IAEA has continued to help countries improve the security of their nuclear material and facilities, but three key issues limit the agency's ability to ensure that its nuclear security resources are used efficiently and effectively. First, IAEA's heavy reliance on extra-budgetary contributions for its nuclear security activities makes it difficult to plan and implement projects because these funds vary from year to year and because donor countries often place conditions on their contributions. Second, IAEA has not conducted a needs-based assessment of the resources required beyond its 2-year budget cycle, which also hinders its ability to ensure that resources are directed to the greatest security needs. Third, IAEA does not systematically report the results of performance measures related to its nuclear security program, thus the extent to which the agency is meeting its nuclear security goals is unclear.

IAEA Continues to Support Countries' Nuclear Security Efforts through Its Nuclear Security Program

Since our 2005 report, IAEA's role in nuclear security has gained increased prominence and has been reinforced through international Nuclear Security Summits held in 2010 and 2012. Specifically, participants at the 2010 Nuclear Security Summit in Washington, D.C., issued a statement recommending, among other things, that countries (1) work with IAEA to implement the agency's guidance on nuclear security and (2) request the agency's assistance in assessing the physical protection systems of civilian nuclear material and facilities. Two years later, participants at the 2012 Nuclear Security Summit in Seoul, South Korea, issued a statement that highlighted the importance of IAEA's role in nuclear security, encouraging countries to contribute funds

toward the agency's efforts and supporting the agency's sponsorship of a conference in 2013 to coordinate nuclear security activities.

In addition, IAEA has enhanced its training activities and continued other activities since our 2005 report—such as providing advisory services and managing a database on incidents involving nuclear and other radioactive materials detected outside of regulatory control—to support countries' efforts to improve the security of their nuclear material and facilities. While security of nuclear and radiological materials is first and foremost a national responsibility, IAEA responds to countries' requests to participate in the agency's voluntary nuclear security program. According to NNSA officials, one of IAEA's most important functions in the area of nuclear security is the range of training activities it offers to countries on physical protection of nuclear facilities and materials. In particular, NNSA officials told us that training is an essential component to countries developing and sustaining a national nuclear security regime, as it helps build a cadre of capable personnel who are responsible for maintaining and enhancing a country's nuclear security infrastructure. The Director of IAEA's Office of Nuclear Security also told us that it is equally important for countries to have a minimum number of well-educated, trained people as it is to have radiation detection equipment. Therefore, IAEA offers a wide variety of international, regional, and national training courses and workshops. We reported in 2005 that IAEA had conducted almost 80 training courses for about 1,500 participants from January 2001 through March 2005.[36] In IAEA's *Nuclear Security Report 2012*, the agency stated that it conducted 70 nuclear security training programs and workshops that reached over 1,750 people from July 2011 to June 2012—indicating that the agency is now reaching more people in a shorter period of time. In addition, since 2005, IAEA has sponsored several new training initiatives in support of nuclear security efforts, including

- completing a nuclear security training site in Obninsk, Russia—the agency's largest project to date on physical protection—which offers in-field training and hands-on exercises in nuclear security;

[36] GAO-06-93.

- developing the International Network for Nuclear Security Training and Support Centers, designed to facilitate human resource development and provide technical support services, and;

- creating the International Nuclear Security Education Network, which provides a forum for IAEA, educational institutions, and research bodies to collaborate on nuclear security education. The network is open to any educational and research institution already involved or that plans to be involved in nuclear security education in the future.

IAEA has also continued to provide International Physical Protection Advisory Service (IPPAS) missions to countries that request them. These voluntary missions assist countries in strengthening their national civilian nuclear security regimes by providing (1) guidance on the protection of nuclear material and facilities, as well as sealed radioactive sources and other radioactive material, (2) best practices in nuclear security, and (3) peer advice on implementing international agreements related to physical protection of nuclear material and facilities. The 2010 Nuclear Security Summit recognized the value of these missions, while the 2012 summit encouraged countries to enhance their physical protection and welcomed IAEA's assistance in these efforts. The Director of the Office of Nuclear Security told us that, as of June 2012, the agency had conducted 57 IPPAS missions in 37 countries and that the number of countries requesting these missions continues to grow. During an IPPAS mission, at the request of a country, IAEA assembles a team of international experts that assesses the country's system of physical protection, compares it with international guidelines and best practices, and makes recommendations for improvements to correct any identified deficiencies. IAEA's nuclear security guidelines establish the standard by which the United States and other countries generally classify the categories of physical protection that should be given to nuclear material, based on the type, volume, and disposition of the material. The results of IPPAS missions, which are contained in a report provided to each country, are confidential. According to NNSA officials, the agency believes it is obligated to keep the information confidential to respect countries' concerns that security vulnerabilities in the reports could be made public. To promote the continued use of IPPAS missions, IAEA does not share the reports with the public or other countries. In addition, countries that agree to host an IPPAS mission are not required to implement any recommendations contained in the mission report. However, IAEA conducts follow-up visits to determine whether the country has implemented the agency's recommendations.

IAEA has also increased its efforts to assist countries in improving their capabilities to detect, track, and respond to illicit trafficking of nuclear and radiological materials. In 2005, we reported that IAEA was encouraging countries to contribute data to its Incident and Trafficking Database (formerly called the Illicit Trafficking Database) to help identify trends in incidents involving nuclear and radiological materials detected outside regulatory control.[37] Since that time, the agency has increased the number of countries participating in the database by nearly 50 percent: from 81 countries in June 2005 to 121 countries as of February 2013. Using this data, the agency produces quarterly and annual reports to facilitate information exchange on trends related to incidents involving unauthorized acquisition, provision, possession, use, transfer, or disposal of nuclear and other radioactive materials. In addition, since 2007, IAEA has held 14 regional information meetings worldwide to, among other things, (1) help raise awareness of the database, (2) improve the quality and accuracy of reporting in the database, and (3) highlight the support that IAEA can offer to countries to improve their nuclear security efforts. Participants from over 100 countries have attended one or more of these meetings. In July 2012, IAEA also held a meeting with representatives from 81 countries to discuss, among other things, how to use information from the database in ways that would further satisfy their security needs.

Three Key Issues Limit IAEA's Nuclear Security Program

IAEA's nuclear security program faces three key issues that limit the agency's ability to ensure that its resources are used efficiently and effectively:

- *IAEA relies heavily on extra-budgetary contributions for funding its nuclear security activities*.[38] Certain member countries, particularly the United States, and other donors provide IAEA with extra-budgetary contributions on a voluntary basis to supplement the agency's regular budget and to meet critical needs. These extra-budgetary

[37] In December 2012, in response to a recommendation made by several countries, IAEA changed the name of this database to the Incident and Trafficking Database. To better reflect the nature of the incidents contained in the database, IAEA also redefined the database's goal as "to track incidents of nuclear and other radioactive material not under regulatory control."

[38] In 2002, IAEA established a Nuclear Security Fund to support its nuclear program through extra-budgetary contributions. In 2011, the European Union and 16 member countries, including the United States, donated $25 million to the fund.

contributions vary from year to year and, according to the Director of the Office of Nuclear Security, are often subject to donors' conditions. As a result, it is difficult for the agency to plan and implement projects where security needs may be greatest. This heavy reliance on extra-budgetary contributions is a long-standing challenge that we reported on in 2005. At that time, we reported that 89 percent of the agency's total nuclear security funding came from extra-budgetary contributions, and the remaining 11 percent came from the agency's regular budget and was used primarily for staff salaries. We recommended that IAEA consider determining whether the nuclear security program receives adequate regular budget funds.[39] In February 2010, a State official reported that IAEA had made efforts in this regard by moving toward a model in which administrative overhead costs, such as salaries, are paid from the regular budget, and special projects are funded through extra-budgetary contributions. However, during this review, we found that IAEA continues to rely heavily on extra-budgetary contributions, accounting for $25 million or 82.5 percent of its total $30.3 million funding for nuclear security in 2011.[40] The majority of this extra-budgetary funding is designated by the donor countries for specific projects. According to the Director of the Office of Nuclear Security, the conditions that donor countries often place on their extra-budgetary contributions limit the agency's ability to establish its own priorities and ensure that the resources are directed to the areas of greatest need. For example, officials from one foreign mission told us that their country had contributed $8 million over the past 4 years and designated it for specific projects, such as improving the security of radiological materials at hospitals or providing nuclear security training, in certain countries.

- *IAEA has not conducted a needs-based assessment of the resources required for the nuclear security program beyond the agency's 2-year budget cycle*. Consequently, IAEA has not identified how it will meet any long-term resource needs through the regular budget, extra-budgetary contributions, or both. The absence of such information hinders the agency's ability to ensure that resources are directed to the greatest security needs. We have previously reported that good

[39] GAO-06-93.

[40] In addition, as noted earlier, a number of member countries make in-kind contributions, such as equipment and expert services, to the agency's various programs on a voluntary basis.

strategic planning practices include describing the relationship between long-term goals and budgetary needs.[41] IAEA's Director of the Office of Nuclear Security told us that the agency has been working for the past year to identify countries' needs through individual nuclear security support plans. The objectives of these plans are to (1) identify and consolidate a country's nuclear security needs into a single document that includes the necessary security improvements, as well as an appropriate framework for implementing these improvements, and (2) to quantify the resources needed and prioritize the agency's activities to meet those needs. According to the director, these individual plans are designed to identify actions required and approved by both the country and IAEA to ensure that the country's nuclear security regime is effective and sustainable. The director told us that the agency expects to have plans in place for over 100 countries by July 2013 and intends to use this approach for short-, medium-, and long-term assessment of countries' needs and the agency's program and budget priorities. The director added that these plans would also inform the agency's upcoming *Nuclear Security Plan 2014-2017*. Nonetheless, the agency does not have an overall long-term plan that incorporates the country-specific plans and looks comprehensively at nuclear security needs across all countries and identifies resources and priorities for the agency.

- *IAEA does not systematically report the results of performance measures related to its nuclear security program*. As a result, the extent to which the agency is achieving its nuclear security goals is unclear. IAEA has taken steps in recent years to develop measures for assessing the performance of its nuclear security efforts, but it does not systematically report on the results of these measures. State officials told us that if they had more performance-based information, they could more easily present justification for funding that the United States directs to IAEA by providing Congress more information about the results and impact of U.S. contributions to the program. In 2005, we reported that IAEA did not systematically measure the results of its nuclear security activities and recommended that State work with IAEA and its member countries through the agency's Board of Governors to consider developing such measures.[42] Since that time,

[41] GAO-06-93.

[42] GAO-06-93.

IAEA has developed the following two performance measures for the agency's nuclear security efforts:

- number of countries that have established or improved national nuclear security systems on the basis of advice or assistance from the agency, and
- number of countries implementing national nuclear security systems on the basis of agency assistance.

The Director of IAEA's Office of Nuclear Security told us that the agency is using these measures to assess the program's performance. However, IAEA has not systematically reported on the results of these performance measures. For example, in the agency's annual report for 2011, with regard to its nuclear security program, IAEA reported on the number of IPPAS missions undertaken annually and the number of training events facilitated related to nuclear security. However, IAEA did not report any results related to the two performance measures outlined in its program and budget report, and the Director of the Office of Nuclear Security could not provide any additional information documenting the results of the performance measures or how the agency used them to assess its progress in achieving the nuclear security program's goals. In our 2005 report, we stated that IAEA officials said that it is difficult for the agency to link nuclear security efforts, such as recommendations stemming from advisory missions, to results, such as whether recommendations were implemented.[43] During this review, IAEA officials reaffirmed this point and attributed this difficulty to the agency's limited advisory role, noting that countries are not obligated to follow its guidelines or implement its recommendations. Nonetheless, reporting on performance measures is important to ensure that IAEA can enhance the international community's knowledge of the impact and effectiveness of the nuclear security program. Because IAEA has not systematically reported on the results of its performance measures, member countries and the international community at large cannot gauge the extent to which IAEA is meeting its goals or the nuclear security program's impact and effectiveness.

[43] GAO-06-93.

IAEA Is Making Progress in Implementing a Nuclear Fuel Bank, but Uncertainties Exist Concerning Its Value, Potential Market Impact, and Long-term Operation

IAEA is making progress in establishing an international nuclear fuel bank containing LEU by 2014, but several experts and foreign officials told us they were uncertain about the fuel bank's value, potential market impact, and long-term operation. Further, IAEA's fuel bank is one of several guaranteed fuel supply options currently planned or in operation worldwide—including one in the United States—which raises questions about possible duplication of efforts.

Nuclear Fuel Bank Is Expected to Become Operational by 2014

Since IAEA's Board of Governors approved in December 2010 the establishment of a nuclear fuel bank to provide a guaranteed fuel supply, the agency has made progress in its plans to operationalize the bank by 2014. IAEA and U.S. officials told us they expect the bank to have two benefits: (1) to serve as an assured source of nuclear fuel for countries with civilian nuclear power programs in the event of a supply disruption and (2) to offer countries an alternative to the development of sensitive nuclear fuel enrichment technologies, as such technologies could also be used to produce nuclear material—including highly enriched uranium (HEU)—for nuclear weapons.

IAEA officials responsible for the fuel bank told us that, since April 2012, the fuel bank project has shifted from the design to the implementation phase. During this phase, the agency plans to (1) negotiate a host state agreement with Kazakhstan concerning, among other things, the physical security, legal status, and safety of the bank,[44] (2) purchase approximately 60 metric tons of LEU for fuel, and (3) manage the bank's budget. As part of this process, the agency is preparing a site assessment in Kazakhstan that includes a review of the proposed site—the Ulba Metallurgical Plant, located in the city of Ust-Kamenogorsk—which manufactured nuclear fuel for the Soviet Union. Figure 4 shows a map of Kazakhstan that includes the location of the proposed site at Ust-

[44] Kazakhstan volunteered to host IAEA's fuel bank 20 months prior to the Board of Governors' vote in December 2010 to approve the bank.

Kamenogorsk. IAEA has also moved oversight of the fuel bank from its Office of Nuclear Energy to the Director General's Office for Policy. According to NNSA officials, this transfer was done to ensure that the project receives the highest level of attention by the agency and also to demonstrate its importance to IAEA's member countries.

Figure 4: Map of Kazakhstan Showing the Proposed IAEA Nuclear Fuel Bank Site at Ust-Kamenogorsk

Sources: Department of State and GAO.

According to a statement issued by IAEA's Director General in September 2012, the agency is reviewing the necessary legislative and regulatory framework that is required to ensure that the bank will operate consistently with IAEA safety standards, security guidelines, and safeguards requirements. The statement also noted that the results of these reviews would be incorporated in early 2013 into a plan that will make the bank fully operational. In addition, IAEA officials also told us that the site assessment would indicate whether physical security upgrades are required to accommodate the proposed fuel bank.

According to IAEA officials, the agency's Board of Governors has developed criteria for countries that could purchase LEU fuel from the bank. To be eligible to purchase fuel, a country has to meet the following criteria: (1) the country is experiencing a supply disruption of fuel for a nuclear power plant and is unable to obtain fuel by other means, (2) IAEA has concluded that there has been no diversion of declared nuclear material from the country and that there are no issues related to the country's safeguards implementation that are under consideration by the

Board of Governors, and (3) the country has a comprehensive safeguards agreement in force. In addition, the country receiving fuel from the bank has to conclude a supply agreement with IAEA that contains the following additional criteria:

- The fuel can only be used for fuel fabrication for energy generation at a nuclear power plant;
- The fuel may not be used to manufacture any nuclear weapon or nuclear explosive device, or for any other military purpose;
- The country cannot further enrich, reprocess, retransfer, or re-export the fuel unless IAEA permits it to do so;
- The fuel is subject to applicable IAEA safeguards, safety standards, and physical protection measures; and
- The country must take responsibility for all liability for any nuclear damage that may be caused by a nuclear incident associated with the use, handling, storage, or transport of the fuel.

Uncertainties Exist about the Fuel Bank's Value, Potential Market Impact, and Long-term Operation

We identified several uncertainties about the international nuclear fuel bank's value, potential impact on the international nuclear fuel market, and long-term operation, based on discussions with several experts and officials from State, NNSA, IAEA, and foreign missions. Specifically:

- *The fuel bank may never be used, raising questions about its value*. Officials from State, NNSA, and foreign missions, as well as some experts, told us that the fuel bank may never be used. For example, a senior State official told us that there are currently numerous countries that are willing and stable suppliers of LEU fuel; therefore, a country that needs fuel for civilian nuclear power plants already has willing suppliers from whom they can purchase it. NNSA officials told us that IAEA's fuel bank is intended to be used only as a last resort and that it will likely never be used. In addition, officials from some foreign missions told us that they were uncertain about the bank's true purpose, given that, in their view, there is a ready supply of LEU fuel worldwide and numerous suppliers. Officials from two of these foreign missions also described the bank as "a solution looking for a problem." Notwithstanding these concerns, some experts and foreign mission representatives who support the fuel bank told us that a better measure of the bank's success is in providing countries an assurance

of supply, and one expert described the bank as a crisis avoidance tool.

In addition, officials from one foreign mission told us that the countries the bank is targeting—those that are considered a nuclear proliferation risk, such as Iran—are suspicious of the bank's true purpose. As a result, those countries of greatest proliferation concern are not likely to use the bank under any circumstances. Furthermore, according to State officials, some countries, such as Iran, are not eligible to participate due to past safeguards violations. Therefore, as a former Head of IAEA's Department of Safeguards told us, the bank does not solve the problem of Iran's continued nuclear fuel enrichment activities. Moreover, officials from several foreign missions, including some who support the bank, told us that certain developing countries that are members of the Non-Aligned Movement and the Group of 77[45] are concerned that the bank might be used to constrain, or at least discourage, countries' rights to pursue peaceful uses of nuclear energy under Article IV of the NPT by developing their own enrichment facilities.[46] Some experts we interviewed also stated that countries within the Non-Aligned Movement view the bank as IAEA's attempt to deprive them of their rights of peaceful use of nuclear energy. Officials from a foreign mission that supports the bank told us that this concern still exists, despite the Board of Governors' vote to approve the bank in 2010.[47]

- *The bank's potential impact on the international nuclear fuel market is uncertain*. The conditions that IAEA's Board of Governors has placed

[45] The Non-Aligned Movement is a group of 120 countries that consider themselves not aligned formally with or against any international power bloc. The Group of 77 is the largest intergovernmental organization of developing countries in the United Nations. Composed of 131 member countries, it provides the means for these countries to articulate and promote their collective economic interests and enhance their joint negotiating capacity on major international economic issues within the United Nations system.

[46] Article IV of the NPT states, among other things, "Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination... ."

[47] Of the 35 Board of Governors members at the time of the December 2010 vote to approve the bank, 28 voted in favor of the bank, including 10 members and 3 observers of the Non-Aligned Movement. Six members abstained from voting, all of which were Non-Aligned Movement members or observers, and one Non-Aligned Movement member was absent from voting.

on the fuel bank include a stipulation that the use of the bank will not affect the international nuclear fuel market. IAEA plans to purchase 60 metric tons of LEU to supply the bank in advance of its startup. According to NNSA officials, the greatest challenge is identifying the point at which IAEA's fuel bank moves from serving as a safety net for countries in need of fuel to becoming a disruption to the nuclear fuel market. Similarly, a senior State official told us that some fuel supplier countries have expressed concern that the bank could disrupt the market and affect fuel prices. While IAEA has not released an assessment of the fuel bank's potential market impact, other studies indicate that a new source of supply could impact the international fuel market. For example, a 2010 study by the Brookings Institution queried nuclear industry officials on the feasibility of multilateral nuclear approaches, including an IAEA-administered nuclear fuel bank. According to the study, commercial nuclear fuel vendors are concerned about the implications of a fuel bank on the current market system that has, to date, had no supply issues. The study also reported that nuclear industry officials are worried that a fuel bank would artificially force down prices to levels that are uncompetitive for private vendors. In addition, according to a 2006 report by the Pacific Northwest National Laboratory,[48] the long-term impact of having assured fuel on the international nuclear market is unclear, including the effect that an assured fuel supply could have on the competitiveness of U.S. commercial fuel. For example, an influx of LEU on the market could affect market structure, potentially pushing a marginal supplier of uranium or enrichment out of the market, discouraging an existing supplier from making a necessary investment to upgrade its capacity, or depressing investment in mining and other operations. The report also stated that there has been significant discussion between industry and government regarding how much LEU can be introduced into the nuclear fuel market without causing a serious market disruption and added that a wide variety of variables can impact the market.

IAEA officials who are responsible for managing the fuel bank told us that the bank will not affect the international nuclear fuel market for two reasons: (1) the agency will replenish the bank's inventory by procuring one reload of LEU for every reload of fuel that it supplies,

[48] Pacific Northwest National Laboratory, "Options for Creating a Nuclear Fuel Stockpile for Assured Nuclear Fuel Supply," PNNL-SA-48328 (Richland, WA: February 2006).

making the bank market-neutral; and (2) the agency approved an LEU procurement plan in September 2011 that specifically addresses the avoidance of market impact during the initial inventory acquisition for the fuel bank. However, we have not reviewed the plan and its assessment of the bank's potential impact on the market, as the plan is confidential and not publicly available. As a result, it is impossible to evaluate whether IAEA's fuel bank could adversely affect the international market. Nonetheless, IAEA officials also told us that, in their view, the 60 metric tons of LEU the agency is planning to purchase is not enough to have a significant impact on the market worldwide.

- *IAEA does not have a plan in place for the long-term operation and funding of the fuel bank*. The nuclear fuel bank is the first project of its kind that IAEA has ever undertaken, is large in scope, and requires complex planning and coordination across different departments within the agency. While IAEA has given countries briefings about the fuel bank's status, the agency has not yet developed a long-term plan that addresses key aspects of the project, although agency officials responsible for managing the bank told us that they intend to provide a detailed financial plan to the Board of Governors in 2013. Among other things, they stated that this plan would identify the long-term funding needs for the bank. We have previously reported that a long-term funding plan should include effective strategies to help set priorities and allocate resources, including staffing, to inform decision-making and help ensure accountability.[49] Such priority-setting and resource allocation is especially important in a fiscally constrained environment, such as the one that IAEA faces, and should include information on the levels and sources of funding needed for the ongoing maintenance and operation of the fuel bank. IAEA officials told us that funding for the bank will be kept to a minimum and come solely from extra-budgetary contributions, with sufficient resources set aside to cover operation of the bank for a period of time to be determined by the Director General. The agency's Board of Governors agreed to rely on extra-budgetary funds because of the zero-real-growth budget policy under which the agency generally operates and the resistance among countries to increase the agency's

[49] See, for example, GAO, *Combating Terrorism: Evaluation of Selected Characteristics in National Strategies Related to Terrorism*, GAO-04-408T (Washington, D.C.: Feb. 3, 2004), and GAO, *Rebuilding Iraq: More Comprehensive National Strategy Needed to Help Achieve U.S. Goals*, GAO-06-788 (Washington, D.C.: July 11, 2006).

regular budget to fund the project. As stated earlier, IAEA has received $159.4 million in extra-budgetary cash contributions and pledges from the United States and other donors toward the establishment of the fuel bank. However, without a long-term plan in place, it is unclear whether IAEA will need funding beyond the initial $150 million and, if so, how the agency would be able to financially support the bank's ongoing maintenance and operation.

IAEA's Nuclear Fuel Bank Is One of Several Guaranteed Fuel Supply Options Available

IAEA's nuclear fuel bank is one of several guaranteed, multilateral fuel supply options that are currently available to countries seeking an assured LEU fuel source in the event of a supply disruption. Several countries, including the United States, have independently established a fuel bank or similar mechanism to provide eligible countries with a guaranteed fuel supply. The number of fuel banks raises questions about a potential duplication of effort among these similar options.

Several Guaranteed Fuel Supply Options Are Available

We identified three options available for countries seeking an assured supply of LEU fuel in the event of a supply disruption, in addition to IAEA's planned nuclear fuel bank. These efforts have independently been undertaken by the United States, Russia, and the United Kingdom. Each of these initiatives is described below.

- *United States*. In addition to supporting IAEA's nuclear fuel bank, the United States has created its own guaranteed fuel supply option, called the American Assured Fuel Supply, to serve as a backup fuel supply to eligible foreign or domestic recipients. In 2005, the Department of Energy (DOE) announced that 17.4 metric tons of U.S. surplus HEU from a former nuclear weapons plant would be downblended to LEU to be used as a U.S. fuel bank. NNSA officials told us that the U.S. fuel bank has been operational since 2011, although it had not been used as of February 2013. According to an announcement in the *Federal Register* on August 18, 2011, the purpose of the U.S. fuel bank is to provide an assured supply of LEU fuel in the event of a supply disruption where all other market options have been exhausted. This fuel bank is also intended to help countries pursue nuclear power without the burden of producing their own fuel, while curbing the spread of sensitive technology. To be eligible to purchase the fuel, recipients, through their governments, must meet certain nonproliferation criteria.

  NNSA has made little information publicly available about the details of the U.S. fuel bank, apart from the *Federal Register* announcement and an accompanying press release. For example, NNSA has not

released key information about the U.S. fuel bank's operations, such as whether the bank is being used, estimated demand, potential impact on the international nuclear fuel market, or any controls to mitigate such impacts. In May 2012, DOE issued a Secretarial Determination that stated, among other things, that certain planned DOE sales and transfers of excess uranium—including the transfer of 60 metric tons of LEU to a contractor in creating the U.S. fuel bank—would have no adverse material impact on the U.S. uranium mining, conversion, or enrichment industries.[50] NNSA officials acknowledged that the analysis did not cover the potential impact of the U.S. fuel bank's 230 metric tons of LEU on the international nuclear fuel market. As we noted in reference to the IAEA nuclear fuel bank, some studies indicate that a new source of LEU fuel could affect the international fuel market, including the competitiveness of U.S. commercial fuel. NNSA officials told us that there were no requirements for the agency to conduct any studies that would provide this type of information. Nonetheless, without more information, the extent to which the U.S. fuel bank may be used, its potential impact on the international nuclear fuel market, or any controls to mitigate such impact is unclear.

In addition, during our review, we obtained some key information from NNSA officials about the U.S. fuel bank's financial status that had not been previously reported. For example, NNSA officials told us that as of December 2012, Nuclear Fuel Services, a contractor in Erwin, Tennessee, had completed downblending 17.4 metric tons of HEU, yielding 290 metric tons of LEU. Of that amount, approximately 230 metric tons of LEU have been made available for the U.S. fuel bank, which is stored at a fuel fabrication facility in Columbia, South Carolina, while the remaining 60 metric tons were used to compensate the contractor through what NNSA describes as a barter

[50] *Secretarial Determination for the Sale or Transfer of Uranium* (Washington, D.C.: May 15, 2012). Before making any sales or transfers of LEU and natural uranium, DOE is required under the USEC Privatization Act to determine that the transactions will not have an adverse material impact on the domestic uranium industry.

arrangement.[51] The value of this arrangement is approximately $145.3 million, composed of (1) $105.3 million to cover the contractor's downblending services and (2) approximately $40 million to cover the cost of diluent (natural uranium that is blended with HEU to produce LEU). As compensation for its storage of the LEU for the U.S. fuel bank, the contractor is also allowed to borrow a portion of the LEU for its ongoing business activities, provided the contractor meets certain conditions, including replacing any LEU it uses. The storage portion of the contract extends for 10 years, through June 2017, but there are also options to extend the contract in 5-year increments. However, NNSA has not published this information in publicly available documents, such as DOE's *Excess Uranium Inventory Management Plan*.[52]

In addition to NNSA's $145.3 million contract, NNSA officials told us that the agency spent a total of $28.3 million in fiscal years 2002 through 2012 to prepare the HEU for downblending and to support the project. Specifically, NNSA officials said these funds were used to retrieve the HEU from NNSA's storage repository, perform inspections, sample, process, pack, and ship the HEU to the contractor and, in later years, to provide program management support such as quarterly contract reviews. However, NNSA has not quantified the specific costs per year associated with this aspect of creating the U.S. fuel bank in its annual budget justification reports to

[51] We have previously analyzed transactions that DOE characterized as barters of uranium on two occasions. In both cases, we found that the transactions actually constituted sales of uranium that were authorized under the United States Enrichment Corporation (USEC) Privatization Act but violated the miscellaneous receipts statute. Because we found that the transactions were sales, we did not consider and did not decide whether barters are also authorized under the USEC Privatization Act. We also did not perform such an analysis in this case. See GAO, *Excess Uranium Inventories: Clarifying DOE's Disposition Options Could Help Avoid Further Legal Violations*, GAO-11-846 (Washington, D.C.: Sept. 26, 2011); and GAO, *Department of Energy: December 2004 Agreement with the United States Enrichment Corporation*, B-307137 (Washington, D.C.: July 12, 2006).

[52] In December 2008, DOE published the *Excess Uranium Inventory Management Plan* "to provide the general public and interested stakeholders more specific information and enhanced transparency with respect to DOE's preliminary plans for its excess uranium transactions." The plan identified excess uranium inventories and specific transactions that were planned or under consideration at that time, or that might be considered by DOE in the future, for disposition. In early March 2013, NNSA officials told us that DOE's Office of Nuclear Energy was preparing an updated version of this plan.

Congress or in other publicly available documents. We have previously reported that Federal Accounting Standards Advisory Board guidance calls for the identification of the full cost of federal programs and activities, and congressional requesters have emphasized that NNSA should establish budgets that reflect total program costs and that these budgets should be more transparent to oversight.[53] Moreover, DOE's 2008 *Excess Uranium Inventory Management Plan* states that the agency will manage its excess uranium inventory through controlled sales or transfers in a transparent manner that will result in the U.S. government's receipt of reasonable value for any such transactions.

- *Russia*. In 2009, IAEA's Board of Governors approved a Russian-established fuel bank housed in Angarsk, Russia, that operates under the auspices of IAEA. Specifically, according to an IAEA report, a country facing a fuel supply cutoff would apply to IAEA to access the fuel bank, and IAEA's Director General would then assess whether the applicant country meets the criteria for access. Similar to IAEA's nuclear fuel bank, fuel from the Russian bank is available as a backup supply to any eligible IAEA member country that faces a non-commercial or technical disruption of fuel supply for its civilian nuclear power reactors. According to IAEA officials, this bank is funded entirely by Russia and uses Russian fuel, whereas IAEA's fuel bank is being funded by the $150 million in extra-budgetary contributions from certain member countries and other donors.

- *United Kingdom*. In 2011, IAEA's Board of Governors approved a proposal by the United Kingdom to create a nuclear fuel assurance program that would ensure the continued supply of nuclear fuel in the event a country's supply is disrupted for political reasons. Unlike the IAEA, Russian, and U.S. fuel banks, this guaranteed fuel supply option does not call for a physical stockpile of fuel. Instead, it is intended to provide a contractual agreement between IAEA, a supplier country, and a recipient country to guarantee an uninterrupted supply of fuel. According to IAEA, the agency's status as a co-signatory would play a central role in building confidence in such contracts.

[53] GAO, *Nuclear Weapons: Actions Needed to Identify Total Costs of Weapons Complex Infrastructure and Research and Production Capabilities*, GAO-10-582 (Washington, D.C.: Jun. 21, 2010).

Multiple Fuel Supply Options May Result in Duplication of Effort

We identified potential overlapping functions among the United States' nuclear fuel bank and these other guaranteed fuel supply options, as they are all similar in purpose and intent.[54] Although some of these options are better developed than others, they all have a common goal. Specifically, each one seeks to provide a guaranteed supply of nuclear fuel to eligible countries to reduce the risk of nuclear proliferation. Consequently, they all appear to be targeting a similar set of countries: those countries that are looking to develop or sustain civilian nuclear power programs without having to develop their own nuclear fuel enrichment capabilities. However, it is unclear how the existence of multiple guaranteed fuel supply options will directly reduce potential proliferation risks because those countries of greatest proliferation concern may not be likely—or eligible—to use these fuel supply options.

Notably, there is potential duplication between the U.S. nuclear fuel bank, which already exists, and the IAEA fuel bank, which is expected to begin operation by 2014. There may be significant financial implications associated with the United States' supporting two nuclear fuel banks. Specifically, the United States has already expended resources with a total value of approximately $223.1 million on these two fuel banks through fiscal year 2012: $49.5 million for the IAEA bank and about $173.6 million for the U.S. bank. Given the fiscal pressures that the United States currently faces, it is important for NNSA to review and assess the need for a U.S. fuel bank and report on the results of such an assessment. As we have reported in the past,[55] consolidating programs

[54] In this report, and as we have done in previous reports, we use the term "overlap" to refer to circumstances when multiple agencies and programs have similar goals, engage in similar activities or strategies to achieve them, or target similar beneficiaries. The presence of overlap can suggest the need to look closer at the potential for unnecessary duplication. However, our review did not go to sufficient depth to determine whether and to what extent the programs are actually duplicative, which occurs when two or more agencies or programs are engaged in identical activities or provide the same services to the same beneficiaries. For more information on overlap and duplication in federal programs, see GAO, *Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue*, GAO-11-318SP (Washington, D.C.: Mar. 1, 2011); and GAO, *Managing for Results: Using the Results Act to Address Mission Fragmentation and Program Overlap*, GAO/AIMD-97-146 (Washington, D.C.: Aug. 29, 1997).

[55] See GAO, *2012 Annual Report: Opportunities to Reduce Duplication, Overlap and Fragmentation, Achieve Savings, and Enhance Revenue*, GAO-12-342SP (Washington, D.C.: Feb. 28, 2012) and GAO, *Nuclear Nonproliferation: Action Needed to Address NNSA's Program Management and Coordination Challenges*, GAO-12-71 (Washington, D.C.: Dec. 14, 2011).

sharing common goals and implementing similar projects can maximize limited resources and may achieve potential cost savings or other programmatic and administrative efficiencies. In addition, we have reported that conducting an assessment to better understand the extent to which programs may overlap with each other is important to mitigate the risk of unnecessary duplication. However, as of February 2013, NNSA officials told us they had not formally assessed the extent to which the U.S. fuel bank may overlap with IAEA's fuel bank. As a result, NNSA may lack information on the extent to which unnecessary duplication between the U.S. and IAEA fuel banks may exist.

NNSA and IAEA officials told us that having several backup fuel supply options increases the availability of LEU fuel worldwide to serve as a safety net in the event of a supply disruption or shortage. Thus, according to IAEA officials, the existence of multiple fuel assurance programs would help ensure that a country interested in developing or expanding its civilian nuclear power program would have ready access to fuel and not be dependent on one supplier but could choose from a number of fuel supply options. Furthermore, IAEA officials told us that the greater the number of these fuel supply options, the lesser the likelihood that a country will develop its own enrichment capability, thus reducing potential nuclear proliferation risks. These officials also stated that some element of duplication is inherent in the concept of assurance but noted that there is a point at which multiple efforts have diminishing returns. Moreover, having multiple safety net suppliers decreases the likelihood that any one of these options will ever be used.

Conclusions

IAEA has continued to strengthen its safeguards program since we last reported on it in 2005. In particular, IAEA has successfully encouraged more countries to conclude an Additional Protocol and, as appropriate for certain countries, to amend or rescind small quantities protocols, or to bring comprehensive safeguards agreements into force. Despite this progress, IAEA continues to face certain challenges that may limit its ability to further enhance the effectiveness and efficiency of the safeguards program. First, the agency has not clearly defined and communicated how it will implement the state-level concept, and several countries have raised concerns as to whether IAEA would implement it in an objective, nondiscriminatory manner that does not exceed its authority to collect information about countries' nuclear activities. Without widespread acceptance among member countries, IAEA may not be able to implement this next phase in the evolution of safeguards in all countries with safeguards agreements by 2014. Second, the agency has

not identified the human capital, technological, or other resources it needs to broaden implementation of the state-level concept—as well as the associated long-term costs and benefits of such resources. Without assessing and quantifying the long-term resource needs and the associated costs and benefits, it is unclear what expertise, technology, or other resource gaps may exist.

In addition, while IAEA has increased training and other efforts to build countries' capacity to improve the physical security of their nuclear material and facilities, the agency continues to rely heavily on extra-budgetary contributions, which vary from year to year and are often designated by donors for specific projects in certain countries. As a result, it is difficult for the agency to plan and implement projects where security needs may be greatest. In this context, IAEA has not assessed its long-term resource needs for nuclear security activities and has not identified how it will meet those needs through the regular budget, extra-budgetary contributions, or both. Without more predictable long-term financial resources, the agency cannot adequately plan ahead and ensure that the greatest security needs are addressed in a timely manner. Further, while IAEA has developed performance measures for its nuclear security program since our 2005 report, the agency does not systematically report on the results of these performance measures. Without systematically reporting on these results, member countries and the international community at large cannot gauge the extent to which IAEA is achieving its goals or the nuclear security program's impact and effectiveness.

The concept of an international nuclear fuel bank as a nonproliferation tool may have merit, but uncertainties exist about its value, potential market impact, and long-term operation. In particular, it is unclear what value the IAEA fuel bank adds to nuclear nonproliferation efforts worldwide. Furthermore, it is impossible to determine whether IAEA's fuel bank would interfere with the operation of the international nuclear fuel market because the agency has not made publicly available its assessment of the bank's potential market impact. Two years after IAEA's Board of Governors voted to approve the nuclear fuel bank, the agency also has not yet developed a plan for the bank's long-term operation and funding. Without a long-term plan that includes strategies to help set priorities and allocate resources to guide the bank beyond its first few years, the long-term prospects for the fuel bank's viability are uncertain. In the event that IAEA needs funds beyond the initial $150 million, the United States—the largest single-country donor to the fuel bank—and other donors will likely expect additional information about the bank's long-term operation before making further contributions.

In addition to supporting IAEA's nuclear fuel bank, the United States has created its own fuel bank to serve as a safety net fuel supply to eligible countries. However, it is unclear how the existence of multiple guaranteed fuel supply options will directly reduce potential proliferation risks because those countries of greatest proliferation concern may not be likely—or eligible—to use the U.S. fuel bank. Furthermore, NNSA has released little information about the U.S. bank's operations, such as whether the bank is being used, estimated demand, potential impact on the international market, or any controls to mitigate the potential market impact. Moreover, NNSA has not released information on the financial status of the U.S. fuel bank—including a 10-year contract that transferred government assets worth approximately $145.3 million, plus $28.3 million in appropriated funds from fiscal years 2002 through 2012—in NNSA's annual budget justification reports or other publicly available documents. Finally, given the overlapping purposes of IAEA's and the United States' fuel banks, there may be duplication of effort that could have significant financial implications. In light of the fiscal pressures the United States faces, and the United States' financial support of IAEA's fuel bank, it is important for NNSA to review and assess the need for a U.S. fuel bank and report on the results of such an assessment.

Recommendations for Executive Action

We are making nine recommendations in this report.

To ensure that safeguards and nuclear security resources are allocated and spent in the most effective and efficient manner, the Secretary of State should work with IAEA and its member countries through the agency's Board of Governors to consider the following four actions:

- clearly define and communicate how the agency will implement the state-level concept in an objective, nondiscriminatory manner that does not exceed IAEA's authority to collect information about countries' nuclear activities;
- conduct an assessment of the human capital, technological, and other resources the agency may need to broaden implementation of the state-level concept—and the associated long-term benefits and costs;
- evaluate the nuclear security program's long-term resource needs and assess whether the agency's heavy reliance on extra-budgetary contributions is sufficient to plan and meet those needs; and

- systematically report on the results of the agency's performance measures for the nuclear security program to allow member countries and the international community at large to gauge the extent to which the agency is achieving its goals or the nuclear security program's impact and effectiveness.

To ensure that IAEA's nuclear fuel bank is implemented in the most effective and efficient manner, the Secretary of State should work with IAEA and its member countries through the agency's Board of Governors to consider the following two actions:

- prepare a publicly available assessment of the potential impact of IAEA's nuclear fuel bank on the international nuclear fuel market; and

- ensure that the agency's plan for the long-term operation and funding of the nuclear fuel bank includes strategies to help set priorities and allocate resources for the viability of the fuel bank that include, for example, information on the levels and sources of funding needed for the ongoing maintenance and operation of the fuel bank.

To ensure the most effective, efficient, and transparent use of U.S. government resources, we recommend that the Administrator of NNSA take the following three actions:

- review and assess the need for the U.S. nuclear fuel bank, based on the United States' financial support of IAEA's fuel bank and the potential for duplication of efforts, and report on the results of this assessment;

- report key information on the U.S. nuclear fuel bank's operations, such as its use to date, estimated demand, potential impact on the international nuclear fuel market, or any controls to mitigate the potential market impact; and

- review and report on the financial status of the U.S. nuclear fuel bank, including its costs to date and any ongoing costs related to the bank, in NNSA's annual budget justification reports or other publicly available documents.

Agency Comments and Our Evaluation

We provided a draft of this report to State, NNSA, the Nuclear Regulatory Commission, and IAEA for review and comment. State and NNSA provided written comments, which are presented in appendixes III and IV, respectively. In its written comments, State noted that our report provides

timely and useful information on several aspects of IAEA's continuing work in the vital areas of safeguards and nuclear security. In addition, State commented that our report accurately recognizes that continued and focused work in the areas identified will require the United States to work closely with IAEA and other member countries to achieve success. Of the six recommendations directed to it, State agreed with three recommendations, disagreed with two recommendations, and did not comment on our recommendation that it should work with IAEA to consider systematically reporting on the results of the agency's performance measures for the nuclear security program. NNSA agreed with all three recommendations directed to it. The Nuclear Regulatory Commission and IAEA did not provide written comments. All three U.S. agencies, as well as IAEA, provided technical comments on our draft report, which we incorporated as appropriate.

In its written comments, State agreed with our recommendations that it should work with IAEA and other member countries to consider the following three actions: (1) clearly define and communicate how IAEA will implement the state-level concept in an objective, nondiscriminatory manner that does not exceed its authority to collect information about a country's nuclear activities; (2) conduct an assessment of the human capital, technological, and other resources the agency may need to broaden implementation of the state-level concept—and the associated long-term benefits and costs; and (3) ensure that the agency's plan for the long-term operation and funding of IAEA's nuclear fuel bank includes strategies to help set priorities and allocate resources for the viability of the fuel bank, such as information on the levels and sources of funding needed for the ongoing maintenance and operation of the fuel bank.

However, State disagreed that it should work with IAEA and other member countries to consider the following two actions: (1) evaluate the nuclear security program's long-term resource needs and whether the agency's heavy reliance on extra-budgetary contributions is sufficient to plan and meet those needs, and (2) prepare a publicly available assessment of the potential impact of IAEA's nuclear fuel bank on the international nuclear fuel market. Specifically, State commented that it believes a resource assessment or long-term planning for the nuclear security program is not possible because IAEA assists member countries by responding to specific requests that cannot be anticipated and then addresses those requests based on staffing and resource availability. State also noted that it does not believe IAEA should spend resources assessing whether extra-budgetary funding is sufficient because such funding is, by nature, voluntary, unpredictable, and often comes with

conditions. In addition, State indicated that IAEA will continue to rely heavily on extra-budgetary contributions for nuclear security, given the limited regular budget for the program.

Notwithstanding State's comments, we continue to believe that long-term strategic and budgetery planning is important to identify priorities and needs and that the absence of such information hinders IAEA's ability to ensure that resources are directed to the greatest nuclear security needs. Given IAEA's extensive knowledge of nuclear security issues worldwide—and after managing the program for more than 10 years—we believe it is reasonable to expect the agency to forecast, prioritize, and plan beyond the agency's 2-year budget cycle. While IAEA has started to develop country-specific nuclear security support plans to identify individual countries' needs, the agency does not have an overall plan that looks comprehensively at nuclear security needs globally and identifies long-term priorities and resource needs for the agency. In our view, such information would add a greater degree of transparency to IAEA's nuclear security program and provide member countries with a clearer understanding of how they might assist the agency in achieving its long-term goals while maximizing limited resources. We agree with State that IAEA will likely continue to rely heavily on extra-budgetary contributions for nuclear security, which, as we have reported, exceeded 80 percent of IAEA's total nuclear security funding both during our prior review in 2005 and our current review. However, this may not be a sustainable long-term funding plan, and the agency may be missing opportunities to justify a potential increase to its limited regular budget and, therefore, to rely less on extra-budgetary contributions. As noted in our report, such extra-budgetary contributions typically fluctuate from year to year and may be designated by donors for projects that are not the agency's highest priorities. We recognize that IAEA currently operates under a zero-real-growth budget environment, but given the fiscal constraints faced by major donors, including the United States, IAEA cannot necessarily assume that donors will continue to make extra-budgetary contributions at the same levels as in the past.

Regarding our recommendation that IAEA should consider preparing a publicly available assessment of the potential impact of IAEA's nuclear fuel bank on the international nuclear fuel market, State indicated that such an assessment "would be a questionable use of the Agency's resources." We disagree with State's position because, as noted in our report, IAEA officials told us that they have already conducted such an assessment but have so far kept the assessment confidential. The point of our recommendation is for IAEA to publicly release the existing

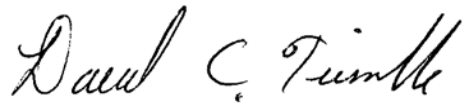
assessment so that member countries and others in the international community can evaluate it and draw their own conclusions. We recognize that IAEA's fuel bank is intended to be used only as a guaranteed supply option in the event of an unanticipated market failure. Nonetheless, some stakeholders have raised concerns, as noted in our report, about the potential market impact of such a multilateral nuclear fuel bank, regardless of its size. In fact, a senior State official told us that some fuel supplier countries have expressed concern that IAEA's planned fuel bank could disrupt the market and affect fuel prices. In our view, unless IAEA publicly releases its assessment, there will likely continue to be debate about whether IAEA's fuel bank could have unintended consequences. In addition, State commented that there is no danger the IAEA fuel bank would "flood" the international nuclear fuel market because the fuel would never be offered en masse or under a long-term supply contract. Our report does not suggest that IAEA's fuel bank would flood the market but, rather, that its potential effect on the market is unclear. As stated in our report, one of the IAEA Board of Governors' conditions for the bank is that its use will not affect the international nuclear fuel market. Thus we continue to believe that our recommendation for IAEA to publicly release its assessment of the fuel bank's potential market impact has merit.

In its written comments, NNSA agreed with all three recommendations directed to NNSA to help ensure the most effective, efficient, and transparent use of U.S. government resources in reference to the U.S. nuclear fuel bank. Specifically, our recommendations are for NNSA to take the following three actions: (1) review and assess the need for the U.S. nuclear fuel bank, based on the United States' financial support of IAEA's fuel bank and the potential for duplication of efforts, and report on the results of this assessment; (2) report key information on the U.S. nuclear fuel bank's operations, such as its use to date, estimated demand, potential impact on the international nuclear fuel market, or any controls to mitigate the potential market impact; and (3) review and report on the financial status of the U.S. nuclear fuel bank, including its costs to date and any ongoing costs related to the bank, in NNSA's annual budget justification reports or other publicly available documents. Regarding the third recommendation, NNSA commented that "there are no future costs anticipated to NNSA, as the ongoing compensation for the storage of the [LEU] for the fuel bank is covered by barter arrangement whereby the contractor can use a portion of the LEU as working inventory." Based on this comment and additional technical information provided by NNSA, we have added clarifying language in our report. Specifically, we added that the contractor is allowed to borrow a portion of the LEU fuel for its ongoing business activities, provided the contractor meets certain

conditions, including replacing any LEU it uses. In addition, we noted that the storage portion of the contract extends for 10 years, through June 2017, and that there are options for extending the contract in 5-year increments. However, until NNSA extends the contract or potentially awards it to another party, it is premature to speculate, in our view, as to whether NNSA may incur additional storage or other costs related to the U.S. fuel bank in the future.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Secretary of State, the Administrator of NNSA, the Chairman of the Nuclear Regulatory Commission, the appropriate congressional committees, and other interested parties. In addition, this report will be available at no charge on the GAO website at http://www.gao.gov.

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



David C. Trimble
Director, Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

The objectives of our review were to examine: (1) changes that have occurred since 2005 and challenges, if any, that the International Atomic Energy Agency (IAEA) faces in carrying out its safeguards program; (2) changes that have occurred since 2005 and limitations, if any, regarding IAEA's nuclear security program; and (3) the status of IAEA's planned international nuclear fuel bank.

For all three objectives, we traveled to Vienna, Austria, in June 2012 and spoke with IAEA officials responsible for implementing the safeguards, nuclear security, and fuel bank programs. While in Vienna, we also conducted interviews with a nonprobability sample[1] of officials from 15 countries, in addition to the U.S. Mission to the United Nations System Organizations in Vienna (U.S. Mission), to obtain their views on these programs.

To select these countries, we identified criteria and selected countries that met at least three of the criteria we identified. The criteria for selection included IAEA member countries that:

- possess nuclear weapons,
- reprocess nuclear material,
- are members of the IAEA Board of Governors for 2011-2012,
- are members of the Non-Aligned Movement,
- have nuclear power or plan to have nuclear power reactors,
- brought an Additional Protocol into force, and
- consume the greatest share of IAEA safeguards resources.

Given the aforementioned criteria, we identified and invited 25 geographically diverse countries to participate in interviews. Of the 25 countries, 15 responded to our invitation. Therefore, we completed in-person interviews with officials from the following countries: Brazil, Canada, Chile, China, France, Germany, India, Israel, Japan, Pakistan, Russia, South Korea, Turkey, the United Arab Emirates, and the United Kingdom. Throughout this report, we distinguish between statements made by the U.S. Mission and other countries (foreign missions), and we

[1] Results from nonprobability samples cannot be used to make inferences about a population because in a nonprobability sample some elements of the population being studied have no chance or an unknown chance of being selected as part of the sample. However, in this case, the results of such a sample can provide examples of individual countries' views of the three IAEA programs.

use the term “some” when referring to two or three countries and “several” when referring to four or more countries.

In addition, we interviewed 15 experts who specialize in nuclear nonproliferation issues and are knowledgeable about IAEA’s safeguards, nuclear security, and/or fuel bank programs. Specifically, we met with 11 experts from 9 different academic think tanks and nongovernmental organizations—such as the Belfer Center for Science and International Affairs at Harvard University’s John F. Kennedy School of Government, the World Institute for Nuclear Security, and the Nuclear Threat Initiative—and 4 former senior IAEA officials. The four former senior IAEA officials consisted of the immediate past two Heads of the Department of Safeguards, the former Director of the Office of Nuclear Security, and the prior Head of the Department of Management. To select the experts we interviewed, we identified and prepared a list of nuclear nonproliferation experts based on several factors, including the following:

- their direct knowledge of IAEA from their recent prior work at the agency regarding the safeguards, nuclear security, and/or fuel bank programs;
- their extensive knowledge of IAEA’s safeguards, nuclear security, and/or fuel bank programs, based on their work at academic institutions or nongovernmental organizations;
- their prior experience in meeting with GAO as subject matter experts; and
- referrals from other nuclear nonproliferation experts (snowball sampling).

Throughout this report, we use the term “some” when referring to two or three experts and “several” when referring to four or more experts.

For all three objectives, we also collected documents from, and interviewed, officials from the Department of Energy’s (DOE) National Nuclear Security Administration (NNSA) and DOE national laboratories, including Brookhaven National Laboratory in New York, which manages U.S. technical assistance to IAEA’s safeguards program. Further, we obtained the views of officials from the U.S. Mission on the changes and

any challenges they identified for the IAEA safeguards and nuclear security programs since we last reported on them in 2005, as well as their views on IAEA's planned fuel bank.[2] We also met with officials from the Department of State's (State) Bureau of International Organization Affairs, Bureau of International Security and Nonproliferation, and Office of Multilateral Nuclear and Security Affairs in Washington, D.C., as well as officials from State who were knowledgeable about U.S. extra-budgetary contributions for each of the programs.

To examine the changes that have occurred since 2005 and challenges, if any, that IAEA faces in carrying out its safeguards program, we obtained and analyzed agency documentation related to the safeguards program, including the agency's biennial program and budget documents, annual reports, and long- and medium-term strategic plans. In June 2012, we met with IAEA officials from the Department of Safeguards, including the directors and staff responsible for implementing the state-level concept in Vienna, Austria. We also toured IAEA's Safeguards Analytical Laboratories in Seibersdorf, Austria, where environmental and nuclear material samples are analyzed. We also interviewed officials from DOE's Lawrence Livermore National Laboratory in California, which, as part of IAEA's international network of safeguards analytical laboratories, analyzes nuclear material samples collected by IAEA inspectors. Furthermore, we interviewed officials from the Nuclear Regulatory Commission and the Department of Defense, including a senior official from the U.S. Air Force Technical Applications Center, which operates one of the laboratories that conducts environmental sample analysis as part of IAEA's international network of safeguards analytical laboratories. In addition, we attended a workshop in May 2012 on "evolving the state-level concept" because it was dedicated to discussing IAEA's plans for implementing the state-level concept for safeguards and because it included attendees from IAEA and U.S. government agencies. The workshop was hosted by the Institute of Nuclear Materials Management and held at the University of Virginia in Charlottesville, Virginia. To identify IAEA's total regular budget and extra-budgetary cash contributions for the safeguards program in 2011, we indentified such information in the agency's annual report for 2011 and gathered and reviewed data from IAEA officials. To identify the United States' extra-budgetary cash

[2] GAO-06-93.

contributions to the safeguards program in 2011, we gathered and reviewed data from State.

To examine the changes that have occurred since 2005 and limitations, if any, regarding IAEA's nuclear security program, we collected and analyzed documentation, including IAEA's yearly reports to its Board of Governors on its nuclear security program, as well as IAEA's *Nuclear Security Plan 2010-2013*. We also met with officials from IAEA's Office of Nuclear Security and the Office of Legal Affairs in Vienna, Austria. Moreover, we met with NNSA officials to obtain their views on IAEA's security activities, budget, and management issues. In addition, we spoke with experts from nongovernmental organizations and academic think tanks, such as the Partnership for Global Security and Harvard University's Belfer Center, to obtain their perspectives regarding IAEA's nuclear security activities. To identify IAEA's total regular budget and extra-budgetary cash contributions for the nuclear security program in 2011, we reviewed such information in IAEA's annual report for 2011. To identify the United States' extra-budgetary cash contributions to the nuclear security program, we gathered and reviewed data from State.

To examine the status of IAEA's planned nuclear fuel bank, we spoke with officials in the Director General's Office for Policy in Vienna, Austria, to discuss IAEA's progress toward implementing the fuel bank. We also met with officials from the Nuclear Threat Initiative, which, alongside IAEA and the U.S. government, contributed funding for the fuel bank. Further, we met with NNSA officials to obtain additional information regarding IAEA's fuel bank, as well as the American Assured Fuel Supply (U.S. fuel bank). To identify IAEA's total budget on the fuel bank program, we obtained documentation and met with IAEA officials involved in the budgeting process. We also obtained U.S. budget data related to the U.S. fuel bank from NNSA officials, as well as gathered other information related to the U.S. fuel bank published in the *Federal Register*.

To assess the reliability of IAEA's budget data related to the safeguards, nuclear security, and fuel bank programs, we compared data from different published sources, including the *Federal Register*, and we met with IAEA and U.S. officials to discuss these data in detail. We also obtained and reviewed responses from key officials from State that addressed such areas as data entry, data access, quality control procedures, and data accuracy and completeness regarding the data they provided on U.S. extra-budgetary cash contributions for each program. Further, we analyzed other documentation, such as the external auditor's report on IAEA, as well as the agency's strategic planning documents. In

addition, we obtained written responses from IAEA and U.S. officials to clarify discrepancies in the data we received. Throughout this report, we calculated all monetary figures for IAEA's safeguards, nuclear security, and fuel bank programs using the exchange rates published in the agency's annual report for 2011, which was the average exchange rate used by the United Nations in 2011 of $1.3893 to €1.00. Based on this work, we determined that data provided by IAEA to be sufficiently reliable for presenting the overall amount of money budgeted for each program in 2011. Additionally, we determined that the data on U.S. extra-budgetary cash contributions provided by State to be sufficiently reliable for presenting the overall amount of U.S. extra-budgetary cash contributions to IAEA in 2011. Finally, we determined that the data provided by NNSA and published in the *Federal Register* related to U.S. funding for IAEA's planned fuel bank to be sufficiently reliable for presenting the amount of funding that IAEA's fuel bank program has received to date from the United States.

We conducted this performance audit from January 2012 to April 2013 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Status of Countries' Safeguards Agreements, Additional Protocols, and Small Quantities Protocols in Force with IAEA, as of December 2012

Country	Comprehensive safeguards agreement[a]	Additional Protocol	Small quantities protocol
Non-nuclear weapon states			
Afghanistan	X	X	X
Albania	X	X	
Algeria	X		
Andorra	X	X	X
Angola	X	X	X
Antigua and Barbuda	X		X
Argentina	X		
Armenia	X	X	
Australia	X	X	
Austria	X	X	
Azerbaijan	X	X	X
Bahamas	X		X
Bahrain	X	X	X
Bangladesh	X	X	
Barbados	X		X
Belarus	X		
Belgium	X	X	
Belize	X		X
Benin			
Bhutan	X		X
Bolivia	X		X
Bosnia and Herzegovina	X		
Botswana	X	X	
Brazil	X		
Brunei Darussalam	X		X
Bulgaria	X	X	
Burkina Faso	X	X	X
Burundi	X	X	X
Cambodia	X		X
Cameroon	X		X
Canada	X	X	
Cape Verde			
Central African Republic	X	X	X

Country	Comprehensive safeguards agreement[a]	Additional Protocol	Small quantities protocol
Chad	X	X	X
Chile	X	X	
Colombia	X	X	
Comoros	X	X	X
Congo, Republic of the	X	X	X
Costa Rica	X	X	X
Côte d'Ivoire	X		
Croatia	X	X	X
Cuba	X	X	
Cyprus	X	X	
Czech Republic	X	X	
Democratic People's Republic of Korea (North Korea)[b]	X		
Democratic Republic of the Congo	X	X	
Denmark	X	X	
Djibouti			
Dominica	X		X
Dominican Republic	X	X	X
Ecuador	X	X	X
Egypt	X		
El Salvador	X	X	X
Equatorial Guinea			
Eritrea			
Estonia	X	X	
Ethiopia	X		X
Fiji	X	X	X
Finland	X	X	
Gabon	X	X	X
Gambia	X	X	X
Georgia	X	X	
Germany	X	X	
Ghana	X	X	
Greece	X	X	
Grenada	X		X
Guatemala	X	X	X
Guinea			
Guinea-Bissau			

Country	Comprehensive safeguards agreement[a]	Additional Protocol	Small quantities protocol
Guyana	X		X
Haiti	X	X	X
Holy See	X	X	X
Honduras	X		X
Hungary	X	X	
Iceland	X	X	X
Indonesia	X	X	
Iran, the Islamic Republic of	X		
Iraq	X	X	
Ireland	X	X	
Italy	X	X	
Jamaica	X	X	
Japan	X	X	
Jordan	X	X	X
Kazakhstan	X	X	
Kenya	X	X	X
Kiribati	X		X
Korea, Republic of (South Korea)	X	X	
Kuwait	X	X	X
Kyrgyzstan	X	X	X
Laos	X		X
Latvia	X	X	
Lebanon	X		X
Lesotho	X	X	X
Liberia			
Libya	X	X	
Liechtenstein	X		
Lithuania	X	X	
Luxembourg	X	X	
Macedonia, Republic of	X	X	X
Madagascar	X	X	X
Malawi	X	X	X
Malaysia	X		
Maldives	X		X
Mali	X	X	X
Malta	X	X	

Country	Comprehensive safeguards agreement[a]	Additional Protocol	Small quantities protocol
Marshall Islands	X	X	
Mauritania	X	X	X
Mauritius	X	X	X
Mexico	X	X	
Micronesia			
Moldova, Republic of	X	X	X
Monaco	X	X	X
Mongolia	X	X	X
Montenegro	X	X	X
Morocco	X	X	
Mozambique	X	X	X
Myanmar	X		X
Namibia	X	X	X
Nauru	X		X
Nepal	X		X
Netherlands	X	X	X
New Zealand	X	X	X
Nicaragua	X	X	X
Niger	X	X	
Nigeria	X	X	
Norway	X	X	
Oman	X		X
Palau	X	X	X
Panama	X	X	X
Papua New Guinea	X		X
Paraguay	X	X	X
Peru	X	X	
Philippines	X	X	
Poland	X	X	
Portugal	X	X	
Qatar	X		X
Romania	X	X	
Rwanda	X	X	X
St. Kitts and Nevis	X		X
St. Lucia	X		X
St. Vincent & the Grenadines	X		X

Country	Comprehensive safeguards agreement[a]	Additional Protocol	Small quantities protocol
Samoa	X		X
San Marino	X		X
Sao Tomé and Principe			
Saudi Arabia	X		X
Senegal	X		X
Serbia	X		
Seychelles	X	X	X
Sierra Leone	X		X
Singapore	X	X	X
Slovakia	X	X	
Slovenia	X	X	
Solomon Islands	X		X
Somalia			
South Africa	X	X	
Spain	X	X	
Sri Lanka	X		
Sudan	X		X
Suriname	X		X
Swaziland	X	X	X
Sweden	X	X	
Switzerland	X	X	
Syrian Arab Republic (Syria)	X		
Tajikistan	X	X	
Tanzania, United Republic of	X	X	X
Thailand	X		
Timor-Leste			
Togo	X	X	X
Tonga	X		X
Trinidad and Tobago	X		X
Tunisia	X		
Turkey	X	X	
Turkmenistan	X	X	
Tuvalu	X		X
Uganda	X	X	X
Ukraine	X	X	
United Arab Emirates	X	X	X

Country	Comprehensive safeguards agreement[a]	Additional Protocol	Small quantities protocol
Uruguay	X	X	
Uzbekistan	X	X	
Vanuatu			
Venezuela	X		
Vietnam	X	X	
Yemen	X		X
Zambia	X		X
Zimbabwe	X		X
Nuclear weapon states[c]	**Voluntary offer safeguards agreement**	**Additional Protocol**	**Small quantities protocol**
China	X	X	
France	X	X	X[d]
Russian Federation (Russia)	X	X	
United Kingdom	X	X	X[d]
United States	X	X	X[d]
Non-NPT signatory countries[e]	**Item-specific safeguards agreement**	**Additional Protocol**	**Small quantities protocol**
India	X		
Israel	X		
Pakistan	X		

Source: GAO presentation of IAEA data.

[a] As noted earlier, IAEA does not officially recognize Taiwan as a state, but IAEA applies safeguards in Taiwan under two agreements that entered into force in October 1969 and December 1971. Taiwan has also implemented the measures of the Model Additional Protocol since October 1999.

[b] Although North Korea concluded a comprehensive safeguards agreement with IAEA in 1992, the agency has not been able to conduct all necessary safeguards activities provided for in the agreement since 1994 and, in January 2003, North Korea announced its withdrawal from the Treaty on the Nonproliferation of Nuclear Weapons (NPT).

[c] As of the end of December 2012, the five nuclear weapon states had safeguards agreements in force, called voluntary offer agreements, in which safeguards were implemented with regard to declared nuclear material in selected facilities in all five states. In addition, the five nuclear weapon states had Additional Protocols in force at that time.

[d] As of the end of December 2012, France, the United Kingdom, and the United States had operative small quantities protocols in reference to their respective territories in Latin America. These operative small quantities protocols are associated with these three countries' safeguards agreements pursuant to Additional Protocol I to the Treaty of Tlatelolco, which are different from their voluntary offer agreements under the NPT.

[e] As of the end of December 2012, these three non-NPT signatory countries had what are called item-specific safeguards agreements in force that require the application of safeguards to nuclear material, facilities, and other items specified in the relevant safeguards agreement.

Appendix III: Comments from the Department of State

United States Department of State
Comptroller
1969 Dyess Avenue
Charleston, SC 29405

MAR 20 2013

Dr. Loren Yager
Managing Director
International Affairs and Trade
Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548-0001

Dear Dr. Yager:

We appreciate the opportunity to review your draft report, "NUCLEAR NONPROLIFERATION: IAEA Has Made Progress in Implementing Critical Programs but Continues to Face Challenges" GAO Job Code 361375.

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 Michael Foughty, Foreign Affairs Officer or Stephen Adams, Physical Scientist, Bureau of International Security and Nonproliferation at (202) 647-2832 or (202) 647-3302.

Sincerely,

James L. Millette

cc: GAO – David Trimble
ISN – Thomas Countryman
State/OIG – Evelyn Klemstine

Department of State Comments on GAO Draft Report

NUCLEAR NONPROLIFERATION: IAEA Has Made Progress in Implementing Critical Programs but Continues to Face Challenges (GAO-13-139, GAO Code 361375)

Thank you for the opportunity to comment on your draft report entitled *NUCLEAR NONPROLIFERATION: IAEA Has Made Progress in Implementing Critical Programs but Continues to Face Challenges*. The Department of State has been a strong supporter of the International Atomic Energy Agency (IAEA) since its creation in 1957 and welcomes the latest GAO report on IAEA oversight. This is the first GAO review of the IAEA's safeguards and nuclear security programs since 2005, and it provides an update on how these programs are conducted at the Agency. The report provides timely and useful information on several aspects of the IAEA's continuing work in these vital areas.

Safeguards: The Department of State endorses most of the main findings and conclusions contained in the GAO report. We also agree with many of the recommendations. In particular, we agree on the need to work with the IAEA and with other IAEA Member States to clearly define and communicate how the IAEA will implement the state-level concept (SLC) in an objective, nondiscriminatory manner that does not exceed IAEA's authority to collect information about a country's nuclear activities. Indeed, the Department of State, along with DOE/NNSA, has been engaged in such work with the IAEA and other member States for some time. While the implementation details of the SLC will be decided upon by the IAEA Secretariat, the Department of State will continue to work with interagency partners and other Member States to provide support to the IAEA in this endeavor. As mentioned in the report, at the most recent IAEA General Conference, the "*Strengthening the effectiveness and improving the efficiency of the safeguards system and application of the Model Additional Protocol*" resolution "[requested] the Secretariat to report to the Board of Governors on the conceptualization and development of the State-level concept for safeguards." It is our understanding that the Secretariat is currently preparing this report, which will largely address this recommendation.

We agree that it would be useful to have "an assessment of human capital, technological, and other resources the agency may need to fully implement the state-level concept—and the associated long-term benefits and costs," and recognize that the IAEA has not quantified the long-term costs and benefits of fully

implementing the state-level concept.[1] We have encouraged the IAEA to improve its methodology for assessing the costs of alternative safeguards approaches in order maintain or strengthen safeguards effectiveness while increasing efficiency. But we also recognize that it is much more difficult to assess the cost implications for state-level safeguards approaches than for traditional facility-level safeguards approaches, since much of the much of the effort under a state-level safeguards approach is devoted to cross-cutting activities performed across many organizational units at IAEA headquarters in Vienna. After the IAEA issues its report on the SLC, we will be in a better position to determine ways to assist and advise the IAEA to improve cost methodologies and assess resource needs. Though this is an important goal, it will be equally important that such work is done within the parameters and constraints of the resources that will be available to the IAEA in an environment of little or no growth. The IAEA's most recent publication concerning this topic – "The Agency's Draft Programme and Budget 2014-2015"—observed that for the 2014-15 budget, "strict prioritization was pursued among and within the programmes, and the application of efficiency measures."[2]

Finally, we particularly agree that clearly defining and communicating how the IAEA can implement the state-level concept in an objective, nondiscriminatory manner that does not exceed the IAEA's authority to collect information about a country's nuclear activities is an important goal that should be undertaken quickly.

Nuclear Security: Planning and Needs Based Assessment (Performance Measures). We do not agree that a needs-based assessment or long-term planning is possible, because the IAEA assists Member States by responding to specific requests that cannot be anticipated, which the IAEA addresses based on staffing and resource availability. The development of living Integrated Nuclear Security Support Plans (INSSPs) could have a beneficial impact on long-term planning. Specifically, if states would be willing to share requests and needs documented in the INSSPs with donors, then it is conceivable that extrabudgetary funding could be more effectively used. We also do not believe the Agency should spend time and resources attempting to assess whether its extrabudgetary funding can meet its needs. By its nature, extrabudgetary funding is voluntary, unpredictable, and often comes with conditions. Furthermore, given the limited regular budget for nuclear security, the IAEA will continue to rely heavily on the voluntary contributions to the Nuclear Security Fund.

[1] This is a key finding on pp. 25-27
[2] See IAEA Board of Governors GOV/13/1, dated March 5, 2013, page iii

IAEA Fuel Bank. We agree with the GAO that the IAEA's nuclear fuel bank should be implemented in the most effective and efficient manner possible. We share GAO's view that the IAEA's plan for the fuel bank's long term operation and funding should include strategies to help set priorities and allocate resources for the viability of the fuel bank, e.g., information on the levels and sources of funding for the ongoing maintenance and operation of the fuel bank. In this regard it should be noted that as part of its 2010 decision to create the bank, the Board of Governors tasked the IAEA Director General to develop a "detailed financial and administrative plan for the on-going operation of the LEU bank to ensure its effective management and sustainability." At the same time the Board recognized its responsibility to "provide direction on governance and accountability" on this project to the Director General (IAEA document GOV/201-/67, paragraph 17). The administrative means to monitor the efficiency and effectiveness of the LEU bank are thus already in place.

We believe the recommendation in the first LEU bank bullet, on the bottom of page 46, that the Agency prepare a publicly available assessment of the potential impact of the IAEA's nuclear fuel bank on the international market, based on the reported worries of some industry officials, would be a questionable use of the Agency's resources. There is no danger that LEU bank would "flood" the market for LEU. The bank's LEU stock would never be offered en masse on the spot market or under a long-term supply contract. Under the terms approved by the Board of Governors, it would only be offered, in specific amounts, to individual countries that can demonstrate that they cannot obtain the necessary LEU on the open market. In order for the bank to be used, the market must already have failed, for whatever reason, at least as to one IAEA Member State. The LEU bank should be thought of as an insurance policy against unanticipated failure of the market, not a potential competitor in the enriched uranium market.

As the GAO draft report illustrates, the IAEA is vital in supporting the nonproliferation goals of the United States and the international community through its safeguards and nuclear security programs. Partnering with the GAO to ensure appropriate oversight is an important element in the U.S. government's ongoing commitment to strengthen management at the Agency. The report accurately recognizes that continued and focused work in the areas identified will require the United States to work closely with the IAEA with other Member States to achieve success.

Appendix IV: Comments from the National Nuclear Security Administration

Department of Energy
National Nuclear Security Administration
Washington, DC 20585

March 13, 2013

Mr. David Trimble
Director
Natural Resources and Environment
Government Accountability Office
Washington, DC 20458

Dear Mr. Trimble:

The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Government Accountability Office's (GAO) draft report, *NUCLEAR NONPROLIFERATION: IAEA Has Made Progress in Implementing Critical Programs but Continues to Face Challenges*. In response to a request made by the Committee on Homeland Security and Governmental Affairs, United States Senate, GAO was asked to examine: (1) Any challenges the International Atomic Energy agency (IAEA) faces in carrying out its safeguards program; (2) Any limitations regarding the nuclear security program; and (3) The status of IAEA's planned nuclear fuel bank.

The GAO provided three recommendations to NNSA to help ensure the most effective and efficient use of U.S. government resources. NNSA agrees with the recommendations identified in the report, and the enclosure to this letter provides our initial response to each. Technical and general comments for GAO's consideration were also provided directly to the auditors from our Office of Defense Nuclear Nonproliferation.

If you have any questions concerning this response, please contact Dean Childs, Director, Internal Control, at (301) 903-1341.

Sincerely,

Cynthia A. Lersten
Associate Administrator
for Management and Budget

Enclosure

Printed with soy ink on recycled paper

Enclosure

Initial Response to GAO Draft Report Recommendations
"NUCLEAR NONPROLIFERATION: IAEA Has Made Progress in Implementing Critical Programs but Continues to Face Challenges"

To ensure the most effective and efficient use of U.S. government resources, the GAO recommended that the Administrator, National Nuclear Security Administration (NNSA), take the following three actions:

Recommendation 7: Review and assess the need for the U.S. Nuclear Fuel Bank based on the United States' financial support of IAEA's fuel bank and the potential for duplication of efforts, and report on the results of this assessment.

Management Response: Concur

NNSA will commission a report analyzing the need for the U.S. Nuclear Fuel Bank and its relationship to the IAEA Fuel Bank and the potential for duplication of efforts.

Recommendation 8: Report key information on the U.S. Nuclear Fuel Bank's operations, such as its use to date, estimated demand, potential impact on the nuclear fuel market, or any controls to mitigate the potential market impact.

Management Response: Concur

NNSA will prepare and provide a report on all aspects of use of U.S. Nuclear Fuel Bank operations.

Recommendation 9: Review and report on the financial status of the U.S. Nuclear Fuel Bank, including its cost to date and any ongoing costs related to the bank, in NNSA's annual budget justification reports or other publicly available documents.

Management Response: Concur

NNSA will prepare and provide a report on the financial status of the U.S. Nuclear Fuel Bank operations. However, there are no future costs anticipated to NNSA, as the ongoing compensation for the storage of the Low Enriched Uranium (LEU) for the fuel bank is covered by barter arrangement whereby the contractor can use a portion of the LEU as working inventory.

Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact

David C. Trimble, (202) 512-3841 or trimbled@gao.gov

Staff Acknowledgments

In addition to the individual named above, Glen Levis, Assistant Director; Josey Ballenger; Antoinette Capaccio; Bridget Grimes; Alison O'Neill; Steven R. Putansu; and Emily Suarez-Harris made key contributions to this report.