

**The G8 Global Partnership:
Background and Current Status**

Cristina Chuen
Monterey Institute of International Studies

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The Global Partnership Against the Spread of Weapons and Materials of Mass Destruction is nearly three years old. While the initiative—launched on June 27, 2002, at the G8 annual summit in Kananaskis, Canadaⁱ—brought new donors to the table and added a new sense of urgency to nonproliferation projects in Russia, to date the programs have yielded mixed results. There is much that remains to be done if the next seven years are going to fulfill the promise of Kananaskis.

The partnership committed the G7 to raising up to \$20 billion over 10 years to fund nonproliferation projects and launched a new phase in cooperative nonproliferation. Vastly increased amounts of funding were promised by new and old donors alike, along with a commitment by both Russia and its partners to facilitate nonproliferation projects. The partnership built on the foundation of the earlier programs; indeed, the United States promised to contribute half of the Global Partnership funds, counting ongoing efforts as part of their partnership work. The other half of the partnership funds, however, were to be largely new commitments, from the other G7 nations as well as other possible future donors. Since Kananaskis, total pledges have reached nearly \$18 billion.ⁱⁱ New program priorities have been identified and substantial progress has been made in some of these new areas. Twelve new countries have joined the partnership, legal bases for project implementation have been adopted by several nations, and new

mechanisms have been developed to coordinate assistance.ⁱⁱⁱ

However, it is still early to deem the Global Partnership a success. Of the areas declared priorities, the elimination of fissile material, arguably the most important factor in preventing nuclear proliferation, very little progress has been made. Instead, the issue of liability protection has been allowed to stall activities in this and other areas—the increased attention Kananaskis brought to the proliferation threat apparently not enough to persuade world leaders to solve this legal issue. Another priority, submarine dismantlement, has met with far greater success, but has done far more to ameliorate environmental risks than proliferation concerns. And much of the new funding pouring into the submarine area is focused on the easiest tasks, not the biggest threats. The greatest Global Partnership success to date is in the sphere of chemical weapons (CW) annihilation, which had been woefully lagging before the launch of the initiative. However, even here it is not at all certain that Russia will be able to meet Chemical Weapons Convention (CWC) deadlines. While the support of Russia's partners in this area has been significantly revitalized, Russia itself could still do more to ensure its CWC commitments are met.

As it has been nearly three years since Kananaskis, it is time to ask whether the initiative is making a difference or could do more to meet its objectives. This paper details the background to the agreement in Kananaskis; examines events in the areas of submarine dismantlement, chemical weapons elimination, and the elimination of fissile materials; provides an overview of the progress and pitfalls of the past three years; and, finally, summarizes the current status of the initiative. If this program is to make a real difference in securing weapons of mass destruction (WMD) and component materials, stronger leadership and more coordination is needed.

The Lead-Up to Kananaskis

The Global Partnership is the first concrete action by the G8 to deal with nonproliferation issues. However, the G8, and the G7 before it, had made statements on nonproliferation issues for more than a decade prior to Kananaskis, including those on the importance of nonproliferation regimes and the threat to international security posed by nuclear, chemical, and biological weapons proliferation in declarations made at the July 1990 Houston summit and July 1991 London summit. The idea of assisting countries in eliminating their nuclear weapons was first broached at the July 1993 Tokyo summit, where the G7 issued the political declaration “Striving for a More Secure and Humane World,” which included the statement that the G7 “encourage[s] the countries concerned of the former Soviet Union to ensure rapid, safe and secure elimination of nuclear weapons in accordance with current agreements, providing effective assistance to this end.”^{iv}

Subsequent G7 summits paid increasing attention to nonproliferation assistance. At the April 20, 1996, Moscow Summit on Nuclear Safety and Security, G7 and Russian leaders agreed that international cooperation was needed for the safe management and use of plutonium no longer required for defense purposes.^v Thus, the Global Partnership built on a foundation of G7 and G8 attention to the problem of eliminating WMD in the former Soviet Union.

The Kananaskis initiative also benefited from the experience of individual G7 countries in the sphere of nonproliferation assistance. Indeed, the G7 countries had all begun individual assistance programs in the former Soviet countries in the early 1990s, around the time the G7 made its first statement, in Tokyo, regarding the importance of these projects. At the time, most nations preferred to run their own assistance programs, instead of creating a new international organization to handle such aid.^{vi} In December 1991, the

U.S. Congress passed the Soviet Threat Reduction Act, thus initiating the Cooperative Threat Reduction (CTR) programs, the first and most far-ranging of all of the nuclear weapons elimination programs. Programs first started by other countries, such as the Canadian Nuclear Safety Initiative, tended to focus on the safety of Soviet nuclear power plants and domestic nuclear regulatory regimes, with nonproliferation a secondary issue.^{vii}

However, by 1993 many countries were starting nonproliferation programs in the former USSR, particularly projects involved in the elimination of weapons-grade plutonium in Russia. France initiated its AIDA (“Aide au démantèlement,” or dismantlement assistance) program by signing an agreement with Russia in November 1992, which provided for the delivery of radiation detection equipment, containers for radioactive waste, and equipment for nuclear warhead dismantlement.^{viii} Paris began its involvement in studies aimed at adapting Russian nuclear plants to the use of mixed oxide (MOX) fuel (from excess weapons plutonium) one year later.^{ix} Germany, too, became interested in cooperating on MOX fuel research in 1992.^x In January of that year, German Minister of Foreign Affairs Hans-Dietrich Genscher also sponsored a plan tying the elimination of tactical nuclear arms deployed on former Soviet territory with Western financial assistance for disarmament, resulting in the establishment of the Group on Nuclear Weapons, comprising Canada, Germany, France, Italy, and the United Kingdom.^{xi} The German government concluded a framework agreement with Russia at the end of 1992 and, soon after, an agreement on a project for the delivery of special equipment to secure the dismantlement of nuclear weapons.^{xii} Germany, France, and the United Kingdom were also active in upgrading the accounting, protection, and control of fissile materials in the former Soviet Union.^{xiii} Japan too commenced its nonproliferation assistance

projects in the early 1990s. In April 1993 Tokyo pledged \$100 million to aid in the dismantlement of former Soviet nuclear weapons, an amount it later doubled.^{xiv} The following year, Atomic Energy of Canada Limited and Ontario Hydro began cooperating with U.S. and Russian experts to study the possibility of burning MOX fuel derived from weapons plutonium in Canadian CANDU reactors, Canada's first project that was strictly nonproliferation oriented.^{xv} Other European countries were also involved in assistance, either on a bilateral basis or through the International Science and Technology Center (ISTC).^{xvi} However, other than the ISTC and a few other small programs, there was little coordination of nonproliferation assistance to Russia. Each nation carried out its own projects; only the U.S. CTR program really made a significant overall difference in the security of Russian nuclear materials. Other projects made small contributions on the margins but could have made more of an impact with better coordination.

The terrorist attacks of September 11, 2001, in New York and Washington brought a new urgency to efforts to prevent terrorists from obtaining WMD materials. The G8 was quick to react, issuing a statement on September 19 condemning the attacks. The statement indicated that the G8 members had instructed their governments to draw up measures to enhance counterterrorism cooperation, including export controls and the identification and removal of terrorist threats.^{xvii} The G8 also agreed that the terrorist attacks required a collective response.^{xviii} Just more than a week later, on September 28, 2001, the United Nations Security Council adopted Resolution 1373, a wide-ranging anti-terrorism resolution condemning the 9/11 attacks and committing states to new anti-terrorism measures. The resolution also noted the close connection between international terrorism and the "illegal movement of nuclear, chemical, biological and other potentially deadly materials, and in this regard emphasize[d] the

need to enhance coordination of efforts on national, subregional, regional and international levels in order to strengthen a global response to this serious challenge and threat to international security."^{xix} The resolution further galvanized the G8 into action. As Canada assumed the chairmanship of the G8 in January 2002, it made implementation of Resolution 1373 and the fight against terrorism a chief goal for the Kananaskis summit.^{xx} While initial efforts continued the traditional G8 emphasis on legal measures to combat terrorist financing,^{xxi} the G8 soon began discussions on how to prevent terrorists from gaining access to WMD materials and missiles. In addition to the protection of materials and facilities at home, mandated by Resolution 1373, international nonproliferation efforts became a topic of discussion.

Despite the plethora of bilateral programs, by 2002 it was clear that the progress made in the previous decade was small compared to the work that remained to be done. While some projects had been successfully completed, other moneys had not been spent or had not led to visible results. Coordination of the various programs and duplication of efforts had also been a problem, further reducing effectiveness. Representatives from the United States were particularly interested in persuading their partners to increase their funding of these programs, eventually coming up with the proposal that the other nations match the funding commitments already made by Washington.^{xxii} In addition to financial promises, however, much diplomatic work had to be done to develop a framework for the program. Without an agreement on guidelines and principles, it would have been difficult to get the program off the ground. The Canadian delegation also worked hard to reach an agreement that would establish a balance between what recipient nations, primarily Russia, would accept (in terms of verification, monitoring, contracting, treatment of foreign personnel

on its territory, etc.) and the needs of donor nations.

The Kananaskis Statement

The Kananaskis statement included a commitment to six “principles to prevent terrorists, or those that harbor them, from gaining access to weapons or materials of mass destruction.” The development of these principles was a mid-point in the effort to develop a concrete strategy to counter terrorism, another step toward realizing Resolution 1373. The first principle, to “promote the adoption, universalization, full implementation and, where necessary, strengthening of multilateral treaties and other international instruments whose aim is to prevent the proliferation or illicit acquisition of such items [and to] strengthen the institutions designed to implement these instruments,” echoed language in the UN resolution, while the pledges to maintain effective physical protection, accounting, border control, and export control measures with regard to WMD materials, and to strengthen management of WMD materials, minimizing the stocks of nuclear and biological materials and eliminating all chemical weapons, made concrete the commitment inherent in 1373.^{xxiii}

Once the delegates had reached agreement on these principles, negotiators turned to implementation issues. Negotiating the guidelines, outlined in the latter half of the G8 statement issued in Kananaskis, was more difficult than obtaining agreement on the principles and required last-minute negotiations about the program's implementation in Russia and issues of taxation, liability, access, and privileges and immunities.^{xxiv}

The Guidelines for New or Expanded Cooperation Projects, which deal with the issue of implementation, mandated the following:

1. Mutually agreed effective monitoring, auditing, and transparency measures and procedures will be required in order to ensure that cooperative activities meet agreed objectives (including irreversibility as necessary), to confirm work performance, to account for the funds expended, and to provide for adequate access for donor representatives to work sites.
2. The projects will be implemented in an environmentally sound manner and will maintain the highest appropriate level of safety.
3. Clearly defined milestones will be developed for each project, including the option of suspending or terminating a project if the milestones are not met.
4. The material, equipment, technology, services and expertise provided will be solely for peaceful purposes and, unless otherwise agreed, will be used only for the purposes of implementing the projects and will not be transferred. Adequate measures of physical protection will also be applied to prevent theft or sabotage.
5. All governments will take necessary steps to ensure that the support provided will be considered free technical assistance and will be exempt from taxes, duties, levies and other charges.
6. Procurement of goods and services will be conducted in accordance with open international practices to the extent possible, consistent with national security requirements.
7. All governments will take necessary steps to ensure that adequate liability protections from claims related to the cooperation will be provided for donor

countries and their personnel and contractors.

8. Appropriate privileges and immunities will be provided for government donor representatives working on cooperation projects.
9. Measures will be put in place to ensure effective protection of sensitive information and intellectual property.

Some of the guidelines, such as the provision for transparency or to provide tax exemptions for support given under the program, did much to put to rest problems that had been hampering assistance projects for much of the previous decade. Until Kananaskis, for instance, Moscow had been demanding that assistance providers initially pay value-added taxes and receive refunds via a complex process.^{xxv} Other guidelines, however, recognized the importance of certain issues without providing concrete solutions. The guideline stating that “adequate liability protections from claims related to the cooperation will be provided for donor countries and their personnel and contractors” left open a wide field for continued negotiation. The Russians would later seek to use the Multilateral Nuclear Environmental Program in the Russian Federation (MNEPR) agreement, an agreement to facilitate nuclear safety and security projects in the Russian Northwest that was adopted in May 2003, as a template for bilateral agreements with partner countries, whereas some of the partners, such as Canada, took the Global Partnership Guidelines as the starting point for negotiations on their bilateral agreement. While MNEPR included a Protocol on Claims, Legal Proceedings, and Indemnification, its liability provisions were far weaker than those provided in the U.S. CTR umbrella agreement, for instance. Russia’s partners continue to object to the unequal treatment of different assistance projects; as of January 2005, liability

negotiations related to several nonproliferation programs had yet to reach resolution.^{xxvi}

In addition to creating a framework for nonproliferation assistance, the Kananaskis statement was notable for the G7 nations’ commitment to vastly increase their funding of such assistance. The statement promises to raise “up to \$20 billion” over 10 years, through a range of financing options, including debt exchange. Half of the \$20 billion was money already promised by the United States, but the other half was largely new funding. Canada, for instance, which had only spent some \$23 million in the previous decade, was to commit Canadian \$1 billion (U.S. \$650 million).^{xxvii} Italy would promise €1 billion (\$1.2 billion), France €750 million (\$890 million), Germany €1.5 billion (\$1.7 billion), and the United Kingdom \$750 million, similarly multiplying their funding by many times.^{xxviii}

In addition, the Kananaskis statement identified some priority project areas: the destruction of chemical weapons, dismantlement of decommissioned nuclear submarines, disposition of fissile materials, and employment of former weapons scientists. This was a nonexclusive list of priorities, but it was greatly influenced by the issues identified by Moscow as areas in which it was willing to work with foreign partners. Thus, these were the areas in which work was likely to move forward in the initial stages of the partnership. The first project officially mentioned in the G8’s run-up to Kananaskis was the initiative to dispose of excess weapons plutonium, referred to in the progress report issued after the pre-summit foreign ministers’ meeting of June 12-13, 2002.^{xxix} Russia pushed to increase activities in the submarine field and speed up chemical weapons elimination soon thereafter, and continued to support the endeavors of the International Science and Technology Center (ISTC), an international organization that funds civilian science

projects by former and current weapons scientists in the former Soviet Union.^{xxx}

Finally, the Kananaskis statement also provided for the establishment of procedures to conduct annual reviews of project progress; consultation on priorities, project gaps, and overlaps; other coordinating measures; and the reporting of findings to G8 governments.^{xxxi} The form these various measures were to take, however, was left open for future negotiation.

Submarine Dismantlement Assistance: From Talk to Substance

As noted above, assistance dismantling Russia's general-purpose, nuclear-powered submarines was identified in Kananaskis as a priority area for assistance projects. These vessels and their nuclear fuel pose serious environmental and security risks.^{xxxii} The most severe include the risk of proliferation of materials that could be used in the creation of nuclear devices or radiation dispersal devices (also known as "dirty bombs").^{xxxiii} In the past decade, the United States has spent approximately \$1 billion to eliminate nuclear-powered ballistic missile submarines (SSBNs) and improve the security of sites where nuclear warheads and fresh and spent nuclear fuel are stored. As part of this aid, Washington has also provided equipment to scrap submarines in Murmansk, Severodvinsk, and Bolshoy Kamen, much of which can now be used to dismantle general-purpose nuclear-powered submarines. Nevertheless, Russia estimates that \$3.443 billion more will be needed to eliminate all decommissioned general-purpose nuclear submarines and handle related nuclear and radioactive materials (and this figure may well not include the cost of handling three submarines with damaged reactors located in Primorskiy territory).^{xxxiv}

In the two years after Kananaskis, very substantial commitments were made to assist Russia in dismantling general-purpose submarines and in handling related nuclear

and radioactive waste (see Table 1). Russia itself has said it will spend \$65 million per year; Canada, France, Germany, Italy, and the United Kingdom have pledged over \$1 billion in new moneys toward naval projects; while Japan and the United States have retained their commitment in the naval sphere (Japan has promised \$100 million and indicated that it will pledge additional funds when that money has been spent; the United States continues to scrap Russian SSBNs as well as pay for materials protection, control, and accounting upgrades at naval facilities, the construction of nuclear fuel storage casks and facilities, radioactive waste treatment, and other related activities). Non-G8 nations have also joined the Global Partnership work in the naval sphere. Norway, which became involved in this area in 1994 because of environmental concerns, has expanded its assistance in line with its increased concerns over proliferation risks, committing \$122 million in funding, largely to naval projects. Sweden too has brought its related projects under the Global Partnership framework and is considering additional projects for 2005. Most recently, Australia has promised \$7.2 million for naval projects, to be expended through Russia's agreement with Japan. Much of the new expenditure, however, has been on scrapping submarines that are neither a threat to the environment (the oldest are sinking but dismantlement of these vessels is more risky) nor a proliferation concern (the nuclear fuel is not vulnerable until it has been removed from the submarines). Several countries, however, plan to emphasize security upgrades in the coming year.

Table 1: Current Global Partnership Commitments in the Naval Sphere^{xxxv}

Country	Funding Commitments	Projects
Australia	\$7.2 million	No projects have yet been announced. The Australian donation has been contributed to the Japan-Russia Committee on Cooperation for the Elimination of Nuclear Weapons, which will oversee projects.
Canada	\$264 million	Canada's first project, the dismantlement of three Victor-class boats, will cost \$18.5 million. Canada plans to fund the scrapping of an additional nine submarines.
France	\$75 million	France is focusing on remediation of the Gremikha technical base. As France has yet to conclude its overall cooperation agreement with Russia, AIDA-3, France will apparently fund projects under the Northern Dimension Environmental Partnership (NDEP) auspices. NDEP projects awaiting Russian approval include improving spent fuel storage, defueling equipment, and physical protection; work may commence in summer 2005.
Germany	\$410 million in 2003-2008	Germany is focusing on creating safe land-based reactor storage in Sayda Bay, Murmansk. Related projects include refurbishing Nerpa Shipyard, physical protection improvements, and creation of a radioactive waste monitoring system.
Italy	\$476 million	Italy's parliament ratified its overall agreement with Russia on October 28, 2004. Since then, Rome has preliminarily agreed to commit €66 million to fund dismantlement of three Victor submarines and the nuclear-powered battle cruiser <i>Admiral Ushakov</i> , €208.5 million for solid and liquid radioactive waste treatment and transport, including a mobile liquid radioactive waste treatment plant, and €45 million for physical security upgrades. Parliament is expected to approve contracts in these areas within two years.
Japan	\$100 million	Dismantlement of one Victor III-class submarine was completed in December 2004. Negotiations on scrapping five additional submarines have begun.
Norway	\$122 million	Norway is concentrating on rehabilitation of Andreyeva Bay and the <i>Lepse</i> service ship, and funded the dismantlement of two submarines in 2004. Oslo is considering the dismantlement of an additional submarine at Nerpa Shipyard.
Russia	Russian federal budget: \$65 million per year for submarine dismantlement and related issues	Moscow has been quite active in the naval sphere, particularly in the Russian Far East. Activities in the Pacific include shipyard refurbishment, submarine dismantlement, preparations for reactor storage facility construction, and construction of a sarcophagus to encase damaged submarines.
Sweden	\$21.6 million ^{xxxvi}	Swedish activities focus on Andreyeva Bay and the <i>Lepse</i> nuclear service ship.
United Kingdom	\$191 million	UK activities focus on submarine dismantlement and spent fuel storage safety and security. The United Kingdom has been active at Andreyeva Bay and the Atomflot nuclear icebreaker facility in Murmansk region.
United States	U.S. expenditures per year in this area are unknown. Total Global Partnership pledge: \$10 billion.	U.S. aid includes ballistic missile submarine (SSBN) dismantlement (16 to be scrapped by 2012), material protection, control, and accounting (MPC&A) upgrades at naval facilities (may be complete), construction of an interim dry fuel storage facility and special railcars to transport spent nuclear fuel (SNF) to the site, and provision of SNF storage casks.

As in other areas of nonproliferation assistance, before project implementation could begin, Russia's partners had to develop the requisite legal framework and identify concrete projects. Some, like the United States, already had framework agreements with Russia, while others had agreements on individual projects or were already negotiating international and bilateral agreements before the Kananaskis summit. On May 21, 2003, Norway, Sweden, Denmark, Finland, Russia, Belgium, France, Germany, the United Kingdom, and the Netherlands signed the MNEPR agreement, a general framework agreement covering assistance projects addressing problems regarding radioactive waste and spent nuclear fuel in the Russian Northwest. MNEPR entered into force on April 14, 2004. The United Kingdom also signed a bilateral agreement with Russia on June 26, 2003, after two years of negotiation. Germany too signed a bilateral agreement, based on MNEPR, on October 9, 2003. Italy, not a MNEPR signatory, also based its agreement with Russia on MNEPR. The bilateral agreement was signed on November 5, 2003, but only ratified by the parliament in Rome on October 28, 2004.^{xxxvii} Canada and Russia signed a bilateral agreement covering cooperation in the naval sphere on June 9, 2004. Paris is continuing to negotiate AIDA-3, a broad cooperation agreement that would cover work in the naval sphere with Moscow.^{xxxviii} France is likely to begin funding some projects this summer, before the conclusion of AIDA-3, for work under the auspices of the Northern Dimension Environmental Partnership (NDEP).^{xxxix}

Framework agreements, which specify liability, access, taxation, and similar broad issues, are necessary before projects can be identified and real work can begin. However, Russia and its partners did not wait for the conclusion of these agreements to start discussing project priorities. The NDEP, created by the European Bank of Reconstruction and Development in 2001 to handle donor-funded environmental and

nuclear safety projects (the latter particularly focused on Northwest Russia), decided that not enough was known about Russia's specific needs in the naval field and financed the development of a Strategic Master Plan for Northwest Russia. This plan, the final draft of which was completed in November 2004, details the state of all relevant facilities and decommissioned vessels in the region and their needs, analyzes relevant legal and regulatory frameworks, and identifies high-priority tasks.^{xl} All of Russia's partners are to have some access to the document, even those that are not NDEP members, and plans call for it to be updated on a regular basis. (To date, however, it appears that only members of the NDEP committee directly involved with drafting the plan have had access to the full plan; NDEP has distributed a 78-page executive summary of the plan to other members and nonmembers.)^{xli} While the full plan lacks some details, such as the status of individual spent fuel canisters (needed to determine whether the fuel can be recycled or must be put in long-term storage; however, the fuel inside cannot be examined without opening the containers and repacking them), it provides donor countries with a good overall understanding of the needs and scope of the problem in Northwest Russia and should assist them in making good project choices in the future. Further, the NDEP's next step is to obtain public comments on the plan—nongovernmental organizations and other parties that wish to comment on the plan are to be contacted by March 2005 and to forward their comments by July 2005. These will be analyzed and subsequently reported to a donors' assembly.^{xlii} The NDEP, which has received nearly €200 million in donations from member countries,^{xliii} is expected to begin funding projects in this area in 2005. All of these projects are now considered part of the larger Global Partnership effort.

There are already a great number of ongoing projects in the naval sphere, particularly in Russia's Northwest. At the Andreyeva Bay radioactive waste and spent nuclear fuel

(SNF) storage site in Murmansk region, Norway, Sweden, and the United Kingdom have been funding projects to improve infrastructure and SNF and radioactive waste storage, and to rehabilitate the local environment. Oslo is now considering projects to further improve the site's physical protection system. Canada, Japan, Norway, and the United Kingdom have paid to scrap general-purpose submarines. Germany is building an onshore reactor storage facility and a low- and intermediate-level radioactive waste conditioning facility at Murmansk's Sayda Bay, and is paying for related activities, such as refurbishing dismantlement facilities at nearby Nerpa Shipyard, repairing a floating dock used to tow reactor compartments and providing a computer-assisted waste monitoring system for the bay. The Norwegian and U.K. ministries of defense and U.S. Department of Defense are also cooperating with Russia under the auspices of the Arctic Military Environmental Cooperation (AMEC) Program in the Russian Northwest, funding projects to develop better types of radioactive waste storage containers, storage pads, transport, and the like, as well as environmental monitoring.^{xliv} This is the only military-to-military cooperation outside of U.S. Cooperative Threat Reduction programs and provides the best link to the Russian navy and its shipyards and other facilities, which have benefited from less security assistance than other sites despite having sensitive materials. Unfortunately, some projects have not been entirely successful (for instance, AMEC developed new and better radioactive waste storage containers but Russia is not ordering or using them), and support for this important program appears to be waning in some quarters.^{xlv} If the world wants to maintain the security of these sites, the AMEC program should be given renewed attention.

Other projects are under discussion. The Italian nuclear company Società per la gestione degli impianti nucleari (Sogin) has

come to a preliminary agreement with the Russian Atomic Energy Agency (Rosatom) to commit €66 million to fund the dismantlement of three Victor-class nuclear-powered submarines and the nuclear-powered battle cruiser *Admiral Ushakov*; €208.5 million for solid and liquid radioactive waste treatment and transport, including a mobile liquid radioactive waste treatment plant; and €45 million for physical security upgrades.^{xlvi} However, it may take up to two years for actual contracts to be granted and approved by Italy's parliament.^{xlvii} Paris has discussed assisting with the handling of SNF and solid radioactive waste, focusing particularly on the Gremikha technical base on the Kola Peninsula, though the lack of a framework agreement with Russia puts any such projects on hold.^{xlviii} Even with this assistance, however, Russia's needs are far from met. According to Rosatom, completing all projects related to submarine dismantlement will cost approximately \$3.443 billion.^{xlix}

Coordinating Submarine Dismantlement Assistance

As more and more of Moscow's partners begin to implement projects, the coordination of their efforts has increased in importance. Those providing funding want to make certain that the moneys they provide are put to the best possible use and that they can document this use for taxpayers back home. Unless assistance is well coordinated, efforts may be duplicated or crucial tasks left undone. It is also critical that delays in one project do not create difficulties for other activities. There are now many avenues for project coordination, though the system remains imperfect.

During the first year of the Global Partnership, several donor countries voiced concerns about project coordination in the naval sphere. Since that time, several new bodies have been created to assist in this area. In January 2004, the G8 formed the Global Partnership Working Group to

address project implementation issues for all Global Partnership programs. The group has chiefly served as a body that can bring high-level Russian attention to particular problems hampering individual projects, as well as a forum for more general discussions of problems donor countries have in common, but does not coordinate actual project implementation.ⁱ Later in the year, foreign assistance providers requested that Russia form a body dedicated to coordinating assistance at the Andreyeva Bay site, where Norway, Sweden, the United Kingdom, and the United States have been engaged in projects.ⁱⁱ If successful, this body could provide a model for coordination at the site level elsewhere, if multiple countries become involved in assistance at one location.

Other international bodies useful for organizing submarine assistance have existed for several years. High-level discussions on submarine assistance occur at meetings of the International Atomic Energy Agency's Contact Expert Group, set up in April 1996. Just as important are the meetings between assistance providers on the sidelines of official meetings. The NDEP, the organization that sponsored the creation of the master plan detailing the work that needs to be done in northwest Russia, is set to begin funding its own projects and coordinating its activities in 2005. The AMEC program, also mentioned above, was the first multilateral assistance program involved in nuclear dismantlement in Russia and has been carrying out joint projects at Russian Northern Fleet sites since 1996. It is an additional forum for contacts between assistance providers and has become adept at coordinating work among several organizations at individual facilities. Chiefly a military-to-military program, it is the only body concentrating on work at Russian military sites, but it has not been as active in other locations.

Thus, there are a large number of organizations through which donor nations

meet to discuss submarine dismantlement assistance in northwest Russia. There is little such discussion about the Russian Far East, but to date a few countries are involved in projects there.ⁱⁱⁱ Nevertheless, the system to ensure that no project duplication or critical gaps exist remains imperfect. Although communication between Russia and donor countries has improved, many officials involved with implementing projects continue to have to contact their counterparts in other countries in an ad hoc manner to learn of their activities. This problem appears to be particularly difficult for those nations new to involvement in this area. Most recently, donors working in northwest Russia have worried that Italy has apparently promised to build a liquid radioactive waste treatment plant for the northwest, giving the Russians an incentive not to complete the refit of a similar plant that Norway and the United States began funding in 1996 (see footnote 54). In addition, there is some concern Italy might fund construction of a new ship to transport spent nuclear fuel; while a new transport ship is sorely needed, the Italian plan would apparently take years, while alternative plans (but possibly less lucrative for Russian shipyards) could bring a boat into service far earlier.^{liii}

Donor nations also continue to complain about a lack of transparency within Russia itself.^{liv} While Russia's partners are generally involved in concrete projects that form only one part of the overall process required to dismantle submarines and handle associated radioactive and toxic wastes, as well as spent nuclear fuel, it has become increasingly clear to those partners that a full understanding of all of the stages of the dismantlement process is needed to ensure that all projects run smoothly. The sinking of the decommissioned submarine K-159 while under tow from the remote Gremikha Naval Base to a dismantlement facility in August 2003, caused by insufficient oversight during a rush to transport 16 submarines from the base to dismantlement sites during the

summer transport season, made this fact abundantly clear. Although the K-159 was being towed by Russian naval personnel and was a Russian-funded project, Norway became concerned that similar unsafe towing practices were being used to move vessels Oslo was paying to scrap. In response, the United Kingdom funded a new project to develop improved methods to transport decommissioned submarines. But Canada, after studying the issue, decided to move ahead, using Russian towing methods for several transfers. In Norway, on the other hand, the K-159 incident resulted in hearings in the Norwegian parliament related to risk assessment and the oversight of assistance projects. The Norwegian parliament learned that environmental impact assessments (EIAs) for some projects had not been performed and hired the U.K. company Enviro to review the EIAs done on the dismantlement of two submarines funded by Oslo. Enviro reported that the impact assessments “seemed to have been done as part of the dismantling process, rather than being done in advance to help determine the best way to do the job.” This practice is in line with Russian law but is not the international standard.^{lv} Even more worrisome, Enviro pointed out that fuller information supporting the assumptions made within EIAs and related justification was needed.^{lvi} Without a full understanding of how EIAs are put together, it is difficult for Russia’s partners to evaluate project options and evaluate the potential hazards and benefits of particular undertakings. Although there has been a great deal of progress in the past few years, and Russia provided unprecedented, detailed information for the NDEP master plan, even more transparency is needed if projects are to be well designed and coordinated.

Chemical Weapons Elimination

Another priority highlighted at Kananaskis was the elimination of the chemical weapons stockpiles Russia inherited from the Soviet

Union. In 1997, Russia ratified the Chemical Weapons Convention (CWC), obliging it to abolish arsenals by 2007, with a five-year extension option until 2012.^{lvii} Moscow endorsed the agreement only after Europe and the United States assured it of financial support: The safe elimination of these weapons is both technically challenging and financially costly. Russia has declared 40,000 tons of chemical weapons at seven stockpile sites. Over 30,000 metric tons is in the form of nerve agent (Sarin, Soman and VX), contained in more than 4 million munitions.^{lviii} While the Russian CW elimination program was initially slow, due to funding, organizational, and other problems,^{lix} Russia successfully met the CWC deadline for the elimination of 20% of Category 1 (the most toxic) chemical weapons by April 29, 2002. The first of Russia’s chemical weapon destruction facilities (at Gornyy, Saratov region), which received €40 million in funding from Germany, became operational in December 2002.^{lx} By April 2003 the Gornyy plant had destroyed more than 400 metric tons of mustard gas (or 1 percent of Russia’s chemical weapons stocks—three years after the CWC deadline for destruction of this amount). Russia has now destroyed more than 700 tons. Moscow currently plans to meet the April 2007 deadline for destruction of 20 percent of its CW stocks by constructing CW elimination facilities at Kambarka (near Perm) and Maradykovskiy (near Kirov). Additional facilities are under construction at Shchuchye and planned for Leonidovka and Pochep. A facility may also be built at Kizner, although other plans call for the elimination of CW stored at Kizner in the Shchuchye facility. Russia has sought an extension of its final CWC deadline to 2012. Elimination of all Russian CW by that date, however, will require a high level of concentrated assistance from Moscow’s partners.

The Global Partnership resulted in a great boost to Russia’s CW elimination effort.

Prior to Kananaskis, Germany had the most successful chemical munitions elimination project. German assistance was based on an agreement signed in December 1992 and was dedicated to the construction of the blister agent elimination site in Gornyy.^{lxvi} Since 2002, Germany has expanded its assistance to the Kambarka site. The United States had a more mixed record in the decade of CW assistance before Kananaskis. Although Washington has committed to funding the construction of 99 of 100 buildings in the nerve agent elimination facility at Shchuchye, currently estimated to cost more than \$1 billion, work was delayed for several years because of planning, funding, contracting, and organizational concerns. However, with the launch of the Global Partnership, the United States has put greater emphasis on completing the Shchuchye project, increasing funding from \$50 million in 2002, to \$132.9 million in 2003, and \$200.3 million in 2004, with \$121.8 million requested for 2005.^{lxvii}

The partnership has also led to a great increase in the participation of additional countries in the CW elimination effort. Germany's aid to Gornyy was bolstered by €8 million in funds from additional countries in 2003.^{lxviii} Large new promises of aid for CW elimination were made by countries such as Canada (CAN\$300 million), Italy (€375 million), and the United Kingdom (€100 million), while new countries became involved in the assistance projects as well, including the Czech Republic and New Zealand. Other countries, such as France, also plan to aid in the CW effort.^{lxix} Most recently, on February 7, 2005, the Washington DC-based nongovernmental organization, the Nuclear Threat Initiative, pledged substantial new funds: \$1 million toward construction of a railway from the chemical weapons depot in Planovy to the destruction facility in Shchuchye. The funding will be expended through Canada's agreement with Russia.^{lxx}

The renewed global emphasis on these projects has also led to enhanced efforts on the part of those already active in this sphere, including both the United States and Russia itself. Funds from the Russian budget were used to complete the destruction facility at Gornyy and provide infrastructure near the site. In 2004, Moscow paid for the construction of a Lewisite detoxification facility, reaction mixtures recovery building, and various other infrastructure projects (from communications and heating to warning systems) at Kambarka, a facility that is scheduled to commence CW elimination in 2006.^{lxxi} Russia has both increased its own funding and revisited its CW elimination plans, making some significant changes. After a review of the expenses associated with transporting CW munitions from Kizner to Shchuchye, Moscow decided it would be faster and more cost-effective to construct an additional elimination facility at Kizner. The facility is now scheduled to be completed in 2009, in order that all CW elimination can be completed by 2012.^{lxxii} Sufficient funding for the Kizner facility, however, remains in doubt.

Coordination of projects in the sphere of CW elimination is less problematic than in the area of submarine dismantlement assistance. Donor country and Russian representatives regularly gather at meetings of the Organisation for the Prohibition of Chemical Weapons to discuss projects both formally and informally. In order to coordinate programs at Shchuchye, the United Kingdom, Russia, Canada, and the United States have also set up an informal Shchuchye Coordination Group.^{lxxiii} An individual country has taken the lead at many of the sites, further simplifying coordination (Germany at Gornyy and Kambarka, the United Kingdom outside Shchuchye, etc.) The only remaining problem is whether promised funds will be expended on projects quickly enough to allow Russia to meet its CWC commitments.

Table 2: Current Global Partnership Commitments in the Sphere of Chemical Weapons Elimination^{lxix}

Country	Funding Commitments	Projects
Canada	\$242 million	Canada is providing \$26.7 million to support the elimination facility at Shchuchye through the construction of an 18 km railway connecting the chemical weapons storage depot near Planovyy to the destruction facility, and plans to commit \$58.5 million over 3 years for equipment for the second drill, drain, and neutralization building at Shchuchye; patrol and access roads; a local warning system; and an intra-site communications project.
Czech Republic	\$155,000	Construction of an electrical substation at Shchuchye, funded through the United Kingdom agreement to work at the site. Prague provided \$75,000 in 2004 and has promised another \$80,000 in 2005.
European Union	\$30.4 million through 2004 ^{lxix}	The EU's Joint Action Program funds three CW destruction projects and has plans for a fourth, at a total of \$18.5 million. Projects include infrastructure equipment for the Kambarka facility (\$5.3 million), electrical power system components for Shchuchye, and assistance for project management at the Russian Munitions Agency (which is responsible for the CW Destruction Program). A project to build infrastructure for the Gornyy facility (\$7.9 million) was completed in 2003. The EU Technical Assistance to the Commonwealth of Independent States (TACIS) program provides \$11.9 million for environmental projects that assist in CW destruction (environmental monitoring in Saratov region and Novocheboksarsk; preparation for decontamination at Dzerzinsk).
Finland	\$2.4 million in 2003-2006	Finland is providing a technical control system for the safe storage of Lewisite at Gornyy; Helsinki's completed projects in 2003 totaled \$1.3 million. New projects are under discussion.
France	\$11.9 million for the first year; \$330 million pledge for CW and BW activities under the Global Partnership	France continues to negotiate a framework agreement covering work in the CW area with Russia. In July 2004 at a French-Russian meeting, a proposal was mooted that France participate in the Swiss program until a Franco-Russian accord can be finalized. According to a statement by U.S. Senator Richard Lugar, France is expected to provide secure containers for the shipment of chemical weapons to elimination at Shchuchye.
Germany	\$396 million through 2006 (\$63.4 million in 2004)	Germany will continue to fund the Gornyy facility through 2005. In July 2003, Germany committed to funding CW elimination at Kambarka (\$27.5 million spent in 2003, \$163.8 million to fund additional contracts). The facility, slated to be finished by 2006, is being jointly built and funded by the Netherlands, the EU, Finland, Sweden, and Switzerland. Germany will provide a thermal disposal facility for residual CW agent materials, a Lewisite cistern draining facility, and air filter systems.
Italy	\$482 million in 2004-2008	Italy is funding construction of a gas pipeline at Shchuchye (\$10 million in 2001-2003, \$6.6 million in 2003/2004, \$6.1 million in 2005). Rome has also committed \$475.7 million in 2004-2008 for construction of the CW elimination facility at Pohep.
Netherlands	\$15 million	\$2.9 million was spent at Gornyy in 2002. A November 2003 agreement committed \$5.3 million for an electrical power substation at Kambarka. In December 2004, the Netherlands pledged an additional \$2 million to be administered by the United Kingdom to

		facilitate the construction at Shchuchye.
New Zealand	\$0.87 million	New Zealand's funds will be managed by the United Kingdom, for use at Shchuchye. \$650,000 will be spent on infrastructure projects in 2005.
Norway	\$2.6 million	Norway is funding work on an electricity substation at Shchuchye through the United Kingdom's assistance agreement.
Poland	\$100,000	Poland plans to participate in projects at Gornyy, Shchuchye, and Kambarka.
Russia	\$1.8 billion	Russia spent \$566.9 million for chemical weapons destruction in 2002-2004. \$389.3 million has been allocated for 2005. Since 2001, Russia has allocated at least \$25 million per year at Shchuchye, satisfying a U.S. congressional condition for U.S. assistance at the site.
Sweden	\$248,000	Sweden will fund infrastructure construction in Kambarka.
Switzerland	\$12 million over 5 years	Construction of an environmental monitoring system in Shchuchye is planned, as is a power-supply station at Kambarka (the latter together with the Netherlands).
United Kingdom	\$100 million in 2004-2012	In February 2003, the United Kingdom finished construction of water supply infrastructure for Shchuchye. London is also contributing \$9.6 million for electrical supply infrastructure at Shchuchye, funds a public outreach office near the Kizner CW storage depot, and is discussing possible additional projects at Shchuchye. UK funds are also going toward CW destruction at Gornyy and Kambarka.
United States	Over \$1 billion	The U.S. government is providing 99 buildings for CW elimination at Shchuchye. The Nuclear Threat Initiative, a nongovernmental organization based in Washington, DC, is contributing \$1 million through Canada's agreement.

The Disposition of Fissile Materials: Little Progress since Kananaskis

Highly enriched uranium (HEU) and plutonium are the two types of fissile materials used to make nuclear explosive devices; therefore, limiting the amount of this material existing outside of weapons and the disposition of excess stocks is critical to reducing the risk of nuclear proliferation. Reduction of HEU stockpiles has faced minor obstacles, but has continued to proceed throughout the past decade. While the effort should be sped up to enhance security, it is at least moving forward. Halting the further production of plutonium, an effort of equal importance to the disposition of existing stocks, has also seen some progress of late: The United States and the United Kingdom are funding the replacement of plutonium production reactors with fossil fuel plants in the two Russian cities that continue to rely on these reactors for heat and electricity, so that these reactors may then be shut off. The disposition of plutonium in Russia's existing stockpiles, on the other hand, has come to a standstill, largely because of a lack of political will in the countries involved to overcome outstanding liability issues. For the past two years, the negotiating parties appear to have moved no closer to an agreement in this area. Even if sufficient high-level pressure were applied and an agreement to result, the program is likely to face additional obstacles, from environmental protests and licensing difficulties to a continued lack of sufficient funding. Meanwhile, the current plans for the disposition of plutonium by burning it as MOX fuel gives Russia the incentive to maintain plutonium stockpiles at their current sites, instead of moving them to the Mayak Fissile Material Storage Facility (FMSF), the most secure location for that material while it awaits final disposition. Finally, the current agreement provides for the disposition of only 34 metric tons of Russian plutonium, less than a quarter of

Russia's total stockpile of separated plutonium (military and civilian).^{lxxi} All weapons-usable plutonium, however, constitutes an unacceptable proliferation hazard.

Efforts to reduce HEU through the U.S.-Russian HEU purchase agreement, announced in August 1992 and signed in February 1993, have resulted in the downblending of 231.5 metric tons of HEU.^{lxxii} As a total of 500 metric tons of HEU are to be downblended under the agreement, much remains to be done, but efforts to speed up the process have failed for lack of additional financing. While the LEU that results from downblending HEU is sold in the commercial nuclear power market, and the downblending program has therefore been a commercially viable program, to date no moves have been made by commercial players to increase the amount of downblended uranium on the market (despite recent increases in uranium prices). Therefore, government financing is needed to purchase and downblend the HEU today and hold the resulting LEU until it can be released on the market. In Fall 2003, the Bush administration requested that a House-Senate Conference Committee allocate funds for additional purchases of downblended Russian HEU. However, the U.S. House of Representatives denied the request.^{lxxiii} Since then, European experts have suggested that European states step in, but to date none have done so.^{lxxiv}

The United States has struggled through a series of programs aimed at eliminating the production of new weapons plutonium at Russia's plutonium production reactors. The initial plan, to shut down the plants, was abandoned in the mid-1990s when Moscow determined that it did not have the funds to build new power plants in the cities that depend on the reactors for heat and power; at the time, Russia's partners were not ready to fund construction of such power plants. Then, in 1997, an agreement was signed

whereby the cores of these reactors would be converted, such that far less plutonium, and of lower isotopic quality, would be produced. However, conversion plans soon ran into technical and safety issues, and by late 2000 it became clear that closing the plants down and building alternative sources of heat and power would be cheaper and safer than core conversion. Finally, in 2003, the Elimination of Plutonium Production Agreement was signed by Moscow and Washington and brought under the CTR umbrella agreement (thus eliminating the potential for disputes over liability like those faced by the MOX program—see discussion of MOX, below—at least through June 2006, when the umbrella agreement expires).^{lxxv} Under the 2003 agreement, the three plutonium production reactors that remain in operation are to be replaced with non-nuclear power plants and shut down. Despite the phenomenal cost of constructing a new plant in Zheleznogorsk and refurbishing an existing coal-fired plant in Seversk, the United States has persevered in its effort to halt Russia's plutonium production.^{lxxvi} It has been helped in this effort by the United Kingdom, which has committed £12 million (\$22.6 million) to the construction of the power plant in Zheleznogorsk. In addition, the U.S. Nuclear Cities Initiative is focusing on providing employment for workers at the two reactors, so that their pending unemployment will not become yet one more reason that Russia decides not to shut down the plants.^{lxxvii} The United States is spearheading a drive to increase European participation in this project. Most recently, in mid-February 2005, a two-day conference was held in Switzerland to solicit international funding for projects outside of the existing U.S.-Russia construction agreement to protect and remediate the environment around the reactor sites and create new business enterprises and jobs for the workforce of highly skilled scientists and technicians that will be displaced when the reactors shut down.^{lxxviii}

Reducing plutonium stockpiles has met with even less success. In 1994, U.S. President Bill Clinton and Russian President Boris Yeltsin established a joint plutonium disposition working group, and later founded a bilateral panel, to recommend a course of action for plutonium disposition.^{lxxix} The panel reported in June 1997 that plutonium immobilization, MOX fuel fabrication and its use in civilian reactors, or a combination of the two were the most practical options for plutonium disposition.^{lxxx} Since that time, the idea of immobilization has been largely rejected and MOX fuel fabrication chosen as the method for plutonium disposition in both Russia and the United States. However, despite the involvement of Germany and France, which became interested in Russia's MOX fuel program in 1992 (Germany would later drop out of the program a decade later, after changes in that nation's nuclear power policies), and related research conducted with the assistance of Canada and Japan, as well as the US-Russia Plutonium Disposition Agreement of September 1, 2000, the MOX program has made little headway, due to both liability and financing issues.

The U.S. CTR umbrella agreement of 1992 made Russia solely responsible for any and all damage occurring as a result of activities under that agreement. However, Moscow has since balked at agreements offering such blanket coverage, which Russian officials argue are contrary to Russian laws enacted during the past decade. The 1998 U.S.-Russian agreement on scientific and technical cooperation on plutonium disposition made some compromises: Russia was no longer solely and unconditionally liable for all damages—for instance, Russia could make claims for damages against individuals arising from their premeditated actions.^{lxxxi} The 2000 U.S.-Russian agreement on the management and disposition of plutonium took a different route: The liability provisions were to be contained in a separate protocol. Negotiations over that protocol, however, continue, while the agreement on

technical cooperation was allowed to expire in July 2003, thanks to disputes over liability issues. While technical development under existing contracts under that agreement continue, the lack of a new agreement covering work in this area has made any new projects impossible. The United States continues negotiations over this issue, with the U.S. State Department reportedly insisting on CTR-like provisions and the Department of Energy willing to accept some compromises (the State Department, however, is the party conducting the negotiations with the Russians).^{lxxxii} Meanwhile, the U.S. negotiations have been put on hold until the Russian parliament ratifies the CTR agreement, for fear that any compromises on plutonium disposition might affect the CTR ratification process (the Russian government has yet to submit the CTR agreement to the Duma for ratification).^{lxxxiii} The other nations involved in Russia's plutonium disposition efforts also continue to discuss liability provisions as part of their negotiations on a multilateral agreement on the financing and management of Russian plutonium disposition.^{lxxxiv} Like the United States, Russia's other partners require more liability protection than that provided under other existing agreements (such as the liability protocol to the MNEPR agreement, described in the discussion of submarine dismantlement assistance, above) for the construction and operation of facilities handling plutonium. It seems

unlikely that a multilateral agreement will be reached before a U.S.-Russian agreement. Given the general consensus on the importance of plutonium disposition, it is difficult to understand why the United States has not asserted the political will to overcome the liability issue. Most recently, many observers expected a liability agreement to be reached by the February 2005 Bush-Putin summit in Bratislava, Slovakia.^{lxxxv} However, despite marathon negotiations, an agreement could not be concluded. Indeed, the presidents' joint statement, issued on February 2005, does not mention either liability or plutonium. It does, however, give new impetus to cooperation in this sphere, and created a new bilateral Senior Interagency Group to oversee nuclear security cooperation. Analysts now hope that an agreement might be reached by May, when the two presidents are scheduled to meet once again.^{lxxxvi}

The construction of a MOX plant in Russia alone will cost an estimated 29 billion rubles (approximately \$1.011 billion dollars); operating costs will bring the total closer to \$2 billion.^{lxxxvii} To date, Russia's partners have promised nearly \$900 million. The financial viability of the MOX project thus remains in question.

Table 3: Current Global Partnership Commitments to Plutonium Disposition^{lxxxviii}

Country	Funding Commitments	Comments
Canada	\$49 million	Canada has tested the use of U.S. and Russian MOX fuel in its Canadian deuterium (CANDU) reactor at Chalk River, in Ontario.
European Union	\$7.7 million	\$3 million of the EU commitment will support Rostekhnadzor's development of the regulatory infrastructure for disposition of ex-weapon plutonium; another \$5 million is committed to support Rosatom institutes to develop a MOX fuel demonstration and licensing program and \$660,700 to study transport and storage of MOX assemblies and a fuel pilot plant. France is the implementing country for these projects.
France	\$90.3 million	France is the implementing country for EU projects.
Italy	\$103.2 million	Italy has contributed to MOX feasibility studies in the past.
Japan	\$100 million	Japan is cooperating with Russia in studying vibropack ^{lxxxix} MOX fuel fabrication and its possible use in Russia's BN-600 reactor.
Netherlands	Up to \$3.5 million	The Netherlands has made a combined pledge of \$3.6 million for disposition of nuclear weapons material and transport casks for submarine nuclear fuel.
United Kingdom	\$129 million	In January 2005, the UK committed \$22.9 million to the construction of a power plant in Zheleznogorsk to facilitate the shutdown of the weapons-grade plutonium producing reactor at that site.
United States	\$400 million	The U.S. has earmarked \$64 million in FY2005 for the Russian plutonium disposition effort. The United States has allocated a total of \$485.8 million for Russian plutonium disposition since the beginning of joint efforts in that area.

Even if financial and liability issues can be solved, disposing of Russian plutonium by burning it as MOX fuel will take more than a decade, at best, and meanwhile not enough is being done to ensure its security. Initial plans call for disposing of two tons per year, a rate to be doubled, according to the U.S.-Russian agreement, "at the earliest possible date." However, the licensing of reactors to use MOX fuel is likely to run into political difficulties and cause environmental protests in both Russia and the United States, and the agreement calls for the disposition of U.S. and Russian plutonium to proceed in tandem, so a delay in one country will hinder disposition in the other country. Therefore, final disposition is likely to take many years.

As access to fissile material is the biggest hurdle faced by those who would construct a nuclear weapon, it is critical that all weapons-usable plutonium, whether derived from nuclear weapons or civilian programs, be secured. With some \$400 million in U.S. assistance, the Russians built the state-of-the-art Mayak facility, which finally opened in December 2003. Designed to withstand an earthquake measuring eight on the Richter scale, a flood, or the impact of a jet plane crash, Russia had called for storing 25 tons of plutonium there, though the U.S. Defense Department says the capacity is twice that amount. Today even storage of 25 tons seems unlikely. Moscow has rightly noted that security risks are greatest during transport and argued that transporting plutonium from

sites throughout Russia to the FMSF does not make sense if that plutonium will have to be transported further to MOX fuel production sites soon thereafter, particularly since much of the plutonium is currently stored at Seversk, location of the future MOX fuel plant. However, maintaining the plutonium at Seversk would be the more secure option only if the plutonium were to be quickly turned into fuel. Since this is unlikely even under best-case scenarios, given transport issues, the FMSF remains the more secure solution. It is also possible that some Russian officials suspect that the incentive for Russia's partners to support the MOX effort will be reduced if those partners believe the material is already quite secure. While there have been security upgrades at Russian facilities where plutonium is stored, this security nevertheless remains inferior to that of the underutilized FMSF. Given the dangers involved and the likely timeline even in the rosiest scenario, Russia's partners should turn Russian incentives around, insisting that the MOX program will not move forward until iron-clad agreements are in place to put at least 50 tons of plutonium (derived from weapons or elsewhere) in the FMSF, using this most secure facility to its full capacity.^{xc}

Progress since Kananaskis: Evian and Sea Island

The Global Partnership has seen steady progress since 2002, though actual work has not advanced as quickly as partner countries, Russia in particular, would have liked. Nonetheless, high-level attention to the initiative has been sustained, as evidenced by the continued and expanded focus on nonproliferation at the G8 summits in Evian-les-Bains, France, in 2003 and Sea Island, Georgia, U.S.A. in 2004. New concerns over the possible terrorist use of radiation dispersal devices (or "dirty bombs") led the G8 to announce at the Evian summit a new initiative to improve the security of radioactive sources: The G8 would be

involved in efforts to track radioactive sources and recover orphaned sources, improve export controls, increase physical protection, and ensure the safe disposal of spent sources, providing international assistance and technical support for these efforts. Much of this work is being subsumed under the Global Partnership framework. At the Sea Island Summit, retraining Iraqi and Libyan weapons scientists, eliminating the use of HEU fuel in research reactors worldwide, securing and repatriating fresh and spent HEU fuel, strengthening export control and border security, and reinforcing biosecurity were added to the nonproliferation efforts to be coordinated under the auspices of the Global Partnership.^{xc} When the United Kingdom assumed the presidency of the G8 in 2005, it indicated that it would particularly focus on containing the spread of nuclear enrichment and reprocessing technology and combating the threat of bioterrorism, as well as converting pledges into results.^{xcii}

The post-Kananaskis summits also provided reports on the levels of financial commitments promised by member countries. The total at Evian, \$17.85 billion, did not increase in the following year as new commitments did not equal the revision of Germany's pledge from euros to dollars—thus, partners have yet to meet the goal of \$20 billion in pledges. Nevertheless, new pledges were made as participation in the partnership broadened each year, with Finland, Norway, Poland, Sweden, and Switzerland joining in 2003 and Australia, Belgium, the Czech Republic, Denmark, Ireland, New Zealand, and South Korea becoming members in 2004.

In addition to obtaining pledges and overall agreements to launch programs, the G8 has made some progress toward translating the Global Partnership Guidelines into tangible actions and agreements and initiating and developing concrete projects. Access to sites where cooperative projects are being implemented has improved, but access issues

have not been solved in all cases. Particular problems persist at the most sensitive sites. Moscow and Washington have established a working group to find solutions to the access problem. Tax exemption issues have been solved in most cases, with some G8 countries codifying in bilateral agreements tax-free status for funds expended in Russia. The greatest remaining hurdle, where little progress has been made, is in liability protection. While the *G8 Global Partnership Annual Report* issued at Sea Island noted that several Global Partnership countries had successfully concluded bilateral agreements with Russia on liability protection, these agreements do not cover the plutonium disposition program. Despite the importance of the plutonium disposition program, which represents a major part of the U.S. and French Global Partnership pledges, it was omitted from G8 agreements at Sea Island, while the liability issue, a substantial stumbling block for the Global Partnership, was only mentioned in passing in the Sea Island annual report, issued in June 2004. Even though the disposition of fissile materials is one of the four priority areas identified in Kananaskis documents, and is critical from a nonproliferation standpoint, as of February 2005 no progress had been made on related liability provisions. If the political will is not exerted to find a solution to liability issues, it is possible that the U.S.-Russian CTR umbrella agreement itself may be in jeopardy when it comes up for renewal in June 2006.

One final change as the G8 presidency of the United States came to a close, was the post-Sea Island announcement that Ukraine had been added to the official list of Global Partnership recipient nations. Although this move is not likely to result in additional moneys committed to that country, its proponents noted the increasing importance of coordinating assistance in the region, particularly in the areas of border and export controls. Ukraine's inclusion in the partnership should facilitate efforts in this area.^{xciii}

Conclusion

The Global Partnership has made a clear impact on nonproliferation assistance to Russia, bringing greatly increased attention to the issue and a major increase in the number of countries promising to assist in this area. The Kananaskis initiative, besides presenting the world with a challenge to meet U.S. funding levels, provided governments worldwide with information about proliferation concerns stemming from Russia's WMD inheritance and concrete ways that the world can reduce these security risks. Contacts made through the partnership have helped countries identify programs they would like to assist and helped them to coordinate their efforts. The guidelines issued in 2002 similarly helped to speed agreements in several areas, enabling some projects to get off the ground.

Nevertheless, translating promises into action has not been easy, nor has it been successful in all areas. The Kananaskis statement identified four priority areas in particular: the destruction of CW, dismantlement of decommissioned nuclear submarines, disposition of fissile materials, and employment of former weapons scientists. While CW elimination has been greatly accelerated in the past two years, it is not clear that Russia can meet CWC deadlines. Donor countries and Moscow itself will have to spend more if Russia is to meet these obligations; otherwise, the CW nonproliferation regime could well be harmed. Progress has also been made in dismantling submarines, though some major questions remain. The spent nuclear fuel unloaded from these vessels poses the greatest proliferation threat, and it is as yet unclear where and for how long (and with what security) the fuel will be stored, and how much can or will be reprocessed. Coordination and transparency issues continue to slow efforts in the naval area, though overall progress has been marked. The employment of former weapons scientists through the ISTC has continued,

with ever more funding, while the United Kingdom has recently initiated an additional program, the Closed Nuclear Cities partnership, to make an additional impact in this area.^{xciiv} Of the four Global Partnership priorities, then, much headway has been made in three areas. The fourth, however, the disposition of fissile materials, remains an urgent problem in which there has been little progress in three years. The MOX program awaits the conclusion of a liability agreement. The HEU purchase agreement has been a reliable program but should be sped up, a process that will require funding. The program to repatriate HEU from foreign research reactors to Russia has met with great initial success and will be a priority area for the G8 in 2005. This program, too, must be sped up to secure this vulnerable and dangerous material. Not only money, but political solutions are needed in some cases to persuade countries to part with HEU currently stored at research reactors.^{xciv} The program to secure radioactive sources, launched at Evian, has moved quickly as well. For instance, the U.S. Department of Energy removed 63 radioisotope thermal generators (RTGs) that use Strontium 90 to power signal beacons from the Russian Northwest during the summer of 2004; Washington and Oslo are poised to remove additional RTGs in 2005 and may be assisted by Ottawa and Paris.^{xcvi}

Thus, even if the Global Partnership has not been realized quite as quickly as Moscow would like, it has not been limited to pronouncements. Real progress has been made on the ground, particularly in the area of submarine dismantlement. However, assistance has tended to flow to areas where aid is simple, such as cutting apart submarines, while difficult problems such as securing damaged submarine reactors have yet to be tackled. Moscow is still in real danger of not meeting CW elimination deadlines, though with enough funding and organization, and strong leadership from the Russian government itself, this important

step for global nonproliferation can still be achieved. Progress on plutonium disposition, and securing this most dangerous of nuclear materials, appears far less likely—there has been no reported movement on liability issues in the past several years. To sum up, the achievements of the G8 and other Global Partnership members since 2002 are significant, but there is much more work to be done.

ⁱ The G-8 is made up of the seven major industrial countries (France, the United States, Britain, Germany, Japan, Italy, and Canada, also known as the G-7), plus Russia. "Statement by G8 Leaders: The G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction," June 2002, <<http://www.g8.gc.ca/2002Kananaskis/kananaskis/globpart-en.asp>>.

ⁱⁱ Russia has pledged additional moneys, but Moscow and Washington argue that these funds should not count toward the \$20 billion target identified at Kananaskis.

ⁱⁱⁱ G8 Senior Group, "G8 Global Partnership Annual Report," Sea Island Summit Documents, IS THERE A DOC NUMBER? NO June 2004, <http://www.g8usa.gov/d_060904e.htm>.

^{iv} "Tokyo Summit Political Declaration: Striving For A More Secure and Humane World," University of Toronto G8 Information Centre, July 8, 1993, <<http://www.g7.utoronto.ca/summit/1993tokyo/political.html>>.

^v "Plutonium MOX Fuel Initiative," Foreign Affairs Canada, <http://www.dfait-maeci.gc.ca/nndi-agency/mox_initiative-en.asp>.

^{vi} The French delegation at Tokyo was reportedly particularly negative about the idea of forming any sort of international group to handle nonproliferation assistance. Japanese official (name withheld by request), interview by author, December 20, 2004.

^{vii} The Canadian Nuclear Safety Initiative ran from 1992 through May 2001. For information on the program, see "Completed Projects – Nuclear Safety," Canadian International Development Agency, <<http://www.acdi-cida.gc.ca/index.htm>>.

^{viii} ITAR-TASS, November 17, 1994, as cited in "Agreement With France On Construction Of Nuclear Store," FBIS-SOV-94-223, as cited in "Russia: International Assistance Programs: France," NIS Nuclear and Missile Database, January 3, 1998, <<http://www.nti.org/db/nisprofs/russia/forasst/intnatl/france.htm>>.

^{ix} E-mail communication from researcher at France's Fondation pour la Recherche Stratégique, as cited in e-mail communication from researcher at the Center for Strategic and International Studies, Washington, DC, as cited in "Russia: International Assistance Programs: France," NIS Nuclear and Missile Database, January 3, 1998, <<http://www.nti.org/db/nisprofs/russia/forasst/intnatl/france.htm>>.

^x In June 1998 France and Germany joined together in a trilateral program to research the MOX fuel option, though Germany pulled out of that program when it expired in June 2002. Mark Hibbs, "Germany ends trilateral Pu effort; NFI will get some Hanau equipment," *NuclearFuel*, June 11, 2002. On the German-French MOX research efforts, see Guy Bousquet et al., "Mixed-Oxide (MOX) Fuel Fabrication and Use," Natural Resources Defense Council, 1993, <<http://www.nrdc.org>>, as cited in "Russia: MOX Fuel Overview," NIS Nuclear and Missile Database, <<http://www.nti.org/db/nisprofs/russia/fissmat/mox/moxover.htm>>.

^{xi} Consortium GRS-SIEMENS (Gesellschaft für Anlagen und Reaktorsicherheit — Society on reactor and nuclear power plant safety), as cited in Andrei Frolov, "Germany and the Process of Excess Nuclear Weapons Elimination in Russia," PIR Center, Autumn 2003, <<http://www.sgproject.org/resources/Frolov%20on%20Germany.html>>.

^{xii} German-American Academic Council and the National Academy of Sciences, *U.S.-German Cooperation in Elimination of Excess Weapons Plutonium* (Washington, DC: National Academy Press, 1995), pp. 23-26, <<http://www.nap.edu/books/NX006152/html>>.

^{xiii} In the early 1990s, the United Kingdom sponsored a series of seminars for Russian specialists in materials protection, control and accounting (MPC&A) and provided computers and other equipment to the Russian nuclear regulatory service; London also provided 150 supercontainers for the secure transport of nuclear munitions and participated in the upgrading of physical security at the Mayak fissile material storage facility. Germany also cooperated with the Russian regulatory agency to improve MPC&A, providing equipment and know-how, and provided physical protection upgrades for Mayak. Other countries were involved in similar efforts; for instance, the Netherlands provided more than \$14 million for physical protection at warhead destruction sites. Vladimir Orlov and Nikolai Sokov, editors, *Yadernoye nerasprostraneniye* [Nuclear Nonproliferation] (Moscow: PIR Center, 2002), pp. 404-434.

^{xiv} Japan also provided several thousand containers for plutonium storage and equipment to improve the security of fissile material transports, and funded the construction of a liquid radioactive-waste processing facility for the Russian Far East. For information on the latter project, see Cristina Chuen and Tamara Troyakova, "The Complex Politics of Foreign Assistance: Building the Landysh in the Russian Far East," *Nonproliferation Review* 8 (Summer 2001), pp. 134-149; Orlov and Sokov, *Yadernoye nerasprostraneniye*, p. 432; the Ministry of Foreign Affairs of Japan Website, <<http://www2.ntca.com:8010/infomofa/jr/assist/other.html>>; and Naoaki Usui, "Japan, Russia Sign Pact," *Nucleonics Week*, October 14, 1993, p. 13, as cited in "Russia: International Assistance Programs: Japan," NIS Nuclear and Missile Database, <<http://www.nti.org/db/nisprofs/russia/forasst/intnatl/japan.htm>>.

^{xv} "Plutonium MOX Fuel Initiative."

^{xvi} The ISTC, an international center dedicated to the employment of former Soviet weapons scientists, was formed in November 1992 as a result of an idea first discussed by Genscher and U.S. Secretary of State James Baker in late 1991. The European Union, Japan, Russian Federation, and the United States are permanent members of its governing board. For more information on the ISTC, see <<http://www.istc.ru>>.

^{xvii} "G8 Heads of State and Government Statement," Russian Ministry of Foreign Affairs, September 20, 2001, <<http://www.mid.ru>>.

^{xviii} "Progress Report on the Fight Against Terrorism," G8 Foreign Ministers' Meeting, Whistler, British Columbia, June 12-13, 2002, <http://www.usembassy.it/file2002_06/alia/a2061407.htm>.

^{xix} UN Security Council, Press Release SC/7158, "Security Council Unanimously Adopts Wide-Ranging Anti-Terrorism Resolution," September 28, 2001, <<http://www.un.org/News/Press/docs/2001/sc7158.doc.htm>>.

^{xx} See, for instance, the January 18, 2002, statement by Mr. Paul Heinbecker, Ambassador and Permanent Representative of Canada to the United Nations, "On Threats to International Peace and Security Caused by Terrorist Acts," Department of Foreign Affairs and International Trade, January 18, 2002, <<http://www.un.int/canada/html/s-18jan2002heinbecker.htm>>.

^{xxi} For instance, on January 22-23, 2002, Canada sponsored a meeting on this issue. See "Report on the G8 Meeting on Legal Measures to Combat Terrorist Financing," Canadian Department of Justice, <<http://canada.justice.gc.ca/en/news/g8/doc8.html>>.

^{xxii} According to U.S. participants, the U.S. delegation was one of the main promoters of the partnership and lobbied intensely in order to push it through. State Department official (name withheld by request), interview by author, Washington, DC, August 7, 2002.

^{xxiii} Statement by G8 Leaders, "The G8 Global Partnership." Kananaskis, Canada, June 2002. LOCATION AND DATE?

^{xxiv} State Department official (name withheld by request), interview by author, Washington, DC, August 7, 2002.

^{xxv} For a summary of the 1999-2003 negotiation of the Multilateral Nuclear Environmental Program in the Russian Federation and the taxation issue, see Egil Tronstad and Cristina Chuen, "The Multilateral Nuclear Environmental Program in the Russian Federation (MNEPR)," June 4, 2003, <<http://cns.miis.edu/research/globpart/030604.htm>>.

^{xxvi} Negotiations over liability provisions related to MOX fuel projects were the most contentious, with all of Russia's partners arguing that MNEPR-like provisions did not provide sufficient protection for the sorts of activities the MOX project entails. These negotiations continue both on a bilateral U.S.-Russian basis and on a multilateral basis (involving Canada, Japan, and European nations). For more information, see the discussion of plutonium disposition, below.

^{xxvii} Previous expenditures from Canadian International Development Web site, <www.acdi-cida.gc.ca>; Global Partnership commitment as cited in "G8 Senior Officials Group Annual Report," 2003 Evian Summit, Evian, France, June 2003 <<http://www.g8.fr/evian/english/home.html>>. LINK DEAD --replaced with one that, oddly, works?

^{xxviii} "G8 Senior Officials Group Annual Report."

^{xxix} "Progress Report on the Fight Against Terrorism."

^{xxx} For more information on the ISTC, see the ISTC Website, at <<http://www.istc.ru>>.

^{xxxi} "The G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction."

^{xxxii} In fact, the exact nature of these environmental and security risks has yet to be fully determined. For a detailed overview of the available data and the implications of informational lacunae for foreign assistance projects, see Ole Reistad, Morten Bremer Mærli, and Nils Bøhmer, "Russian Naval Reactors and Fuel: Dangerous Unknowns," in this issue of the *Nonproliferation Review*.

^{xxxiii} The spent fuel from 346 reactor cores, currently stored in several service vessels, four ex-naval bases, and some 78 submarines, contains about 400 metric tons of highly enriched uranium (HEU) and significant quantities of plutonium. The many years some reactors have been decommissioned have reduced the radioactivity of the nuclear fuel, and it could therefore be handled by would-be terrorists not overly concerned with personal safety. Other reactors have fuel rods that were never fully burned up in the first place. While most of the spent naval fuel is enriched to just 20-40 percent, meaning that a great deal of material, and sophisticated equipment would be needed to develop weapons-usable material from the uranium contained in the fuel, a "quick and dirty" reprocessing of this spent fuel could result in plutonium useful for a nuclear device. Irradiated fuel might also be used in a radiological dispersal device, or "dirty bomb," or leaked fuel from aging storage facilities could create an environmental disaster. Figures for decommissioned submarines from presentation by Viktor Akhunov, head of the Russian Ministry of Atomic Energy Department for Decommissioning of Nuclear Installations, presentation "Kompleksnaya utilizatsiya APL i reabilitatsiya radiatsionno-opasnykh ob'yektov na beregovykh tekhnicheskikh bazakh" (Integrated dismantlement of nuclear-powered submarines and rehabilitation of dangerous irradiated sites on on-shore technical bases) to the 16th IAEA Contact Expert Group (CEG) meeting, The Hague, Netherlands, April 23-25, 2003; reactor core figure from V.A. Shishkin, "Programme for Decommissioning of Multipurpose Nuclear Submarines in the North-West of Russia," paper presented to the 16th CEG meeting, The Hague, Netherlands, April 23-25, 2003.

^{xxxiv} Viktor Akhunov, "Kompleksnaya utilizatsiya APL i reabilitatsiya radiatsionno-opasnykh ob'yektov na beregovykh tekhnicheskikh bazakh" (Comprehensive dismantlement of nuclear-powered submarines and rehabilitation of radioactive sites at onshore technical bases), paper delivered to The G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction conference, organized by the PIR Center for Policy Studies in Russia and the Board on Sustainable Partnership for Russia, Moscow, Russia, April 23-24, 2004.

^{xxxv} Sources for this table include: "Controlling Nuclear Warheads and Materials," <http://www.nti.org/e_research/cnwm/overview/cnwm_home.asp>; Franco Adriano, "Nucleare Russo, un affare italiano: Voce per voce la prima tranche dell'impegno con Putin sottoscritto da Berlusconi a Roma" (Russian nuclear power, an Italian matter: Item by item the first plank in the commitment with Putin signed by Berlusconi in Rome), *Milano Finanza*, January 25, 2005, <<http://www.milanofinanza.it>>; French Foreign Ministry Official, interview by author, Washington, DC, January 6, 2005; The G8 Global Partnership, *First Annual Report 2003: Progress report on the UK's programme to address nuclear, chemical and biological legacies in the Former Soviet Union*, <http://www.dti.gov.uk/energy/nuclear/fsu/news/First_annual_report.pdf>; Ministry of Foreign Affairs of Japan, "Japan-Russia Foreign Ministers' Meeting: Overview of Results," January 14, 2005, <<http://www.mofa.go.jp/region/europe/russia/meet0501.html>>; Nadezhda Shcherbinina, "Yest frantsuzskiy interes, italyanskiy tozhe" (There is French interest, and Italian too), *Zvezdochka* (Severodvinsk), November 3, 2004; NIS Nuclear and Missile Databases, <<http://www.nti.org/db/nisprofs>>; NDEP Official (name withheld by request), e-mail correspondence with author, February 28, 2005; Sergio Rossi, "Un affare smantellare l'atomo" (A transaction to dismantle the atom), *Il Sole 24 Ore* (Milan), January 17, 2004, <<http://www.ilsole24ore.com>>; U.S. Department of Energy, "U.S. Department of Energy Budget Roll-Out Media Availability Secretary

Spencer Abraham,” February 2, 2004, <http://www.energy.gov/engine/doi/files/dynamic/512004105158_BudgetRollout2005Transcript.pdf>; William Hoehn, “Analysis of the Bush Administration’s Fiscal Year 2002 Budget Requests for U.S.-Former Soviet Union Nuclear Security: Department of Energy Programs,” August 10, 2001, <<http://www.ransac.org>>; William Hoehn, “Update on Congressional Activity Affecting U.S.-Russian Cooperative Nonproliferation Programs,” July 26, 2002, <<http://www.ransac.org>>.

^{xxxvi} Additional moneys are expected for new projects in 2005; \$0.5 million have been spent on bilateral projects, €10 million was donated to the NDEP for 2002-2005, and €6 million has been pledged for 2006-2008. Swedish Ministry for Foreign Affairs and Ministry of Finance, Press Release, February 16, 2005, “Sweden to Support Environmental Work in Russia,” <<http://www.sweden.gov.se/sb/d/5250/a/39029>>.

^{xxxvii} Sergio Rizzo, “L’Italia distruggerà l’arsenale russo” (Italy will destroy the Russian arsenal), *Corriere della Sera* (Milan), November 2, 2004, <<http://www.corriere.it>>.

^{xxxviii} French Foreign Ministry official (name withheld by request), interview by author, Washington, DC, January 6, 2005.

^{xxxix} Currently, the NDEP is cooperating with France, the European Union, and Russia on several projects in Gremikha. Projects that may begin in summer 2005, if approval for financing them is received in time, are: improvement of spent fuel storage, fuel off-loading equipment, and physical protection. NDEP official (name withheld by request), e-mail correspondence with author, February 28, 2005.

^{xl} The NDEP hired the Energy Safety Analysis Center, a division of the Russian Academy of Sciences’ Nuclear Safety Institute, together with the Kurchatov Institute and NIKIET (the R&D Institute of Power Engineering of the Russian Ministry of Atomic Energy) to compile the master plan.

^{xli} The executive summary is: “Strategic Approaches in Solving Decommissioning Problems of Retired Russian Nuclear Fleet in the North-West Region” (Moscow: 2004), and has been made available to NGOs such as the Center for Nonproliferation Studies as well.

^{xlii} Charles Digges, “Russian, European officials optimistic about Russian nuclear ‘Master Plan,’” February 11, 2005, <http://www.bellona.no/en/international/russia/nuke_industry/co-operation/37176.html>.

^{xliii} Donations to the NDEP are captured under individual country contributions in Table 1. NDEP contributors include Canada (CD\$32 million, or €20.8 million), Denmark (€10 million), the European Union (€50 million), Finland (€10 million), France (€40 million), Germany (€10 million), the Netherlands (€10 million), Norway (€10 million), Russia (€10 million), Sweden (€16 million), and the United Kingdom (£10 million, or over €16 million). Funds are either earmarked for nuclear activities or available for those activities.

^{xliv} The program, begun as a Norwegian initiative to combine the efforts of the United States, Norway, and Russia to address environmental problems in the Arctic region associated with Russian nuclear submarine decommissioning, officially started on September 26, 1996. The United Kingdom joined the Arctic Military Environmental Cooperation (AMEC) in June 2003. AMEC Web site, <<http://osiris.cso.uiuc.edu/denix/Public/Intl/AMEC/RTC/feb.html>>; “United Kingdom Joins Arctic Military Cooperation,” M2 Presswire, June 20, 2003, <<http://www.presswire.net>>.

^{xlv} Norwegian officials, interviews by author, Oslo, January 2005.

^{xlvi} Adriano, “Nucleare Russo, un affare italiano”; Rossi, “Un affare smantellare l’atomo”; Shcherbinina, “Yest frantsuzskiy interes.”

^{xlvii} Adriano, “Nucleare Russo, un affare italiano.”

^{xlviii} The Gremikha base was the base for the Russian Navy’s liquid-metal cooled Alfa-class submarines. There is as yet no technology for recycling spent nuclear fuel (SNF) from these reactors, so any project in this area will be lengthy and expensive.

^{xlix} Akhunov, “Kompleksnaya utilizatsiya APL.” For a breakdown of projects and estimated costs, see Cristina Chuen, “The Global Partnership and Submarine Dismantlement,” June 8, 2004, <<http://cns.miis.edu/pubs/week/040608.htm>>.

^l U.S. State Department personnel, interviews by author, Washington, DC, June 2004. For more details on the various organizations related to nonproliferation assistance in the naval sphere, see “Coordinating Submarine Dismantlement Assistance in Russia,” September 2004, <http://www.nti.org/c_press/analysis_subs_090104.pdf>.

^{li} There are also reports that Italy may become involved in work at Andreyeva Bay. Shcherbinina, “Yest frantsuzskiy interes.”

^{lii} The U.S. Department of Defense is involved in scrapping ballistic missile submarines and related activities; the U.S. Department of Energy is completing projects to improve materials protection, control and accounting (MPC&A) at naval sites; and the Japanese government is funding the dismantlement of submarines at Zvezda Shipyard, near Vladivostok. The only other country that has committed funds to the Russian Far East is Australia; however, these funds are to be expended via the Japan-Russia Committee on Cooperation for the Elimination of Nuclear Weapons, which will thus serve as a coordinating body. “Japan-Russia Foreign Ministers’ Meeting (Summary of Results),” June 24, 2004, <<http://www.mofa.go.jp/region/europe/russia/meet0406.html>>.

^{liii} Norway has been offering to provide a nuclear fuel transport ship for several years, but this offer has not been accepted by Oslo’s Russian counterparts. Ole Reistad, Norwegian Radiation Protection Authority, interview by author, Oslo, January 12, 2005.

^{liv} European officials, interviews by author, September, October, November 2004. One case that illustrates the difficulty of obtaining information in Russia is that of the Murmansk Initiative, a U.S.-Norwegian-Russian project launched in 1996 to increase the capacity of an experimental liquid radioactive waste treatment facility to industrial scale. The facility, far over budget, has yet to enter operation. Rostekhnadzor, the Russian nuclear regulatory agency, has been quoted as stating that the initial contractors were incompetent and the initial design flawed. Information on this initial contracting remains murky. Throughout the ensuing years, officials from donor nations traveled to Atomflot to inspect the facility and agreed to increase funding without obtaining a complete picture of the problems at the facility. See Bellona Foundation, “The Murmansk

Initiative-RF: An observer's point of view," December 5, 2003,

<http://www.bellona.no/en/international/russia/navy/northern_fleet/decommissioning/31925.html>. At present, information about the project continues to be lacking. Rosatom has yet to inform its foreign partners, despite numerous requests, of the exact nature of the continuing flaws in the facility and what must be done (at what cost) to bring all equipment up to code.

^{lv} Ariane Sains, "Better environmental assessments urged for Russian sub cleanup," *Nucleonics Week* 45 (July 29, 2004), pp. 15-16.

^{lvi} This point was driven home to the author by a presentation of the results of an environmental impact assessment (EIA) performed by the Onega Research and Design Engineering Bureau on the dismantlement of a Victor II-class submarine. The results of the EIA suggested that even were an airplane to hit the submarine during defueling, the resulting radiation would not require an evacuation or result in radiation emissions exceeding regulation levels. Given that, on August 10, 1985 the K-314, an Echo II submarine, caught fire and vented radiation in Chazhma Bay, in the Russian Pacific, at the close of a refueling operation resulting in serious bodily injuries and contamination that remains a problem to this day, it would be highly valuable to understand the assumptions underlying the new EIAs that equally devastating accidents could not occur during other types of defueling operations, even were external shocks such as airplane strikes involved. "Scientific and Technical Issues in the Management of SNF and RW of Decommissioned Nuclear Submarines and Nuclear-Powered Surface Vessels," paper delivered to the NATO-Russia Advanced Research Workshop, Moscow, Russia, September 22-24, 2004.

^{lvii} For information on the convention, see the Organisation for the Prohibition of Chemical Weapons Web site, at <<http://www.opcw.org>>.

^{lviii} Two of Russia's CW storage sites, in Kambarka (Udmurtiya) and Gornyy (Saratov region), hold lewisite, mustard, and lewisite-mustard mixtures—older, arsenic-based chemical weapons. The other five sites—Shchuchye (Kurgan region), Kizner (Udmurtiya), Maradykovskiy (Kirov region), Pochep (Bryansk region), and Leonidovka (Penza region)—hold newer and more lethal Russian nerve agents (VX, sarin, and soman, in addition to smaller amounts of lewisite, lewisite-mustard, and phosgene) in varied weapons configurations. Robert J. Einhorn and Michèle A. Flournoy, "Protecting against the Spread of Nuclear, Biological, and Chemical Weapons: An Action Agenda for the Global Partnership" (Washington: Center for Strategic and International Studies, January 2003), p. 54.

^{lix} The U.S. Cooperative Threat Reduction program has funded CW destruction since 1992. The Department of Defense installed security upgrades at the Shchuchye and Kizner facilities, which house portable nerve agents. By 2000, the United States had also spent more than \$140 million on the development and design of a pilot nerve-agent destruction plant in Shchuchye, which is supposed to destroy all of the nerve agents stored in Shchuchye and Kizner. However, in October 1999 the U.S. Congress canceled the \$130 million that had been budgeted for construction of the plant in 2000, due to uncertainty over costs, doubts about the Russian commitment to meet its CWC obligations, the limited amount of funding received from other nations, and the lack of a coordinated federal CW destruction plan in Russia. A Clinton administration request for \$35 million in 2001 was similarly rejected. Work on the Shchuchye plant continued at a delayed pace with previously budgeted funds, until funding was reinstated in 2002 (\$50 million). The United States plans to finance the construction of all buildings within the Shchuchye facility, except for one destruction building, which the Russians will fund. Other nations are funding facility infrastructure, such as electricity substations and railways, located outside of the elimination facility itself.

^{lx} The European Union also committed €6 million to the Gornyy project, transferring responsibility for project implementation to the German Foreign Ministry. *The G8 Global Partnership: German-Russian Cooperation* (Bonn: Federal Ministry of Economics and Labour, May 15, 2004), p. 45.

^{lxi} Germany has experience in eliminating blister agents from similar activities during World War II. German aid to Russia for CW elimination (in millions of U.S. dollars) is as follows:

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Funding	3	2.6	4.2	6.3	5.0	5.3	5.7	3.8	4.6	2.5	1.1	0.8

(Funding numbers from Natalia Kalinina, "The Effectiveness of the Chemical Weapons Convention Depends Upon Russia's Actions," *Yaderny Kontrol* 9, <http://www.sgpproject.org/Kalinarius_CW.pdf>.) With the launch of the Gornyy facility in 2002, German contributions dropped. However, in July 2003 Germany signed an agreement with Russia regarding construction of another blister agent elimination facility, at Kambarka. As of February 2004, €150 million were already under contract for work at this site, wherein Germany will fund a thermal destruction facility for solid and liquid residual CW agent materials, a system for draining the Lewisite cisterns containing the chemical agents, and filter systems for contaminated buildings. Strengthening the Global Partnership, "Donor Factsheet: Germany," <<http://www.sgpproject.org/Donor%20Factsheets/Germany.html>>.

^{lxii} According to the testimony of Deputy Under Secretary of Defense Technology Security Policy and Counterproliferation Lisa Bronson, the decrease in CTR spending at Shchuchye in 2005 reflects the "completion of the capital-intensive construction phase [of the project], not a decrease in commitment." U.S. Senate, Armed Services Subcommittee on Emerging Threats and Capabilities, March 10, 2004, in Federal Document Clearinghouse Media, Lexis-Nexis Academic Universe, <<http://www.lexis-nexis.com>>; budget numbers from Defense Threat Reduction Agency, "Fiscal Year (FY) 2004/FY 2005 Biennial Budget Estimates: Former Soviet Union Threat Reduction Appropriation," February 2003, <http://www.dod.mil/comptroller/defbudget/fy2004/budget_justification/pdfs/operation/Volume_1_-_DW_Justification/CTR_FY04-05_PB.pdf>.

^{lxiii} German Federal Ministry of Economics and Labour *The G8 Global Partnership: German-Russian Cooperation* (Bonn: Federal Ministry of Economics and Labour, May 15, 2004), p. 49.

^{lxiv} Paris has submitted a draft agreement on cooperation on CW elimination to Moscow. There has also been some discussion of funding projects under the Swiss agreement with Russia. In November 2004, French officials involved in the Global Partnership met with their Russian counterparts to discuss CW elimination and announced that they would construct an

environmental monitoring system near Shchuchye, to be completed by early 2006. Agentstvo Voyennykh Novostey (Moscow), November 25, 2004. Media reports suggested that a Franco-Russian agreement might be reached during meetings of the Russian-French Cooperation Council (known in French as the Conseil de coopération franco-russe sur les questions de sécurité [CCQS]) on January 21, 2005. See, for instance, Aleksey Sobolev, "Rossiya prosit u Frantsii zashchity ot Evropy" (Russia asks France for protection from Europe), *Kommersant* (Moscow), January 21, 2005, <<http://www.kommersant.ru>>. However, no agreement has since been reported.

^{lxv} Foreign Affairs Canada, "Canada and NTI Conclude Agreement to Help Destroy Chemical Weapons in Russia," February 7, 2005, <<http://www.canadianembassy.org/homepage/050207-en.asp>>.

^{lxvi} *The G8 Global Partnership: German-Russian Cooperation*, p. 47.

^{lxvii} Sergey Ptichkin, "S khimiyey ne khimichat – bezopasnost" (With chemicals you can't stint on safety), *Rossiyskaya gazeta* (Moscow), May 26, 2004, <<http://www.rg.ru>>.

^{lxviii} The G8 Global Partnership, *Second Annual Report: Progress during 2004 on the UK's programmes to address nuclear, chemical and biological legacies in the Former Soviet Union*, December 2004, pp. 10-11, <http://www.fco.gov.uk/Files/kfile/PostG8_POL_DTI_Second_annual_report.pdf>.

^{lxix} Sources for this table include: "Cooperative Threat Reduction: Annual Report to Congress Fiscal Year 2006," <http://www.ransac.org/documents/fy06_ctr_annual_report_to_congress.pdf>; Foreign Affairs Canada, "Chemical Weapons Destruction," <http://www.dfait-maeci.gc.ca/foreign_policy/global_partnership/destruction-en.asp>; "Czech Rep Gives Two Million to Scrap Russian Chemical Weapons," Czech News Agency, October 22, 2004, in Lexis Nexis Academic Universe, <<http://www.lexis-nexis.com>>; Foreign Affairs Canada, "Canada and NTI Conclude Agreement"; Strengthening the Global Partnership, "Donor Factsheets," <<http://www.sggproject.org/Donor%20Factsheets/Index.html>>; General Accounting Office Report, GAO-04-361, "Delays in Implementing the Chemical Weapons Convention Raise Concerns About Proliferation," <<http://www.gao.gov/new.items/d04361.pdf>>, p. 22; *The G8 Global Partnership: German-Russian Cooperation* (Bonn: Federal Ministry of Economics and Labour, May 15, 2004), p. 47; *The G8 Global Partnership: Progress during 2004 on the UK's programmes*, p. 18; Kalinina, "The Effectiveness of the Chemical Weapons Convention"; "NZ Joins Efforts to Destroy Russia's Chemical Weapons," *New Zealand Herald*, July 8, 2004, in Lexis-Nexis Academic Universe, <<http://www.lexis-nexis.com>>; "Russia to Increase Spending on Dismantling Chemical Weapons," Associated Press, October 6, 2004; Capitol Hill Press Release, November 19, 2003, "Statement by Senator Richard Lugar, Chemical and Biological Arms Control Institute"; "Switzerland to Allocate \$12 Bln for Russian Chemical Weapons Elimination," RIA Novosti, January 28, 2004.

^{lxx} Additional funding is expected after 2006 from the European Union's Strategy Against the Proliferation of Weapons of Mass Destruction program.

^{lxxi} Project on Managing the Atom, "Russian Plutonium Disposition," Controlling Nuclear Warheads and Materials Database, <http://www.nti.org/e_research/cnwm/reducing/rpdispose.asp#_ednref25>.

^{lxxii} As of December 31, 2004, 231.5 metric tons of HEU had been downblended, the equivalent of 9,261 nuclear warheads eliminated. "Progress Report: US-Russian Megatons to Megawatts Program," December 31, 2004, <http://www.usec.com/v2001_02/HTML/Megatons_status.asp>.

^{lxxiii} Nuclear.ru, "Soglasitelnaya komissiya Kongressa SShA otkazala v finansirovaniy dopolnitelnykh zakupok rossiyskogo NOU" (U.S. Congressional conference committee refuses to finance additional LEU purchases), November 10, 2003, <<http://www.nuclear.ru>>.

^{lxxiv} See, for instance, Morten Bremer Mærli and Lars van Dassen, "Europe, Carry Your Weight," *Bulletin of the Atomic Scientists* 60 (November/December 2004).

^{lxxv} If the umbrella agreement is neither ratified by the Russian parliament nor extended beyond its date of expiration, most U.S. assistance projects will be at risk.

^{lxxvi} In May 2003, \$466 million was awarded to Washington Group International and Raytheon Technical Services to begin work on the fossil-fuel power plants. U.S. Department of Energy, "U.S. and Russia Take Major Steps Toward Shut Down of Last Three Weapons Reactors: Contracts Signed for Fossil-Fuel Plants," September 29, 2003, <<http://www.energy.gov>>.

^{lxxvii} Department of Energy official (name withheld by request), interview by author, Washington, DC, July 19, 2004.

^{lxxviii} The conference was attended by 11 countries, the European Commission, and the International Atomic Energy Agency. National Nuclear Security Administration, Press Release, February 14, 2005, "Nations Gather to Help Nuclear Cities Shut Down Plutonium Production Reactors."

^{lxxix} U.S. Department of State, "Joint Statement by the President of the Russian Federation and the President of the United States of America on Non-Proliferation of Weapons of Mass Destruction and the Means of Their Delivery," Moscow, January 14, 1994.

^{lxxx} NIS Nuclear and Missile Database, "Plutonium Disposition Overview," <<http://www.nti.org/db/nisprofs/russia/fissmat/plutdisp/puovervw.htm>>.

^{lxxxii} For the text of the agreement, see: NIS Nuclear and Missile Database, "Text: U.S.-Russian Agreement on Management of Used Plutonium," <<http://www.nti.org/db/nisprofs/russia/fulltext/plutdisp/98Ag.htm>>. An in-depth discussion of the liability issue and possible solutions can be found in R. Douglas Brubaker and Leonard S. Spector, "Liability and Western Nonproliferation Assistance to Russia: Time for a Fresh Look?" *Nonproliferation Review* 10 (Spring 2003), pp. 1-39.

^{lxxxiii} Charles Digges, "Technical Agreement for Plutonium Disposition Allowed to Lapse by US," July 30, 2003, <<http://www.bellona.no/en/international/russia/navy/co-operation/30596.html>>.

^{lxxxiii} U.S. Undersecretary of State for Arms Control and International Security John Bolton made this argument on June 15, 2004, to the Senate Foreign Relations Committee. U.S. Senate, Committee on Foreign Relations, *Sea Island and Beyond: Status Report On the Global Partnership Against Weapons of Mass Destruction*, 108th Cong., 2nd Sess., June 15, 2004, <<http://foreign.senate.gov/hearings/2004/hr040615a.html>>.

^{lxxxiv} The G8's Moscow Nuclear Safety and Security Summit of April 1996 called for action on plutonium disposition and initiated the international process under which disposition options were considered, joint scientific work is being conducted, and financial commitments are being made. For information on this summit, see University of Toronto G8 Information Centre, "Nuclear Safety and Security Summit," <<http://www.g8.utoronto.ca/summit/1996moscow/index.html>>.

^{lxxxv} Indeed, on February 14, U.S. Secretary of State Condoleezza Rice informed Senate Energy and Natural Resources Committee Chairman Pete Domenici that Washington had recently sent a proposal to Moscow to resolve the liability dispute. Mike Nartker, "Experts Praise U.S.-Russian Nuclear Security Enhancements, Say More Must Be Done," Global Security Newswire, February 25, 2005, <<http://www.nti.org>>.

^{lxxxvi} Ibid., Matthew Bunn, as cited.

^{lxxxvii} "Construction cost of MOX fuel plant estimated at 29 billion rubles," Interfax, November 12, 2004; "Controlling Nuclear Warheads and Materials."

^{lxxxviii} Sources for this table include: "Controlling Nuclear Warheads and Materials,"

<http://www.nti.org/e_research/cnwm/overview/cnwm_home.asp>; Strengthening the Global Partnership Project, "Plutonium Disposition," <<http://www.sgpproject.org/Donor%20Factsheets/ProjectAreas/PU.html>>.

^{lxxxix} Vibropacking is an alternative to the creation of pellet fuel. Glove boxes or hot cells are used to fabricate MOX fuel rods; the fabrication process and equipment is simpler than conventional aqueous conversion processes and pellet fuel fabrication technology, according to Russian and Japanese nuclear experts. Further, Japanese Ambassador Yukiya Amano, Director General for Arms Control and Scientific Affairs at the Japanese Foreign Ministry, has pointed out that the irradiation of MOX fuel in light-water reactors requires years of work, while vibropacking could be launched far sooner. Thus, Tokyo is focusing its plutonium disposition assistance in this area. "Vibropacking technology," All-Russian Scientific Research Institute of Atomic Reactors (NIAR) website, <<http://www.niar.ru/xtoengl/englisch/dost3.htm>>; "American Nuclear Society Winter Meeting," August 2001, <<http://www.ans.org/pubs/magazines/nn/docs/2001-8-3.pdf>>; "Japanese View on the G8 Global Partnership," statement to the Second Moscow International Nonproliferation Conference, sponsored by the Carnegie Moscow Center and the Center for Policy Studies in Russia (PIR Center), Moscow, September 19, 2003, <http://www.pircenter.org/conf2003/data/amano_e.html>.

^{xc} The FMSF was designed to hold 50 metric tons of plutonium and 200 metric tons of HEU. In 2003, then-Minister of Atomic Energy (now Rosatom head) Aleksandr Rumyantsev announced that the FMSF would house just 25 tons of plutonium and no uranium. However, according to experts cited in a Bellona Foundation report of December 2004, the facility could hold significantly more than the initial 250 tons of material. Charles Digges, "Rumyantsev letter reveals specific amounts of nuke usable material, but raises many questions," December 2, 2004, <http://www.bellona.no/en/international/russia/nuke_industry/36391.html>.

^{xci} *The G8 Global Partnership: Progress during 2004 on the UK's programmes.*

^{xcii} Ibid, p. 21.

^{xciii} State Department official (name withheld by request), interview by author, Washington, DC, December 8, 2004.

^{xciv} The UK-Russian Federation Closed Nuclear Cities Partnership aims to facilitate "lasting alternative civil sector employment for former nuclear weapons scientists, engineers and technicians, and [support] the longterm economic viability of the closed nuclear cities." *The G8 Global Partnership: Progress during 2004 on the UK's programmes.*

^{xcv} This is particularly true of the HEU in Kharkiv, Ukraine. The Ukrainians appear willing to transfer the material to a country other than Russia, but the United States is unlikely to accept the material, and no other country has offered an alternative solution.

^{xcvi} DOE official (name withheld by request), interview by author, Washington, DC, January 6, 2005. For more information on RTGs, see "Increasing International Attention Paid to RTGs in Russian Arctic," *NIS Export Control Observer*, May 2004, <http://cns.miis.edu/pubs/nisexcon/pdfs/ob_0405e.pdf>, p. 8, and Rashid Alimov, "Radioisotope Thermoelectric Generators," Bellona Working Paper, November 24, 2003,

<http://www.bellona.no/en/international/russia/navy/northern_fleet/incidents/31772.html>.