

Coordinating Submarine Dismantlement Assistance in Russia

CENTER FOR NONPROLIFERATION STUDIES

COMMISSIONED BY THE NUCLEAR THREAT INITIATIVE

SEPTEMBER 2004



Nuclear Threat Initiative
1747 Pennsylvania Avenue NW, 7th Floor
Washington, D.C. 20006
Website: <http://www.nti.org>



Center for Nonproliferation Studies
Monterey Institute of International Studies
460 Pierce Street, Monterey, CA 93940
Website: <http://cns.miis.edu>

Russia's decommissioned nuclear-powered submarines continue to present serious proliferation-related and environmental threats.¹ The most severe include the risk of proliferation of materials that could be used in the creation of nuclear weapons or radiation dispersal devices (also known as “dirty bombs”). Russian President Vladimir Putin has identified submarine dismantlement as a top Russian priority. The immensity of the problem inherited from Soviet times, however, means that without foreign support it would take Russia many years to handle the problem. Russia's concerns have been recognized by the international community, which has pledged its assistance. The dismantlement of nuclear-powered submarines in Russia was identified as one of the priority areas for the Global Partnership against the Spread of Weapons and Materials of Mass Destruction, initiated at the Group of Eight (G8) summit in Kananaskis, Canada, on June 27, 2002.

Nearly all of the countries involved in the Global Partnership have committed themselves to assisting in the dismantlement of Russia's nuclear-powered general-purpose submarines and management of spent nuclear submarine fuel (SNF) and other radioactive wastes. The United States is continuing to dismantle decommissioned ballistic-missile submarines (SSBNs) under the Cooperative Threat Reduction (CTR) program. In the past two years, very substantial new commitments have been made as well. For example, Italy has pledged \$441 million, and a substantial part of France's \$890 million Global Partnership pledge has been earmarked for naval projects. Several countries have begun implementing their projects. The dismantlement of a few Northern Fleet submarines with funds from Norway and the United Kingdom has already begun, and both nations are helping clean up radioactive contamination and increase security at sites on Russia's Kola Peninsula. Japan has dismantled one submarine in the Russian Far East, is in talks regarding additional contracts, and has agreed to facilitate \$7 million in submarine projects funded by Australia. Germany, which has committed \$367 million in the naval sphere for 2003-08, is refurbishing the Nerpa Shipyard so that defueled reactors, now temporarily stored in floating units (consisting of the reactor compartment and two adjacent compartments), can be prepared for long-term storage in a new land-based facility at nearby Sayda Bay. Berlin is also funding the construction of this reactor storage facility; the first reactor compartments are scheduled to enter the facility in fall 2005. Canada, which has committed nearly \$90 million for submarine dismantlement assistance, has also recently concluded an agreement with Russia on realizing projects in this sphere.

Submarine dismantlement programs involving over a dozen countries and organizations faces certain difficulties, though. Assistance must be properly coordinated, so that efforts are not duplicated, delays in one project do not create difficulties for other

¹ Based on a study by CNS Senior Research Associate Cristina Chuen, with comments by CNS Deputy Director Clay Moltz. Funding provided by the Nuclear Threat Initiative. The study used open source materials only. Ms. Chuen has also conducted interviews via telephone and e-mail with officials from the Russian Ministry of Atomic Energy, U.S. Departments of State, Energy and Defense, Canada's Department of Foreign Affairs and International Trade, Norwegian Radiation Protection Authority, Japanese Foreign Ministry, France's Technicatome, Swedish Nuclear Power Inspectorate, United Kingdom Ministry of Trade and Industry, and European Bank of Reconstruction and Development, and experts in the field.

activities, and no critical tasks are left undone. 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 Gremikha to dismantlement sites during the summer transport season,¹ makes it quite clear that foreign partners must be involved in decisions affecting all stages of the dismantlement process, lest they indirectly contribute to another accident. Even a small accident involving a foreign-funded project could put all projects in danger. This paper does not elucidate national assistance programs to Russia in the sphere of submarine dismantlement, but instead examines the mechanisms available for coordinating these programs, identifying the issues and players involved in this assistance, and making recommendations for improving the coordination and oversight of dismantlement assistance programs.² A well-planned, coordinated dismantlement process is critical to ensuring the safety and security of nuclear materials.

Current Coordination Mechanisms

During the first year of the Global Partnership, initiated at the G8 summit in Kananaskis, Canada, in June 2002, several donor countries voiced concerns about coordination of assistance projects in the naval sphere. Much progress has been made in since that time, with several new bodies tasked to assist in this area. Most recently, foreign assistance providers requested that Russia form an organization dedicated to coordinating assistance at one naval site, Andreyeva Bay.² Earlier in the year, the G8 formed the Global Partnership Working Group to address project implementation issues. The first overall plan detailing the work that needs to be done in the submarine area, created under the auspices of the Nuclear Operations Committee of the European Bank of Reconstruction and Development's Northern Dimension Environmental Partnership, is now nearing completion. High-level discussions on coordinating submarine assistance also occur at meetings of the International Atomic Energy Agency's Contact Expert Group and the Multilateral Nuclear Environmental Program in the Russian Federation Committee. Another program that has been carrying out joint projects at Russian Northern Fleet sites is the Arctic Military Environmental Cooperation Program. In addition, the NATO Programme for Security through Science has sponsored several Advanced Research Workshops in the past decade that focused on the dismantlement of Russian nuclear submarines; the next such workshop, to be held in March 2005, will examine coordination issues. Finally, coordination occurs on an ad hoc basis between foreign assistance providers.

A general division of responsibilities has resulted from high-level meetings, which have given donor countries opportunities to learn from each other. However, detailed coordination requires continued efforts. The request for a new organization to handle projects at one particular site, Andreyeva Bay, indicates both this need and a possible solution. The following section looks at each of the international bodies listed

² For information on various national assistance programs in the submarine sphere, please see Cristina Chuen, "Issue Brief: Submarine Dismantlement Assistance," Nuclear Threat Initiative Website, http://www.nti.org/e_research/e3_43a.html.

above in detail, outlining their activities in the submarine dismantlement sphere and the role they play in coordinating that assistance.

Nuclear Operating Committee of the Northern Dimension Environmental Partnership (NDEP)

The NDEP was created in 2001 by the European Bank of Reconstruction and Development (EBRD), European Investment Bank (EIB), Nordic Investment Bank (NIB), and the World Bank Group. The EBRD was given the role of managing donor-funded nuclear safety projects via the NDEP Support Fund, which was established at the bank. The fund has two “windows,” one for non-nuclear environmental projects and one for projects aimed at managing nuclear waste, particularly focusing on the Kola Peninsula and the Barents Sea.³ The NDEP is managed by the Assembly of Contributors and the Steering Group, made up of representatives from the European Commission, the Russian Federation, and the international financial institutions operating in Northwest Russia, namely the EBRD, NIB, EIB, and the World Bank. The Steering Group and the Assembly of Contributors coordinate in overseeing the implementation of projects. The lead on individual projects is shared among the international financial institutions.⁴ At its first meeting, in November 2002, the NDEP Assembly of Contributors decided to establish an Operating Committee for the “nuclear window” to identify, propose, and prioritize projects in the nuclear window and assist during project implementation.⁵

This Nuclear Operating Committee, however, has yet to undertake any projects in the nuclear sphere. At present, members use committee meetings to report on dismantlement-related activities they conduct on a bilateral level.⁶ While the committee plans to undertake projects in Northwest Russia (€160 million in funds have been committed for this purpose),⁷ it decided after much discussion regarding the scale of effort required that its first venture would be to finance the development of a Strategic Master Plan for Northwest Russia. This plan is supposed to detail the state of all relevant facilities in the region and their needs, analyze relevant legal and regulatory frameworks, and identify high-priority tasks. 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) are drafting the first phase of this plan. Ashot Sarkisov, who is in charge of coordinating plan development, presented a draft interim report of the plan to the second meeting of the Nuclear Operating Committee, on July 2, 2004. The final draft is expected in October, and will be presented to the Nuclear Operating Committee for final approval on February 2, 2005.⁸

The draft Strategic Master Plan was lauded by meeting participants for the details included in the report. These include an overview and analysis of Russian legal and regulatory provisions and relevant bilateral and international agreements, information the amounts and types of radioactivity and locations of spent nuclear fuel, details on the conditions of each decommissioned Russian submarine and dismantlement capacities in the Northwest, as well as a great deal of information on the development of methods to dispose of liquid metal fueled reactors. However, since the draft plan was developed by

Russian organizations, Russian priorities naturally influenced the tasks detailed in the plan. For instance, although the documents that founded the Global Partnership, signed in Kananaskis, do not mention physical protection, for several donors this is their chief concern due to terrorist worries. While Russia has recently adopted security concerns as one of the reasons why submarines must be dismantled, it has traditionally averred that its facilities already have adequate protective measures. The draft master plan reportedly does not devote a lot of space to physical protection needs, noting that physical infrastructure is generally in need of improvement but that physical protection measures are otherwise satisfactory. The need for new physical measures at the reactor storage facility in Sayda Bay is listed as a priority.⁹ This is not surprising, since the most recent incident involving theft at a Northern Fleet site was the April 2004 discovery that over 30 tons of metal had been stolen from defueled reactor compartments stored in Sayda Bay. However, an examination of that case also reveals that, although improved engineered features around the storage site are warranted, the key problem in securing the reactor compartments was the human element. In order to gain access to the storage area, the suspects had to pass through a closed city checkpoint, while the trucks loaded with metal had to go through a border checkpoint as well as a customs checkpoint on the road to Murmansk (they do not appear to have been taken out by sea). This implies that the suspects either had documents allowing them to pass with the metal, or paid off guards at each point.¹⁰ Indeed, closed city police as well as former military personnel are among the suspects under investigation.¹¹ Thus, countries interested in improving the security of nuclear materials in the Russian Northwest need to look beyond physical measures. It is not clear that the NDEP will be able to address this need through the Strategic Master Plan.

The NDEP was formed to improve the Northern environment. Indeed, it recently launched a new project entitled the Strategic Environmental Assessment, as part of the EBRD's environmental due diligence on Northwest Russia. The Strategic Master Plan, however, while it discusses the roles of Russian environmental regulators at relevant facilities, does not include projects geared towards strengthening the regulators. Granted, Russia's nuclear regulatory body, formerly known as Gosatomnadzor, is in great flux at present: a May 20, 2004 presidential edict decreed that it will be merged with environmental and technical regulatory bodies and become part of the Federal Service for Environmental, Technological, and Nuclear Oversight in the near future. The lack of certainty regarding the responsibilities of this new service make devising cooperative programs more difficult, but all the more necessary. The Strategic Master Plan evidently does not address this issue. Since the plan is being devised by organizations that are more closely affiliated with the Federal Atomic Energy Agency (the former Ministry of Atomic Energy) than the former Gosatomnadzor, it is not likely that they will devise ways to strengthen the nuclear regulator—the Atomic Energy Agency's traditional bureaucratic rival—of their own accord. However, they might be able to do so if so instructed by NDEP together with Russian authorities. Otherwise, donor countries will have to find another vehicle for outlining such plans.

The Nuclear Operating Committee is accumulating a wealth of information that should facilitate the coordination of assistance projects. It also has operational expertise and experience coordinating similar international assistance projects (such as the

Chernobyl Shelter Fund). Moreover, the committee has indicated its interest in serving as an overall coordinator, not just of projects it sponsors, but of projects conducted in the region by other parties. This would imply, however, that all relevant parties join the NDEP: to date, Japan, Italy, and the United States—the latter the most significant assistance provider—are not NDEP members. Still, the committee expects Italy to join shortly and has invited the United States and Japan to participate as well.

While the committee is unlikely to be given any powers of oversight, which could make decisionmaking excessively bureaucratic in any event, it could serve as a coordinator, informing members of possible gaps or overlaps between projects, and facilitating information sharing. This would appear to require additional work in identifying and prioritizing projects, an issue not addressed in the Master Plan to date. If the Master Plan is to contain all of the information needed to enable NDEP members to prioritize and coordinate their projects, then Russia will have to be willing to add information that may be of secondary or tertiary concern to Russia, but of critical importance to some assistance providers. Otherwise, donors will have to pursue some projects outside the bounds of the Master Plan—making it impossible to use the plan to coordinate those projects. In addition, the use of the plan is limited to Northwest Russia, as there are no current plans to expand it to the Russian Far East.

International Atomic Energy Agency's Contact Expert Group for International Radioactive Waste Projects in the Russian Federation (CEG)

The CEG Secretariat at the International Atomic Energy Agency (IAEA) was set up in April 1996. It was established as the culmination of efforts begun in 1995 to coordinate nuclear waste assistance projects in Russia. A May 1995 IAEA seminar sponsored by the Nordic countries had recognized the need for an organization to help ensure that projects avoid duplication, assure that priorities be properly assessed, and provide points of contact to facilitate cooperation more generally. All countries and international organizations providing resources to assist waste management projects in Russia were eligible to join the CEG. The CEG has held meetings at least two times per year since its establishment as well as workshops focusing on particular problems relating to decommissioned submarines, including a workshop on the problems of dismantling particular types of submarines (held in Severodvinsk, home of Russia's largest shipyards involved in dismantlement) and on remediation of problems at the former naval base at Gremikha (held on-site).

Initially, the CEG collected detailed information on cooperative activities and Russian needs, creating a database on cooperative projects. In 1999, the CEG, with European Commission funding, created a special expert working group to evaluate Russia's general strategy in the area of spent nuclear fuel and radioactive waste management and to identify priority areas for cooperation. Three areas were identified and confirmed by the CEG (in order of priority): (1) the remediation of the naval bases in Northwest Russia (particularly Andreyeva Bay and Gremikha); (2) the recovery and safe interim storage of spent nuclear fuel in decommissioned submarines and storage vessels; and (3) the management of high-level liquid radioactive waste and sludge in fuel cycle

facilities (especially Mayak, Krasnoyarsk and Tomsk).¹² Given the success of Russian and bilateral efforts in the latter two categories, the CEG made Andreyeva Bay its top priority in 2000. In order to promote international assistance for the site, a CEG workshop dedicated to problems at Andreyeva was conducted in October 2001 in Idaho Falls, Idaho, with U.S. sponsorship. Participants detailed technical information at the workshop, and several projects were proposed. The 13th CEG meeting in November 2001 endorsed the workshop conclusions and proposals, and negotiations on several infrastructure projects were initiated. Since that time, projects at Andreyeva Bay have advanced quickly, with Norway, Sweden, and the United Kingdom involved in projects dedicated to creating the necessary infrastructure and handling liquid and solid radioactive waste, as well as spent nuclear fuel.

While the CEG has been successful at identifying basic areas of work, has held workshops that have led to real projects, and has been an important venue for countries to discuss projects in a general way, most CEG meetings have tended to be large affairs, while the secretariat is too small for detailed project coordination. Official NDEP statements indicate that that organization views its work as an extension of CEG activity. While in 2002 the CEG noted that the implementation of NDEP projects will “place further demands on the capacity of the CEG to advise and coordinate radioactive waste management activities in the Russian Federation,”¹³ the minutes from the November 2003 CEG meeting state that “the CEG is not in a position to coordinate different programmes and initiatives, but has to cooperate with them on the regular basis.” The CEG Executive Secretary was tasked with drafting a proposal that it serve as a technical advisor and “project facilitator” for donors. The proposal was to be sent to the G8 Global Partnership Senior Officials Group and to other governing bodies of different CEG-related programs.¹⁴ Whereas Nuclear Operating Committee meetings bring together national representatives, CEG meetings involve not only donor nation officials but also representatives of private companies involved in assistance projects and, in a few cases, non-governmental organizations. While it is important that all of these voices be heard by officials making relevant decisions, the number of participants at these meetings (the November 2003 meeting was attended by 75 participants from 13 countries and 6 international organizations)¹⁵ has made it difficult for details to be discussed. However, private meetings between officials attending the larger CEG meetings have helped improve project coordination, both through such meetings themselves and by the ideas generated at such meetings. Most recently, at a CEG workshop held in May 2004, the countries involved in programs at Andreyeva Bay decided to request that Russia establish a new body dedicated to the coordination of projects at that site alone.

At present, all of the countries involved in assisting Russian in the submarine area are CEG members other than Japan. The CEG has invited both Japan and Denmark, which is a MNEPR signatory and NDEP contributor, to join the CEG. Since the CEG purview extends beyond Northwest Russia, it is better positioned to serve as a venue for coordination than NDEP. However, the unwieldy size of its meetings and small number of permanent staffers make it difficult for it to take on detailed coordination tasks.

Multilateral Nuclear Environmental Program in the Russian Federation (MNEPR) Committee

The idea of creating a multilateral legal framework to fix conditions under which all interested countries could provide nuclear assistance to Russia originated at the March 1999 meeting of the Barents Euro-Arctic Council, a group established in 1993 to bring together the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) and Russia.¹⁶ The MNEPR Framework Agreement was signed in Stockholm on May 21, 2003 after four years of negotiations.¹⁷ The agreement entered into force on April 14, 2004.¹⁸ It was designed to facilitate projects addressing problems regarding radioactive waste and spent nuclear fuel, focusing initially on the Northwest region.¹⁹ The European Commission, nine European countries, Russia, and the United States negotiated the MNEPR Agreement,²⁰ which was initially signed by Norway, Sweden, Denmark, Finland, Russia, Belgium, France, Germany, the United Kingdom, and the Netherlands.²¹ The United States also signed the MNEPR Agreement, but declined to sign the “Protocol on Claims, Legal Proceedings and Indemnification,” since the United States receives greater liability coverage under the Comprehensive Threat Reduction (CTR) umbrella agreement.²²

The MNEPR Agreement is the first general framework agreement covering European nuclear assistance projects in Russia, and addresses questions of site access, tax exemption, and liability issues.²³ It was concluded to facilitate work in radioactive waste management, spent nuclear fuel security, and reactor safety, focusing on Northwest Russia, and is the legal agreement that provides a basis for cooperation under NDEP.²⁴ The framework agreement also states that it is designed to facilitate projects “that may be identified by the Contact Expert Group for International Radwaste Projects.”²⁵ Although some details remain to be worked out, the parties have reached preliminary agreements over how to interpret MNEPR Agreement language concerning “contributors,” as well as related to the details of exempting contractors from various sorts of taxes.²⁶

In addition to a legal agreement, the MNEPR Agreement is an institution: the MNEPR Committee. The committee, which held its first meeting on October 21, 2003, in Moscow and second meeting on May 13, 2004, in Berlin, is co-led by Sergey Antipov, head of the Russian Federal Atomic Energy Agency’s Directorate on the Decommissioning of Nuclear and Radiation-Hazardous Facilities and Anders Nyström, deputy director of the International Law Department of the Swedish Ministry of Foreign Affairs.²⁷ The Committee focuses on legal issues, such as ratification of the MNEPR Agreement by signatory nations and the adoption of legal and regulatory statutes needed for the effective functioning of the agreement. Other issues, such as transparency, are also addressed. However, MNEPR Committee meetings, while they provide an additional place for some of the major actors involved in submarine assistance projects to meet, are largely focused on further developing a common framework, not coordinating individual projects.

Arctic Military Environmental Cooperation (AMEC) Program

The AMEC Program began as a Norwegian initiative to combine the efforts of the U.S., Norwegian, and Russian military establishments to carry out collaborative research and demonstrate technology to address environmental problems in the Arctic region caused by military activities, in particular Russian nuclear submarine decommissioning. The program officially started on September 26, 1996, with the signing of the AMEC declaration.²⁸ It received strong support in the U.S. Congress, particularly from Senator Ted Stevens, chairman of the Senate Appropriations Committee, who made certain funds were channeled to the program. AMEC was expanded on June 27, 2003, when it was joined by the United Kingdom Ministry of Defence.²⁹

AMEC's initial priorities were: 1) development of containers and storage pads for interim storage and transportation of spent nuclear fuel; 2) development of mobile technology for treatment of liquid radioactive waste at remote sites; 3) implementation of technologies to reduce solid radioactive waste volumes and temporarily store solid waste; 4) cooperation in radiation monitoring and environmental safety; and 5) implementation of clean-up technologies.³⁰ By 2004, AMEC had completed eight technology demonstration projects in Northwest Russia, including spent fuel storage and handling and the processing, handling, and storage of solid radioactive waste. Ongoing projects involve characterization of legacy liquid radioactive waste, installation of radiation monitoring systems, and developing new methods for towing submarines. Newly approved projects include a pilot submarine dismantlement project that would explore new dismantlement technologies that produce less radioactive and hazardous wastes, and an emergency exercise to test communication, decisionmaking, radiation monitoring and information exchange among AMEC partner countries. AMEC, given its military-to-military focus and expertise in the area of submarines, may also have a role in implementing the NATO-Russia Framework Document on Submarine Crew Rescue under the NATO-Russia Council, as well as the August 2003 "Support to the National Programme of Action for the Protection of the Marine Environment" project under the United Nations Environment Program, Advisory Committee on Protection of the Sea, and Russian Ministry of Economic Development and Trade of the Russian Federation.³¹

AMEC has developed a wealth of technical expertise and experience working on real projects on the ground. The first multilateral assistance program involved in nuclear dismantlement in Russia, AMEC has also become adept at coordinating work among several organizations at individual facilities. It has both an environmental and security focus, bringing together assistance providers with a variety of goals. Its program to 2010 indicates that it will be considering projects associated with the security of Russian military bases, shipyards, and naval service vessels; analyzing the possibility of consolidating vulnerable materials in the northwest; and conducting vulnerability assessment training to identify design and security systems for safeguard of nuclear materials, among others. However, while AMEC involves cooperation with the Russian Federal Atomic Energy Agency and U.S. Department of Energy, it is primarily a military-to-military program, and chiefly involved in dismantlement projects where the Russian Ministry of Defence is the lead agency (such as dismantlement at the military shipyard in Polyarnyy, on the Kola Peninsula). This military focus has made it possible to implement activities at military sites at which access might otherwise have been difficult.

Should other states seek to provide assistance at Russian military sites, AMEC is the most logical venue for coordination of such assistance. The AMEC partner countries have agreed that other countries may participate in AMEC at the project level via the “AMEC Plus” concept, or more formally by becoming an AMEC member or party to the AMEC Declaration. In addition, the AMEC partner countries have indicated their support for expanding AMEC’s work to the Russian Far East, but have stated that this would require the establishment of a separate administrative structure so that current partner country resources would not be diluted.³² It is not clear how this might be structured, but it is important that work on the Russian Northwest and Far East be well coordinated. Not only is there a great deal of experience and knowledge that AMEC experience in the Northwest can bring to the Far East, but there are also some overlaps in Russia’s work in both regions (particularly where nuclear fuel is concerned: the same railcars are used to transport spent fuel from both locations to the same storage facility at the Mayak Plant in the Urals). There could well be other equipment that might be most efficiently used by sharing it between facilities in both locations.

Global Partnership Working Group

The Global Partnership against the Spread of Weapons and Materials of Mass Destruction was created in order to increase funding for international nonproliferation assistance and improve coordination of that assistance. At the launch of the Global Partnership in 2002, spending priorities were identified and implementation guidelines defined. A Senior Officials Group was established to coordinate partnership activities. In January 2004, at the beginning of the U.S. presidency of the G8, the Senior Officials Group was disbanded and its activities taken over by the new Senior Group. This new group of Global Partnership officials at the deputy ministerial level (including non-G8 and G8 members) has three subcommittees: the Nonproliferation Expert Group, the Nuclear Safety and Security Group, and a new organization—the Global Partnership Working Group—to address project implementation issues.³³

The Global Partnership Working Group meets regularly and is attended by officials from all partnership countries. Its meetings are relatively small, with delegations of varying sizes (countries themselves decide how many officials will attend meetings). No company or non-governmental representatives attend working group meetings. The working group is chiefly a venue for countries to bring specific implementation roadblocks to high-level attention. In the past year, it has been successful at bringing particular issues to the attention of the Russian Foreign Ministry, which has resulted in the successful resolution of several implementation problems. Working group meetings are also a forum for discussing problems donor countries have in common, such as those related to liability provisions. While the working group is billed as a place to address project implementation issues, it does so only when these issues are brought to its attention by Global Partnership members. It does not coordinate project implementation. Since the enterprises involved in project implementation on the ground are not part of the working group, the group does not have detailed information on projects. Further, it is a new organization without a supply of expertise built up through submarine or other

assistance projects. Therefore, it is not likely to be useful in the coordination of projects to ensure that gaps are eliminated or duplication does not occur. Instead, its main usefulness will continue to be in bringing high-level attention to difficulties encountered during the implementation of projects designed and implemented at other levels.

Conferences

Academic conferences, workshops, and other gatherings that bring together individuals who are not members of a particular organization are additional forums where information about submarine dismantlement assistance is exchanged, problems identified and new solutions suggested. Several institutions have been quite active in sponsoring conferences, including NATO, the Center for Nonproliferation Studies (CNS) at the Monterey Institute of International Studies, and the Russian government itself.

The NATO Programme for Security through Science has sponsored Advanced Research Workshops on submarine dismantlement issues since 1995, when it supported a workshop on submarine decommissioning and related problems in Moscow. The findings, on the Russian, U.S., French, and Norwegian experience, became a book that was one of the first publications providing details on relevant issues for public officials.³⁴ These NATO workshops bring scientists and academic researchers together with practitioners involved in implementing assistance projects in the field. Workshops held in 1997 and 2002 also resulted in publications that were distributed among policymakers and practitioners.³⁵ NATO is continuing to sponsor such meetings: in December 2004 there will be a workshop in Moscow on the use of impact assessments and risk estimation in Northwest Russia, while in March 2005 NATO is hosting a workshop in the Russian Far East that will in part focus on coordination issues.

CNS has sponsored similar gatherings, as well as conducting research in this area itself. Since fall 2000 it has particularly focused on expanding participation in Russian submarine dismantlement, organizing conferences that brought together officials from Russia, the United States, Norway, Japan, the United Kingdom, and the Netherlands, as well as members of U.S. and foreign nongovernmental organizations. The Carnegie Endowment for International Peace and the Center for Policy Studies in Russia (PIR Center) have also arranged panels to discuss submarine dismantlement and related issues at international nonproliferation conferences they organize.

From the Russian side, Alexander Pikayev, now of the Institute of World Economy and International Relations (IMEMO) in Moscow, has periodically been involved in the organization of meetings on the status of nuclear submarine dismantlement and aid programs. The Russian government has also organized international conferences dedicated to submarine dismantlement issues. In September 2002, some 200 Russian and 60 foreign specialists, representing official, commercial, academic, environmental, and other public organizations from the United States, Canada, Europe, Japan, and New Zealand met in Vladivostok to discuss environmental and other issues related to scrapping decommissioned submarines. The Russian Ministry of Atomic Energy was the main conference organizer; \$30,000 for the conference was

provided by the International Science and Technology Center, an international organization established in November 1992 to coordinate international efforts to employ Russian weapons scientists. The 2002 conference followed a similar gathering held at Zvezdochka Shipyard in Severodvinsk, Arkhangelsk region in July 2001.

Workshops and conferences are invaluable in promoting research on how better to manage submarine dismantlement assistance and coordination. They bring together officials, practitioners, scholars and the public, and are one of the greatest sources of information on relevant programs and problems for the public. However, they are not a forum for delving into program details, particularly details of a sensitive nature, and thus are not a forum for managing coordination.

Coordination in Practice

The international organizations tasked with coordinating submarine dismantlement assistance all contribute to this effort in important ways. Official coordination, however, is only one way that foreign assistance efforts are managed in practice. In addition to the official coordinating role these organizations play, they provide forums where assistance providers can discuss projects together outside of official agendas. Officials involved in submarine assistance often attend the meetings of the above organizations, even if they come from countries that are not organizations members. For instance, U.S. officials who work on submarine issues at the Defense Department's Defense Threat Reduction Agency and the Department of Energy, as well as State Department officials, attend NDEP meetings. Officials also meet on site when inspecting projects, as well as during meetings devoted to other topics. Sometimes officials from donor countries have made joint visits to facilities at which more than one country is active. However, such informal coordination mechanisms will fail if officials do not meet sufficiently regularly or have discussions at a detailed level, or if countries are not free to share these details. Certainly there is a great deal of sensitive information involved in many of the assistance projects in the naval sphere. While it is of critical security importance—not only from the Russian point of view but also to prevent proliferation—that secrets be maintained, contracts or agreements that prevent foreign donors from discussing their projects can have deleterious effects. There was reportedly a case of one European agency last year unable to hold full discussions with U.S. Department of Energy officials, although the latter had a great deal of experience in improving physical protection at Russian naval sites.³⁶ Unless those implementing projects in the field can share information, not only are gaps or duplication likely, but the spread of best practices, and thus the provision of the best possible security at these sites, will be far less likely.

Another way for assistance to be coordinated is if a donor country serves in a coordinating role, or Russia itself does so. In the Russian Far East, Australia will be providing its Global Partnership funding through mechanisms developed by Japan. On June 24, 2004 Australia officially contributed \$10 million Australian to the Japan-Russia Committee on Cooperation for the Elimination of Nuclear Weapons.³⁷ As the committee will oversee all projects funded by both Japan and Australia, it will be able to ensure that

there is no duplication of work. Detecting gaps is more problematic, unless the committee has access to sufficient information on the region's needs. Unlike Northwest Russia, there is to date no strategic plan detailing decommissioned submarines and related equipment in the Russian Far East, or any plan to develop such a plan. A plan, however, would not only make it more likely to identify gaps and help set priorities, but would also help potential new donors understand what needs they might fill, and form the basis for coordinating assistance in the region. To date, the Russian Federal Atomic Energy Agency is fulfilling the role of coordinator in the Russian Far East, by selecting the projects for which it requests the assistance of the Committee on Cooperation for the Elimination of Nuclear Weapons. However, agency incentives and priorities are not necessarily entirely aligned with foreign priorities. Thus, it is likely that some donor countries will want to play a more active role in choosing projects, and have the information available to make informed choices.

Officials are not the only actors who have a role in coordinating projects. If countries were to hire the same company to serve as general contractor, the contractor itself would be in a good position to coordinate these activities. To date, however, countries have tended to hire different companies. This likely improves competitiveness and may contribute to company transparency, but could lead to duplication and will not help in the identification of gaps.

There is also the strong possibility that private companies might become involved in dismantlement efforts, increasing the need for coordination efforts that go beyond the official arena. Last year, Carnegie Endowment for International Peace Senior Associate Rose Gottemoeller and Jack Edlow, president of Edlow International Co., who have been seeking new sources of funding for dealing with Russia's decommissioned nuclear navy for many years, came up with a plan to use commercial profits to fund dismantlement. Their first idea was to blend down the highly enriched uranium (HEU) that Russia derives from reprocessing spent nuclear submarine fuel and sell the resulting low enriched uranium to make money for dismantlement. Their interlocutor at the Russian Ministry of Atomic Energy, however, noted that this HEU is already being blended down and sold in Russia for use in RBMK power reactors. But the official suggested that a project might be devised whereby excess Russian HEU stocks could be used to finance the program. Edlow International had relations with customers on the spot market ready to buy the resulting fuel, and would have paid the venture's start-up costs, both factors that might have made the deal attractive to Russia. Talks on how to work out the details, such as the difficult question of how to determine the amount of HEU that would be "swapped" for the equivalent amount of HEU in submarine fuel (since the HEU content of various types of submarine fuel is a state secret), continued periodically until April 2004. Then, the Ministry of Atomic Energy officials made it clear that they were not interested in further negotiations, though the reasons remain unclear. (One possibility is that other Russian commercial organizations involved in nuclear fuel sales may have exerted pressure to avoid possible new competition; another is that working out project details was more difficult than the possible resulting profits were worth.) Nevertheless, Minatom's successor agency appears to remain interested in possible commercial approaches to projects related to submarine dismantlement.

To date, few governments have indicated any interest in such commercial ventures. Some, however, would like to see more private funding, in order to lessen the burden on taxpayers. The Gottemoeller/Edlow proposal planned to use profits to fund activities in Kamchatka, where foreign aid has been fairly minimal but is clearly needed. The incentive to support such projects, therefore, exists. If private dismantlement ventures do materialize, though, other donors will have to find ways to include them in overall planning and coordination mechanisms. Finding ways to do this before any contracts are signed would be prudent; coordination after the fact could be far more difficult. In addition, involving private companies in coordination efforts, particularly those already involved in work in the naval sphere, could result in helpful new ideas that further existing assistance efforts.

Coordination Gaps

As this paper indicates, there are many mechanisms, both official and unofficial, for coordinating assistance for submarine dismantlement and related needs. These mechanisms have allowed a basic division of responsibilities between countries, but the possibility of gaps between programs remains, while the information needed to prioritize projects is similarly lacking.

Understandably, different nations have different priorities when it comes to handling nuclear materials. Russia's evident emphasis on dismantling liquid metal reactors, as indicated in the Master Plan for Northwest Russia, may be shared by some nations (such as France, which appears to be quite interested in the technological challenges associated with this project). Other countries that are focused on environmental or security concerns may consider it a low priority. From an environmental perspective, the oldest submarines with the greatest likelihood of radiation leakage should be tackled first—these reactors are apparently identified in the master plan. Next, environmental regulators should be strengthened, so that environmental safety can be maintained long-term. From a security perspective, the physical protection of spent fuel should receive top priority—nuclear fuel assemblies are very difficult to remove from a submarine, and therefore quite secure, before they are unloaded—and vessels that are not in danger of sinking or leakage stored afloat until security measures have been improved. From an efficiency perspective, the order in which projects are undertaken is critical to meeting overall goals as quickly and cheaply as possible. Such planning might mean, for instance, that several projects are scheduled in a row, using the same equipment at the same site, instead of constructing multiple facilities to simultaneously undertake similar tasks. It may also be better to delay the dismantlement of submarines that are in no danger of sinking—the sort of submarines that are currently being scrapped, in most cases—until Germany's construction of long-term storage facilities for dismantled Northern Fleet reactors has been completed and a similar facility is constructed in the Russian Far East. Otherwise, the reactors cannot be cut out when dismantling submarines, and instead have to be maintained in short-term floating storage made up of large, three-compartment sections, until a long-term solution is ready. Such poor planning creates a need for extra towing, special heavy-duty cranes, and other

equipment that might never be needed if projects are undertaken in a more logical sequence. Finally, different Russian organizations involved in these programs each have their own incentives, from the rapid completion of dismantlement (the Federal Atomic Energy Agency's apparent mandate) to maximizing employment and profit (local shipyards).

All of these concerns and priorities are equally valid. For each nation to make rational decisions regarding its project choice, however, and to make certain that one project is not jeopardizing another or, worse yet, creating new environmental or security risks, it is critical that the necessary information about the situation on the ground and planned projects be available to all relevant parties. To a certain degree, each foreign assistance provider will have to make certain that the projects it undertakes are coordinated with other projects, informing Russian actors in Moscow and on the ground, as well as other assistance providers active at the same site or doing related tasks. If the Master Plan can be regularly updated to include such information, and shared with all involved, it could yet prove to be a very valuable tool in coordinating these programs.

Recommendations

There is no single existing forum where all projects in the submarine field can be coordinated in detail. Nor is forming a new overarching organization, given the large number of existing organizations, likely to be the most effective way to improve coordination. However, improving coordination is not only possible, but should be an important near-term focus of assistance providers. As many projects have yet to commence (but are likely to begin in the very near future), most practical problems remain in the future. As program implementation picks up, it is extremely important that partners share information to avoid duplication or gaps and develop best practices. New efforts are required both on the ground and internationally.

Undoubtedly, Moscow should increase its own role. The Federal Atomic Energy Agency, in its statements since the launch of the Strategic Master Plan for Northwest Russia, has indicated that it is interested in improving coordination and has been more open to providing the necessary information. This cooperation is critical and must continue. Russia can do more, however. It must instruct local facilities to point out gaps and overlaps and monitor these facilities to make certain that they share this information with partner countries. In addition, Moscow should be sure that its bilateral agreements with donors allow foreign officials and contractors to share information with others working in the same area, ensuring that secrecy provisions protect facilities without harming cooperative efforts.

The recent initiative to set up a body to coordinate activities at one individual site, Andreyeva Bay, provides another model that might deserve emulation at other locations. Coordination of projects on the ground level is every bit as important as top-level coordination. It is impossible for high-level decisionmakers to know the details of each project and know if there are any synergies that might exist with another project at a nearby location. There has already been one minor case of duplication in 2004, where

two countries installed similar equipment, although only one set of equipment was needed. Even though the sums of money involved were not large, such practices waste precious time, effort, and money. Worse yet, duplication may lead to negative political consequences for assistance programs. If project managers are better able to share information with each other, this case will not have to be repeated.

While the organizations examined above do not appear to be in a position to undertake the detailed coordination of projects on the ground, they all have roles to play to make certain that projects do not overlap, leave critical tasks undone, run into bottlenecks, or result in other difficulties. An effort to find a solution to possible future project delays must also occur in an international setting. If the Strategic Master Plan for Northwest Russia includes all necessary details and is available to all countries involved in projects in that area, NDEP will be well positioned to help ensure that projects do not duplicate each other, bottlenecks are avoided, and no gaps occur. However, as the strategic plan does not appear to involve the Ministry of Defense as deeply as it does the Federal Atomic Energy Agency, AMEC may be better positioned to coordinate activities at military facilities. This suggests that any donor countries interested in assisting at such facilities ought to seriously consider joining AMEC. NDEP is also at a geographic disadvantage, given its focus on the Northwest. AMEC, on the other hand, has indicated its interest in expansion to the Russian Far East, and should be encouraged to do so. Bringing AMEC's expertise and experience to that region would make the successful execution of projects there more likely, and help ensure that synergies between the two regions be discovered.

The CEG has played an important coordinating role to date, and should continue to do so. It is the main venue where companies involved in assistance projects gather together. Therefore, it might consider measures to further their interaction. Since CEG meetings are the largest of the international gatherings, they are the best setting for involving additional players who could bring new, helpful ideas into the process. Thus, the CEG should also consider furthering its interaction with non-governmental and citizens groups. MNEPR Committee expertise is in the legal sphere. Therefore, MNEPR activities should continue to focus on legal barriers to successful cooperation. The Global Partnership Working Group is another organization that is not positioned to coordinate actual projects, but has played and should continue to play a critical role in solving particular implementation problems. Finally, organizations that sponsor conferences and research on particular issues facing submarine dismantlement programs, such as the Monterey Institute's Center for Nonproliferation Studies and the NATO Programme for Security through Science, as well as ISTC and the Russian government, play an important role in highlighting difficulties that may arise, synergies, and gaps. Bringing their findings to the attention of all parties involved in assistance efforts cannot but help promote coordination.

Finally, coordination must occur on the ground. Each donor country must make certain those who carry out their projects have been instructed to *actively* seek out and share information with project managers from all other countries undertaking projects in nearby locations. Such sharing of information is already occurring at many sites, but not

everywhere, although it is the best way to avoid duplication in the near term. In the business world, companies are accustomed to fulfilling contracts, not determining whether these contracts duplicate activities or fail to fulfill some goal that is outside the purview of that contract. General contractors are unlikely to expend time and energy meeting with officials and contractors that are not directly related to fulfilling contracts, unless they are clearly instructed to do so. It is critical, then, that they receive such instructions. This could not only result in the identification of gaps or overlaps, but also generate new ideas for synergies or increased efficiencies.

The above discussion has focused on how countries coordinate assistance projects. It has not dealt extensively with the goals of such coordination. In addition to the obvious benefit of coordination (the avoidance of bottlenecks, gaps, or duplication), Russia and its partners should also use coordination mechanisms to make provisions for the eventuality that some projects are slowed down or do not even get started. This is particularly true for those tasks that are critical to the success of other endeavors. While Global Partnership members themselves hold the chief responsibility for making certain that their national assistance programs move forward, and Russia itself can jump in at times where there is a critical need, it would make sense to develop some provisions for assisting in critical projects if they are threatened with delays or encounter unforeseen difficulties.

Coordination should also be used to ensure that countries do not work at cross-purposes. For example, there has been no apparent coordination to date of requirements for environmental oversight or environmental impact assessments. While Russia certainly has its own regulatory requirements, and these must be fulfilled, donor countries may have additional requirements. Developing standard assessment requirements across countries would facilitate cooperation among donor countries and make certain that differing requirements do not result in a competition among Russian enterprises for those assistance projects with less burdensome requirements. More attention to possible environmental impacts could also help uncover activities that might endanger project success, such as the dangerous towing method that resulted in the sinking of the K-159 in the summer of 2003, an event which resulted in a great outcry in one partner country, Norway, and could have jeopardized a number of related assistance projects. The NDEP's Strategic Environmental Assessment could serve as a model for due diligence on other programs, and should help set a standard for public disclosure and consultation.

Another goal of coordination should be the sustainability of projects funded under the Global Partnership. Exchanges of experience are likely to be most helpful in this regard. Sustainability can also be promoted by making certain that Russian organizations are put in a position to oversee site safety and security in the long term through the adoption of some common project requirements. For instance, providing radiation monitoring and security training to Russian Navy personnel, as AMEC has suggested, or involving services such as the Federal Service for Environmental, Technological, and Atomic Supervision in projects (in an advisory capacity if it does not have the legal right to act as the supervisory body at a particular site until military

materials have been removed) will improve the likelihood that safety and security can be maintained in future.

Summary of Conclusions

- ❖ Coordination of donor assistance is critical so that gaps and bottlenecks can be minimized. Since only a few projects have begun at most locations, coordination issues do not yet loom large. However, they must be anticipated in order to be avoided.
- ❖ Project managers should be given clear instructions to share information with relevant parties. Officials at the highest levels should ensure that such sharing is not restricted in overarching agreements. Tasks must be prioritized, with spent fuel security made a top concern. Proper sequencing of projects can improve security while providing efficiency gains. Since spent nuclear fuel contains highly enriched uranium and plutonium that could be used for a nuclear device, more must be done to ensure that it is neither stolen nor diverted. This material is most vulnerable when it is not onboard a submarine--therefore, physical protection of ship-board and onshore spent fuel storage sites deserves more attention.
- ❖ There are many organizations involved in coordinating assistance in the area of submarine dismantlement. No single venue can meet all coordination needs.
 - AMEC is best suited for work at military facilities and the development of new scientific solutions to avert security and environmental risks—donors interested in activities in this sphere should consider joining AMEC.
 - As the CEG involves the most members and covers all parts of Russia, its meetings are best suited for reaching out to all parties, including business. The CEG, as the only venue where public or NGO involvement is at all possible, should consider expanding access to these groups.
 - The NDEP may soon become the biggest assistance provider in Northwest Russia, as it begins to take on projects (after the completion of the Master Plan for Northwest Russia). It appears willing to take a more hand-on coordinating role, and can draw on EBRD experience coordinating similar projects, such as the Chernobyl Shelter. In this case, all donor countries involved in projects in the Russian northwest should seriously consider joining the NDEP, even if they do not donate to the organization.
 - The MNEPR Committee continues to focus on legal issues. Once all issues directly related to the MNEPR Agreement have been resolved, it should be encouraged to expand its work to solve other liability issues related to nonproliferation assistance to Russia.
 - The Global Partnership Working Group is still quite new, and has to date served as a venue for bringing high-level attention to implementation problems. The Working Group might also be an appropriate place to discuss policy issues such as a joint approach to secrecy restrictions in bilateral contracts that would allow cooperation among donors at a single site.
- ❖ While coordination needs can be divided among the above organizations, a tool is needed to help ensure that gaps and bottlenecks can be identified. The Master Plan for Northwest Russia could serve this role in the Northwest, if all necessary details

are included, particularly those related to security concerns. It would be helpful for donors if the plan helped them to prioritize projects and pointed out issues how to improve program efficiency. A “master plan” is still needed for projects in the Russian Far East, to allow integration of new donors, and help countries identify new tasks they may be willing to undertake.

Table 1. Expenditures on Submarine Dismantlement and Related Activities (in millions)

	1999	2000	2001	2002	2003	2004	2005 request
Russia:							
Industry (dismantlement of nuclear submarines, nuclear surface vessels, and service ships; environmental rehabilitation)	\$19.7	\$28.9	\$34.7	\$56.2	\$61.4		
Capital investment (infrastructure creation and modernization)	\$2.1	\$4.7	\$4.7	\$5.2	\$7.4	Information not available	Information not available
R&D	\$1.0	\$1.9	\$2.0	\$2.9	\$1.8		
United States:							
<i>Department of Defense:</i>							
Strategic Arms Elimination (total)	\$170.1	\$182.6	\$177.8	\$133.4	\$70.1	\$66.6	\$58.5
Of which:							
SLBM Launcher/SSBN Dismantlement	not available	not available	not available	not available	\$27.0	\$9.7	\$10.2
Spent Naval Fuel Disposition					\$12.4	\$7.6	\$0.4
Dismantlement of submarines in the Russian Far East (separate budget line)	\$35.0	\$25.0	\$0.0	\$12.75 million	not available	\$10.0	\$10.0
AMEC	\$4.9	\$4.6	\$5.9	\$2.6	\$1.9	\$3.9	about \$3.9
<i>Department of Energy:</i>							
Nuclear Material Protection, Control and Accounting (total)	\$139.7	\$138.7	\$169.5	\$266.6	\$193.9	\$206.5	\$199.0
Of which:							
Navy Complex MPC&A (Note: The US spent \$54.5 million on MPC&A at Navy nuclear fuel sites through 2000; by 2004, the total cost of MPC&A at Navy sites will be \$74.9)	Navy total total: \$15 million (estimated)	Navy warheads: \$43.2 Navy fuel: \$13.4	Navy total: \$19.0 Navy fuel: \$8.9	Navy warheads: \$61.8 Navy fuel: \$3.1	Navy warheads: \$47.3 Navy fuel: \$8.5	Navy total: \$38.0	Navy complex request: \$15.0
Australia:							
Donation to Japan-Russia Committee on Cooperation for the Elimination of Nuclear Weapons						\$7.2 million*	
Canada:							
NDEP contributions	—	—	—	—	\$23.4	—	not available
European Union:							
NDEP contributions	—	—	—	—	\$49.0	—	not available
France:							
NDEP contributions	—	—	—	—	\$49.0	—	not available
Funding of <i>Lepse</i> nuclear fuel ship rehabilitation	—	—	—	—		(\$17.7 committed, expenditure unknown)	not available
Germany:							
NDEP contributions	—	—	—	—	\$12.2	—	not available
Contracts signed for work at Sayda Bay	—	—	—	—	—	\$30.7	not available
Japan:							
Liquid radioactive waste processing facility (funded 1993-2000)	\$36.0 (total spent by 2000)		(project completed)	—	—	—	—
Funds disbursed for submarine-related assistance projects*	—	—	—	\$100.0*	—	—	—
Includes:							
Nuclear submarine dismantlement	—	—	—	—	\$6.7	not available	not available
Norway:							
NDEP contributions	—	—	—	—	\$12.2	—	not available
Funding of <i>Lepse</i> rehabilitation	—	—	—	Over \$3.0	not available	not available	not available
Nuclear submarine dismantlement	—	—	—	—	—	\$12.0	not available
AMEC	not available	not available	not available	not available	not available	\$1.0	not available
Andreyeva Bay projects	not available	not available	not available	not available	\$4.0	not available	not available
Sweden:							
NDEP contributions	—	—	—	—	\$12.2	—	not available
Andreyeva Bay projects	—	—	—	—	\$0.5	not available	not available
United Kingdom:							
NDEP contributions	—	—	—	—	\$18.4	—	—
Projects in Northwest Russia (includes submarine dismantlement, spent fuel storage, Andreyeva Bay projects, AMEC, physical protection upgrades to nuclear icebreakers)	—	—	\$0.15	\$1.2	\$29.4	not available	not available

*The Japanese government has disbursed \$100 million for projects in the naval sphere. Decisions over concrete project funding are made by the joint Russian-Japanese Committee on Cooperation to Assist in Eliminating Nuclear Weapons Subject to Reduction in the Russian Federation. Australia's donation follows the Japanese model; Australian funds have yet to be disbursed on actual projects.

Table 2. Current Global Partnership Commitments in the Naval Sphere (in millions)

Country	Commitments	Projects	Comments
Australia	\$7.2 million have been promised for the Global Partnership. The entire sum has been committed to naval projects.	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	About \$88 million have been committed to naval projects. Total Global Partnership pledge: \$650 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.	On June 9, 2004, Canada and Russia signed a bilateral agreement covering cooperation related to submarine dismantlement.
France	Nearly \$20.5 million have been earmarked for naval projects. Total Global Partnership pledge: \$890 million.	France is focusing on remediation of the Gremikha technical base. No projects have been announced to date.	France has yet to conclude an agreement with Russia that would allow it to undertake projects in the naval sphere.
Germany	\$367 million have been earmarked for naval projects from 2003-2008. Total Global Partnership pledge: \$1.7 billion.	Germany is focusing on creating safe land-based reactor storage in Northwest Russia. Related projects include refurbishing Nerpa Shipyard, physical protection improvements, and creation of a radioactive waste monitoring system.	The German company Energiewerke Nord (EWN) is acting as the general contractor on German projects, while the work is carried out by Russian companies. Several projects have already commenced.
Italy	\$441 million promised for naval projects. Total Global Partnership pledge: \$1.2 billion.	No project agreements have been made. Russian proposals include: dismantlement of 3 submarines (\$85.7 million); construction of 2 solid radioactive waste and liquid radioactive waste processing plants (\$162.8 million); physical protection improvements (\$55.1 million); construction of spent fuel transport and storage casks (\$36.7 million); construction of a ship to transport dismantled submarine parts (\$73.5 million).	Italy's agreement with Russia awaits ratification by both parliaments, which is expected to take some time. Italy's contribution in the nuclear field will be managed by the SOGIN (Società Gestione Impianti Nucleari) company. The assistance team also includes the Fincantieri (ship-building), Ansaldo Energia (nuclear technology), Duferco (dismantlement), Camozzi (fuel storage and transport casks), and Techint (nuclear technology) companies.
Japan	\$100 million made available for naval projects. Total Global Partnership pledge: \$200 million.	Pilot dismantlement of one Victor III-class submarine is nearly complete. Negotiations on scrapping an additional Victor I and several other projects, including construction of land-based reactor storage, have begun.	While Japan is discussing helping Moscow construct land-based reactor storage in the Pacific, this money would come out of the \$100 million in funds already made available for work in the naval sphere, thus reducing the amounts that can be spent on other projects. Russia itself has already started to prepare a site for a land-based reactor storage facility.
Norway	Much of Norway's Global Partnership pledge will be spent in the naval sphere. Total Global Partnership pledge: \$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.	
Russia	Russian federal budget: \$65 million per year for submarine dismantlement and related issues Total Global Partnership pledge: \$2 billion.	Moscow has been quite active in the naval sphere, particularly in the Russian Far East. Activities in the Pacific include shipyard refurbishment, SSN dismantlement, preparations for reactor storage facility construction, and construction of a sarcophagus to encase damaged submarines.	
Sweden	\$0.5 million for Andreyeva Bay and other projects. No announced total Global Partnership pledge.	Swedish activities focus on Andreyeva Bay and the <i>Lepse</i> nuclear service ship.	
United Kingdom	\$17 million has been allocated for 2004. Total Global Partnership pledge: \$750 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.	U.S. aid includes SSBN dismantlement (16 to be scrapped by 2012), MPC&A upgrades at naval facilities	In 2004 the United States will begin a new program to remove RTGs, beginning with 57

	Total Global Partnership pledge: \$10 billion.	(may be complete), construction of an interim dry fuel storage facility and special railcars to transport SNF to the site, and provision of SNF storage casks.	units in the Russian Northwest (most in Arkhangelsk region, where 9 RTGs have been without any supervision).
--	--	--	--

Chart sources include:

“Controlling Nuclear Warheads and Materials,” report on the NTI Website, http://www.nti.org/e_research/cnwm/overview/cnwm_home.asp.
 “The G8 Global Partnership: 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.
 NIS Nuclear and Missile Databases, NTI Website, <http://www.nti.org/db/nisprofs>.
 U.S. Department of Energy Budget Roll-Out Media Availability Secretary Spencer Abraham,” February 2, 2004, http://www.energy.gov/engine/doe/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, RANSAC website, <http://www.ransac.org>.
 William Hoehn, “Update on Congressional Activity Affecting U.S.-Russian Cooperative Nonproliferation Programs, July 26, 2002, RANSAC website, <http://www.ransac.org>.

¹ Gremikha is a remote naval base, some 300 kilometers east of Murmansk, on the Kola Peninsula. While original plans reportedly called for towing 16 submarines in summer 2003, a ban on the towing method after the sinking of K-159 meant that the final pair of submarines was not towed out of Gremikha. Two vessels with spent fuel onboard remain at the site today. The United Kingdom is sponsoring a project to develop safer methods to tow such vessels.

² Andreyeva Bay is located on the Kola Peninsula, in Murmansk Oblast. It is the Northern Fleet’s largest radioactive waste storage facility, with large quantities of spent nuclear fuel. Some of this fuel comes from nuclear icebreakers, and is quite highly enriched. As the fuel has cooled for some 30 years, it is a high security concern.

³ “Information Memorandum on the Northern Dimension Environmental Partnership (NDEP),” NDEP Steering Group, May 2002, http://europa.eu.int/comm/external_relations/north_dim/ndep/infomemo.pdf.

⁴ “Background,” <http://www.ndep.org>.

⁵ “NDEP Structure,” <http://www.ndep.org>.

⁶ “Nuclear Operating Committee meets in London,” *NDEP News*, Issue 5 (July 2004), <http://www.ndep.org/files/uploaded/NDEP%20News%20issue%205.pdf>.

⁷ The Russian Federation, Denmark, Finland, the Netherlands, Norway and Sweden committed to contribute €10 million each over five years before the NDEP was launched. Since that time, the European Commission, Belgium, France, Germany, and the United Kingdom pledged to make contributions as well. Most recently, in June 2003, Canada, the first non-European donor to contribute, committed €20 million to the NDEP. The fund total stood at €160 million as of December 2003. “Information Memorandum on the Northern Dimension Environmental Partnership (NDEP),” NDEP Steering Group, May 2002, http://europa.eu.int/comm/external_relations/north_dim/ndep/infomemo.pdf; “Agreement on Nuclear Safety in Russia to be Signed in Stockholm on 21 May,” Swedish Ministry of Foreign Affairs, <http://www.ud.se/inenglish/frontpage/MNEPR.htm>; “Canada pledges €20 million to Barents Sea cleanup,” June 4, 2003, EBRD Web Site, <http://www.ebrd.com/new/index.htm>; Charles Digges, “Minatom adopts sub dismantlement ‘master plan’ at NDEP meeting,” Bellona Website, <http://www.bellona.no>, January 12, 2004.

⁸ “Nuclear Operating Committee meets in London,” *NDEP News*, Issue 5 (July 2004), <http://www.ndep.org/files/uploaded/NDEP%20News%20issue%205.pdf>; Charles Digges, “Minatom adopts sub dismantlement ‘master plan’,” op. cit.

⁹ Information on Strategic Master Plan draft interim report from conversations with Western official privy to the draft.

¹⁰ Vladimir Gundarov, “Klondayk v titanovykh otsekakh,” *Krasnaya zvezda* online edition, May 20, 2004, <http://www.redstar.ru>. For more information on the thefts, see “5/20/2004: Titanium Stolen from Retired Russian Submarines,” NIS Nuclear and Missile Database, <http://www.nti.org/db/nisprofs/russia/naval/nucflt/gendev.htm>

¹¹ Andrey Kirashev, “Razvorovan otstoynik atomnykh reaktorov,” *Komsomolskaya pravda* (Murmansk), April 15, 2004; Yelena Nagayeva, “Ostavniki ‘utiliziruyut’,” *Vecherniy Murmansk*, May 14, 2004.

¹² Mayak, Krasnoyarsk, and Tomsk are fuel cycle facilities in the Urals (Mayak) and Siberia (Krasnoyarsk and Tomsk). Spent nuclear submarine fuel is transferred to Mayak for storage and eventual reprocessing; Krasnoyarsk and Tomsk are home to Russia's plutonium-producing reactors.

¹³ Ambassador Torbjørn Norendal, CEG Chairman, Ministry of Foreign Affairs, Norway and Sergey Bocharov, CEG Executive Secretary, IAEA, "Current Activities and Future Perspectives of the IAEA Contact Expert Group," September 2002, http://www.iaea.or.at/worldatom/Programmes/CEG/ceg_paper1.html.

¹⁴ "Minutes of the Seventeenth CEG Meeting," Murmansk, Russian Federation, November 18-20, 2003, <http://www.iaea.or.at/worldatom/Programmes/CEG/meeting17.html>.

¹⁵ "Minutes of the Seventeenth CEG Meeting," Murmansk, Russian Federation, November 18-20, 2003, <http://www.iaea.or.at/worldatom/Programmes/CEG/meeting17.html>.

¹⁶ "Information Memorandum on the Northern Dimension Environmental Partnership (NDEP)," NDEP Steering Group, May 2002, http://europa.eu.int/comm/external_relations/north_dim/ndep/infomemo.pdf.

¹⁷ Several of the Nordic countries subsequently ratified the agreement, while some ratifications are still in progress. It was passed by the Russian Duma on November 28, by the Federation Council on December 10, signed by President Putin on December 23, and became Russian law on December 30, 2003. Anna Lindh, Minister of the Swedish Foreign Affairs, speech at the Signing of the MNEPR, Stockholm, May 21, 2003, <http://www.regeringen.se>; "Segodnya vstupayut v silu," *Rossiyskaya gazeta*, <http://www.rg.ru>, December 30, 2003.

¹⁸ Ann MacLachlan, "Final Agreement Near on Pact for Nuclear Cleanup in Russia," *Nucleonics Week*, Vol. 45, No. 21 (May 19, 2004), p. 9.

¹⁹ Anna Lindh, Minister of the Swedish Foreign Affairs, speech at the Signing of the MNEPR, Stockholm, May 21, 2003, <http://www.regeringen.se>.

²⁰ Morten Bremer Maerli, "Strengthening Cooperative Threat Reduction with Russia - The Norwegian Experience," Norwegian Institute of International Affairs Working Paper no. 633, December 2002, p. 25.

²¹ NTB, "Historisk atomavtale undertegnet," *Aftenposten* online edition, 21 May 2003, <http://www.aftenposten.no>.

²² Charles Digges and Igor Kudrik "MNEPR Accord Signed in Stockholm Wednesday," Bellona Website, May 21, 2003, <http://www.bellona.no>. For additional details, please see R. Douglas Brubaker and Leonard S. Spector, "Liability and Western Nonproliferation Assistance to Russia: Time for a Fresh Look?" *The Nonproliferation Review*, <http://cns.miis.edu/pubs/npr/vol10/101/brub.pdf>, Vol. 10, No. 1 (Spring 2003), pp. 1-39.

²³ Anna Lindh, op. cit.

²⁴ Anna Lindh, op. cit.; "Agreement on nuclear safety in Russia to be signed in Stockholm on 21 May," Swedish Ministry of Foreign Affairs Website, <http://www.ud.se>.

²⁵ "Framework Agreement on a Multilateral Nuclear Environmental Programme in the Russian Federation," Norwegian Ministry of Foreign Affairs Website, <http://odin.dep.no/filarkiv/188385/MNEPR.doc>.

²⁶ Ann MacLachlan, "Final Agreement Near on Pact for Nuclear Cleanup in Russia," op. cit.

²⁷ "MNEPR Committee Met in Moscow," Nuclear.ru, October 23, 2003; "Ausschuss 'Multilaterales Nuklearumweltschutzprogramm in der Russischen Föderation' tagt im Auswärtigen Amt," German Foreign Ministry Press Release, <http://www.auswaertiges-amt.de>, May 12, 2004.

²⁸ "Program Plan and Report on Proposed Obligations for the Arctic Military Environmental Cooperation Program FY 1999," AMEC Website, <http://osiris.cso.uiuc.edu/denix/Public/Intl/AMEC/RTC/feb.html>.

²⁹ "United Kingdom Joins Arctic Environmental Cooperation," State Department Website, <http://usinfo.state.gov/gi/Archive/2003/Jun/27-824046.html>.

³⁰ "Program Plan and Report on Proposed Obligations for the Arctic Military Environmental Cooperation Program FY 1999," AMEC Website, <http://osiris.cso.uiuc.edu/denix/Public/Intl/AMEC/RTC/feb.html>.

³¹ "Arctic Military Environmental Cooperation Program for 2010 and 2015: A Strategic Program Plan."

³² Ibid.

³³ Interview of U.S. Under Secretary of State for Arms Control and International Security John Bolton, *Global Partnership Update*, No. 4 (May 2004), p.3, http://www.sgproject.org/GPUupdate_May2004.pdf; G8 Senior Group, "G8 Global Partnership Annual Report," http://www.g8usa.gov/d_060904i.htm, June 2004.

³⁴ The findings were published as *Nuclear Submarine Decommissioning and Related Problems* Leo LeSage and Ashot Sarkisov, editors (Dordrecht: Kluwer Academic Publishers, 1996).

³⁵ *Analysis of Risks Associated with Nuclear Submarine Decommissioning, Dismantling and Disposal*, Ashot Sarkisov and Alain Tournyol du Clos, editors (Dordrecht: Kluwer Academic Publishers, 1999) and *Remaining Issues in the Decommissioning of Nuclear Powered Vessels*, Ashot Sarkisov and Leo Lesage, editors (Dordrecht: Kluwer Academic Publishers, 2003).

³⁶ Indeed, the inability to share knowledge can lead to a decrease in physical security. In a case cited this April by Vice President for the Nuclear Threat Initiative Russia/New Independent States Program Laura Holgate, the United States declines to build a fence around a nuclear facility in Russia because Russia could not guard the barrier around the clock, and an unguarded fence could shelter potential attackers. Another donor country, unaware of the U.S. concerns, completed the fence, possibly reducing overall security. David Filipov and Anna Dolgov, "Push to Guard Arms in Russia at Risk," *Boston Globe*, April 26, 2004, p. A1.

³⁷ "Japan-Russia Foreign Ministers' Meeting (Summary of Results)," June 24, 2004, Japanese Ministry of Foreign Affairs Website, <http://www.mofa.go.jp/region/europe/russia/meet0406.html>.