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Strengthening Cooperative Threat Reduction with Russia

The Norwegian Experience

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Strengthening Cooperative Threat Reduction with Russia

The Norwegian Experience

Morten Bremer Mærli

[Abstract] Many nuclear safety and security challenges remain in Northwest Russia. Years of international cooperation – and substantial funding – are required to deal with the legacy of the extensive nuclear activities of the Cold War. Among the more urgent projects that call for international attention are the safe dismantling of nuclear attack submarines and clean-up at naval storage facilities, e.g. at Andreeva Bay.

For nearly a decade, Norway and other countries have been working cooperatively with Russia to improve the situation. While important progress has been made, much of the foreign support has come with some hard-learned experiences. However, the dialog established, the cooperative framework institutionalized, and today's understanding of the respective concerns, priorities, and practices of the actors involved should create a sound basis for new rounds of cooperative and concerted efforts to limit the persistent nuclear security and safety risks in the region.

In this report, past and ongoing activities for remedial actions in Northwest Russia are assessed, and suggestions for continued and improved cooperation are presented. The survey has been conducted as part of the Norwegian contribution to the international research consortium on «Strengthening the Global Partnership: Protecting Against the Spread of Nuclear, Biological, and Chemical Weapons».

Contents

Introduction

This survey has been conducted as part of the Norwegian contribution to the joint project "Strengthening the Global Partnership: Protecting Against the Spread of Nuclear, Biological, and chemical Weapons".[1] Emphasis has been placed on activities aimed at nuclear threat reduction in the northern areas, close to Norwegian borders.

Since 1995, Norway has had bilateral cooperation with Russia to limit potential nuclear threats. This cooperation has focused on limiting potential environmental risks associated with the extensive Russian naval nuclear activities in the region. The U.S., another significant international contributor, has focused on threat reduction activities in the more traditional (security/defense related) sense. In this report, past and ongoing activities for remedial actions in Northwest Russia will be assessed, and suggestions for continued and improved cooperation will be presented.

The implementation and results of the joint Norwegian–Russian nuclear cooperation have been formally evaluated twice. Both evaluations – one commissioned by the Norwegian Ministry of Foreign Affairs[2] and one performed by the Office of the Auditor General[3] – and the recommendations given herein form a natural point of departure for this evaluation. A recent summary report titled "Military Nuclear Waste and International Cooperation in North-West Russia" and the latest version of the report by the Bellona foundation, "The Arctic Nuclear Challenge", serve as important additional background information.[4]

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1 For a description of the international project, see http://www.csis.org/isp/sgp/index.htm .

2 Royal Norwegian Ministry of Foreign Affairs, "Evaluation of the Norwegian Plan of Action for Nuclear Safety. Priorities, Organisation, Implementation", *Evaluation Report 7/2000*, prepared by Geir Hønneland and Arild Moe, The Fridtjof Nansen Institute, http://odin.dep.no/archive/udvedlegg/01/01/00133012.pdf

3 Office of the Auditor General (Riksrevisjonen), "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker", Dokument nr. 3:9 (2000–2001).

4 Steven G. Sawhill and Anne-Kristin Jørgensen, "Military Nuclear Waste and International Cooperation in North-West Russia", *FNI-report* 12/2001, The Fridtjof Nansen Institute. Nils Bøhmer, Aleksandr Nikitin, Igor Kurdik, Thomas Nilsen, Michael H. McGovern and Andrey Zolotov, "The Arctic Nuclear Challenge", *Bellona Report* Volume 3–2001.

Threat Assessment

For reasons of geography, Russian nuclear activities in the northern area may pose a specific risk to Norway and Norwegian interests. Norway shares a land border of 196 kilometers with Russia in the Barents region, and the Barents Sea remains one of the most important fisheries worldwide.

The costal regions of northwest Russia, including the Kola Peninsula, have the greatest density of nuclear reactors on earth – nearly one fifth of the world's total. In addition to military submarine operations, several civilian nuclear-powered naval surface vessels are home-ported in the region. The Russian Northern Fleet is now in grave difficulties, with severe local pollution hazards and global proliferation risks in the wash of its nuclear propulsion and nuclear weapon activities.[5] An overview of potential sources of marine radioactive contamination in Northwest Russia is given in Appendix I.

According to Norwegian news reports, there exists a secret military facility outside Murmansk that could be a storage site for chemical war agents.[6] Russian authorities have officially denied this, and have never confirmed the presence of any other chemical storages or dumps in the area. Despite extensive military activities in Murmansk and Arkhangelsk oblasts, rumors about chemical weapon storages in the region thus seem questionable. Nor is there any open-source information or indications of biological weapon activities in the northern region.

Decommissioning and dismantling of nuclear submarines

Since 1958, the Soviet Union/Russia have constructed 249 nuclear-powered submarines, representing more than half the nuclear submarines produced worldwide.[7] Two thirds of these vessels were delivered to the Northern Fleet, the rest were destined for the Pacific Fleet.[8] As most Russian submarines are equipped with two reactors, the total number of naval reactors produced by the Soviet Union/Russia is therefore at least 480. The vessels use fuel enriched from less than 21 percent to 90 percent.[9] Twenty-four reactors are believed to have been designed to use uranium enriched to 90 percent U–235.[10] The majority of reactors, however, use fuel with enrichment levels from 21 percent to 45 percent.

Severe budget crunches have limited and slowed the production of new nuclear submarines. Deployment of nuclear submarines peaked in 1989,

5 The Kursk accident, where a state-of-the-art nuclear submarine sank in the Barents Sea on August 12, 2000, with the loss of all 118 crewmembers, was a dire reminder of the state of Russian naval nuclear affairs.

6 Kjetil Stormark, "Har info om kjemisk lager" ("Possessing information about chemical storage"), *Verdens Gang,* January 21, 2000, http://www.vg.no/pub/skrivervennlig.hbs?artid=4212750

7 92 ballistic missile submarines (SSBNs), 67 cruise missile submarines (SSGNs), 90 attack submarines (SSNs).

8 Additionally, the eight ships in the Russian icebreaker fleet are nuclear propelled, each with one or two reactors, accompanied by four battle cruisers and a communication ship with twin reactors. Moreover, five research and development submarines and several full-sized land-based submarine-training facilities have been produced.

9 Oleg Bukharin and William Potter, "Potatoes were guarded better", *The Bulletin of the Atomic Scientists*, Vol. 51, No. 3, May/June (1995), p. 48.

10 Oleg Bukharin, "Analysis of the Size and Qualities of Uranium Inventories in Russia", *Science and Global Security*, Vol. 6. (1996), p. 63.

when some 196 submarines were in service.[11] Today Russian submarines are at an all-time low in terms of deployment and readiness. Russia's latest nuclear submarine, an *Akula*-class attack submarine, had its first test in November 2000. This was the first submarine to leave the Sevmash production facility in Severodvinsk in three years.[12] Currently, the Northern Fleet has 34 operational nuclear submarines, 12 strategic submarines, and 22 attack submarines. It is expected that five strategic submarines will be decommissioned in the near future, while three new ones are under construction in Severodvinsk.[13] The first of the new *Borey*-class strategic submarines will be ready for launch in 2007, at the earliest.

Russia is likely to maintain only a limited number of strategic submarines (SSBNs) in the coming decade.[14] With the decline of Russian strategic forces, some have asserted that the military complex on the Kola Peninsula is becoming increasingly irrelevant to strategic stability.[15] However, if Russia's military sea-readiness continues to decline, consolidation of all strategic naval operations in the northern area could become an attractive and possible option.

Moreover, plans for floating nuclear power plants (FNPPs) have been a long-term goal for the powerful Russian Ministry of Atomic Energy, MINATOM.[16] The idea is for naval reactors mounted on barges and using HEU to provide electricity to remote coastal areas.[17] The construction of such mobile power plants could give a badly needed boost to Russia's nuclear industry – but it could also pave the way for new HEU markets outside international control.[18] MINATOM announced in March 2001 that it would build a floating nuclear power plant in Severodvinsk,[19] but specific plans have yet to materialize.

Economic problems have forced the Russian Navy to retire older submarines prematurely, and to concentrate its limited sources on maintaining only the most modern assets. Most submarines have reached the end of their service lives and been decommissioned. These vessels are now awaiting dis-

11 Oleg Bukharin and Joshua Handler, "Russian Nuclear-Powered Submarine Decommissioning", *Science & Global Security*, Vol. 5, No. 2 (1995), p. 246.
12 Agence France Presse, "Russia to Test New Nuclear Submarine", November 15, 2000.
13 Thomas Nilsen, "Seks år etter Bellona-rapporten: Nordflåten redusert – atomsikkerheten økt" ("Six years after the Bellona Report: Declining Northern Fleet – Nuclear Security Improved", August 9, 2002, http://www.bellona.no/no/internasjonalt/russland/nyheter/25318.html
14 William Arkin and Hans Kristensen, "Dangerous Directions" *The Bulletin of Atomic Scientists*, March/April (1998), p. 29.
15 Ingemark Dörfer, "Kola Has Lost Significance", *U.S. Naval Institute, Proceedings,* March 2002, p.80.
16 For a survey of various aspects of FNPPs in the northern region, see Kuznetsov, V.M. et al., "Floating Nuclear Power Plants in Russia: A Threat to the Arctic, World Ocean and Non-Proliferation Treaty", Nuclear and Radiation Safety Program, Socio-Ecological Union, Greenpeace Russia.
17 For the past 10 years, the MINATOM has been developing a project for the construction of FNPPs based on the KLT–40 reactor type, pressurized water reactors. According to one assessment, each of the barges will be equipped with two reactors with a total fuel load of 1992 kilo of HEU enriched to 60 percent. A lifetime of 40 years is anticipated for the floating electricity-producing barge, with refueling intervals of 10 to 12 years. From Kuznetsov, V.M. et al. (2000), p. 16.
18 Morten Bremer Maerli, "Deep Seas and Deep-Seated Secrets: Naval Nuclear Fuel Stockpiles and The Need for Transparency", *Disarmament Diplomacy,* No. 49, 2000, http://www.acronym.org.uk/dd/dd49/49fuel.htm
19 Associated Press, "Russia Plans Floating Nuclear Power Plant", March 14, 2001.

mantlement, a process with huge safety (pollution) and security (proliferation) challenges.[20]

The Russian nuclear submarine decommissioning and dismantling process involves:[21]

- removal of the submarine from active status;
- removal of missiles (for ballistic missile submarines (SSBNs) and guided-missile submarines (SSGNs)) and other weapons, such as torpedoes;
- cutting out ballistic missile launch tubes (for SSBNs);
- extraction of spent nuclear fuel and disconnection of reactor circuits;
- transport of spent fuel for reprocessing or long-term storage;
- storage and disposal of low- and high-level radioactive wastes;
- removal, recovery, and recycling of reusable equipment and metals;
- separation of the reactor compartment;
- sealing off the reactor compartment for long term storage (presently, these compartments are floating pier-side as three-part units); and
- scrapping remaining uncontaminated parts that are not salvageable.

According to the head of MINATOM's department in charge of decommissioning nuclear vessels, dismantling Russia's scores of decommissioned nuclear submarines will cost $2.5 billion to 3 billion.[22] As of March 2002, Russia had decommissioned 190 nuclear-powered submarines; however, nuclear fuel has been removed from only 97 of them, and many vessels are still languishing in port, waiting to be dismantled.

In addition to contamination from leaking spent nuclear fuel storage facilities, there is risk of environmental contamination risk if there should be an accident while decommissioned Russian nuclear submarines were laid up or undergoing defueling. According to open-source reports, five Russian Navy criticality accidents have already occurred, twice during refueling operations.[23] These accidents have resulted in airborne releases and local contamination. However, the risk and potential impact of such accidents are hard to assess, as the information provided by the Russians has been limited.

20 For descriptions of the challenges related to the decommissioning of the Russian submarine fleet, see e.g. Oleg Bukharin and Joshua Handler, "Russian Nuclear-Powered Submarine Decommissioning", James C. Moltz, and Tamara Robinson, "Dismantling Russia's Nuclear Subs: New Challenges to Non-proliferation", *Arms Control Today*, June (1999), and James C. Moltz, "Russian Nuclear Submarine Dismantlement and the Naval Fuel Cycle", *The Nonproliferation Review*, Spring (2000), pp. 76–86.

21 Jill Tako and Tamara Robinson, "Decommissioning and Dismantlement Overview", Monterey Institute of International Studies, 1998.

22 Viktor Akhunov, head of the ministry's department in charge of decommissioning nuclear vessels, to Associated Press, "Russia Needs To Dispose Of Nuclear Subs", March 20, 2002.

23 U.S. Department of State Report, October 2001, "Environmental Security Threats From Decommissioned Russian Marine Nuclear Reactors and Associated Spent Nuclear Fuel, Radioactive Waste, and Contamination", Submitted to the U.S. Congress Pursuant to U.S. Public Law 106–255, Cross-Border Cooperation and Environmental Safety in Northern Europe, p.9.

Other potential sources of radioactive contamination

The northern area is thus a high-risk region for radioactive contamination and major nuclear accidents. In addition to the decommissioned submarines, concerns include:[24]

- 4 operational reactors at the Kola Nuclear Power Plant, and 4 operating reactors at the nuclear power plant Sosnovij Bor close to St. Petersburg. Additional nuclear reactors are planned at both these locations.
- 13 operational reactors in the 8 nuclear-powered civilian icebreakers.
- approximately 70 reactors in some 34 operational nuclear-powered submarines.
- accumulation of spent nuclear fuel and radioactive waste at naval bases and naval and civilian shipyards.
- handling and storage of nuclear weapons and weapons-grade fissile material. Open-source assessments indicate that the Northern Fleet is in possession of some 928 nuclear warheads.[25]
- ocean-dumped radioactive waste and spent nuclear fuel, and wrecked nuclear submarines.[26]
- river-transported radioactivity from nuclear industries (Mayak and others), and from European reprocessing facilities.
- contamination from nuclear testing at Novaya Zemlya and from peaceful nuclear explosions (PNEs).
- lighthouses with large strontium energy sources.
- insufficient physical protection, accounting, and control of fissile material.
- Russian imports of radioactive waste.

In addition, illicit trafficking in nuclear and radioactive material may pose threats to both public health and the environment. Several incidents of theft of nuclear material were reported in the Murmansk region during the 1990s. So far, no illicit Russian nuclear or radioactive materials have been seized on the Norwegian side of the border.

Despite international restrictions, until 1992 the Soviet Union/Russia had been dumping radioactive waste at sea – including some nuclear submarine reactors containing fuel.[27] Thirteen nuclear submarine reactors, six of which contained spent or damaged nuclear fuel, were dumped in the Kara Sea. The Soviet Union also dumped untreated solid and liquid low-level radioactive wastes in the Barents and Kara Seas. It is estimated that the Soviet Union dumped at least twice as much radioactive waste at sea as the combined

24 Based on Ole Harbitz, Director-General The Norwegian Radiation Protection Authority, "Threat Assessment and Contingency Planning", The Norwegian Atlantic Committee's 34th Annual Conference, Leangkollen, February 1–3, 1999, with modifications and amendments.

25 Ingemark Dörfer, "Kola Has Lost Significance", U.S. Naval Institute, *Proceedings*, March 2002, p.81.

26 The Komsomolets sank in the Norwegian Sea in April 1989. Most of the Kursk (see note 5 above) was successfully removed from the Barents sea bed in October 2001.

27 The Soviet Union ratified the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (unofficially known as the London Dumping Convention) in 1975.

inventories of the other twelve nations that had carried out disposal activities at sea.[28]

In 1995, the Ministry of Environmental and Natural Resource Protection of the Russian Federation issued the State Report on the Status of the Environment of the Russian Federation. According to this report, "The greatest danger in recent years is found in the radioactive waste repositories [located on the Kola Peninsula]. The repositories for spent nuclear fuel are obsolete, are practically completely full, and could lead the Navy to return to the practice of dumping liquid radioactive wastes into the sea".[29]

While resumption of sea-dumping activities for political reasons seems unlikely, spent-fuel storage conditions are degrading. A total of 33,600 spent fuel assemblies are stored in land-based storage sites and in various run-down service/storage vessels in the northern region.[30] An equivalent number is still onboard inactive submarines, and the total number of spent fuel assemblies is likely to grow to as many as 100,000 over the next decade.[31] This will include fuel from submarines still in operation, from submarines earmarked for retirement, and from the civilian nuclear-powered icebreakers in Murmansk. Control over decommissioned submarines, spent fuel, and radioactive waste has now been transferred from the Russian Navy to MINATOM.[32]

MINATOM is also actively promoting imports of spent nuclear fuel to Russia from foreign countries for storage/reprocessing. MINATOM claims that the plan could reap $21 billion over the next decade, vault Russia into the global nuclear service industry, and provide cash to clean up radioactive hot zones.[33] Given current Russian environmental conditions and the status of relevant infrastructure, international experts fear this may pose significant threats to environmental security – either by exacerbating existing problems in the affected regions or by contributing to problems in the future.[34] Norwegian officials have expressed concern about these plans, as the spent fuel might be shipped along the Norwegian coastline. So far, however, the plans have not affected Norway's willingness to fund other nuclear safety projects in Russia.[35]

Bilateral and International Assistance Programs in the Northern Region

An important point of departure for all Norwegian cooperative activities is the conviction that the handling of Russian fuel and waste remains a solely Russian responsibility, as are the security and safety associated with all Rus-

28 U.S. Department of State Report, October 2001, p. 2.
29 Quoted in U.S. Department of State Report, October 2001, p.2.
30 Contact Expert Group, "Working Material of the 11th Meeting", volume II, Cherbourg, France, October 25–27, 2000, p. 248.
31 Thomas Nilsen, "Mayak spent fuel storage moves to Kola", March 20, 2000, http://www.bellona.no/imaker?id=15894&sub=1
32 Jurisdiction has been transferred according to a governmental decree of May 28, 1998.
33 Fred Weir, "Russia as Nuclear Garbageman?", *The Christian Science Monitor*, February 21, 2001.
34 U.S. Department of State Report, October 2001.
35 Generally, Norwegian officials seem to feel that the plans may be hard realize. Much of the fuel Russia wants to import is of US origin.

sia's nuclear activities. Moreover, all remedial actions taken should comply with Russian laws and regulations.

The extensive activities of the Northern Fleet in the region pose special challenges. Russia lacks a comprehensive and satisfactory "cradle to grave" system for decommissioning its nuclear-powered submarines and warships, as indeed it will for the foreseeable future. While the Government of Russia clearly has the responsibility for addressing this situation, international donors – recognizing their own interests – have initiated several bi- and multilateral assistance programs. Among the most important ones are the U.S. Cooperative Threat Reduction program and the U.S. Material Protection, Control and Accounting Program.

Norwegian assistance has been channeled mainly through two programs, one civilian and one military. There is some overlap, but, in general, the Norwegian Plan of Action for Nuclear Safety Issues deals with civilian aspects of cooperative assistance, while the Arctic Military Environmental Program examines the levels of man-made pollutants emanating from military activities, including activities involving radioactive material, and assesses their effects on the Arctic environment. In order to map levels of anthropogenic pollutants scientifically, the Arctic Monitoring and Assessment Program was established in the early 1990s.

The Norwegian Plan of Action for Nuclear Safety

To meet public concerns and to ensure the cleanest possible waters for fishing activities in the Barents Sea, Norway launched a Plan of Action for Nuclear Safety Issues in 1995. Here the overriding goal is the protection of health, the environment and business against radioactive contamination and pollution from chemical weapons.

In particular, the plan aims to:[36]

- promote policies and procedures that minimize the release of radioactivity to the environment,
- improve safety at nuclear plants without prolonging the lifetime of the plant,
- support the safe disposal of nuclear-powered submarines while avoiding support of Russian operational naval activities,
- ensure that procedures for waste management and decommissioning of nuclear submarines are appropriate and consistent with relevant policies and guidelines adopted by international agencies and other countries, and
- demonstrate that international support results in enhanced radiological and environmental protection.

The Plan spans four priority areas: safety measures at nuclear facilities; management, storage and disposal of radioactive waste and spent nuclear fuel; radioactive pollution in the northern areas; and arms-related environmental

36 Ole Harbitz, Director-General of the Norwegian Radiation Protection Authority, "Threat Assessment and Contingency Planning", The Norwegian Atlantic Committee's 34th Annual Conference, Leangkollen, February 1–3, 1999.

hazards. In addition, the category "Miscellaneous projects" covers matters like NGO support and financial contributions to conferences and workshops.

While the plan of action covers both radioactive and chemical challenges, there is a strong emphasis on nuclear safety and security – in view of threats in the area. Generally, in its cooperation with Russian authorities and nuclear entities, Norway has tended to put more emphasis on environmental problems than on proliferation risks (as the name of the plan also suggests: "Plan of Action for Nuclear *Safety* Issues").

Funding and project portfolio

As of August 2001, 126 projects under the plan of action were planned, under way, or completed (see Table 1).

	1) Safety measures at nuclear facilities	2) Waste and spent fuel management	3) Radioactive pollution	4) Arms-related environmental hazards	5) Miscellaneous
Number of projects	26	33	26	20	21
Ongoing	9	15	5	5	1
Completed	17	18	20	10	20
Cancelled	–	–	–	2	–
Planned	–	–	1	3	–

Table 1. *Project distribution in five project areas for the Norwegian Plan of Action for Nuclear Safety Issues. August 2001*

Most projects concern the safe management of waste and spent, and remedial or preventive measures for radioactive pollution. Safety measures at nuclear installations to avoid releases, pollution and human exposure represent approximately ⅓ of the projects. Only about ¼ of the projects concern arms-related hazards; moreover, in this category, fewer projects have been completed and two projects have been cancelled – a reflection both of Norwegian priorities and the sensitivity associated with cooperative work in this area.

One project – to develop a prototype container for transport/ storage of spent nuclear fuel – has been completely abandoned. Another, to provide physical protection upgrades at the nuclear-powered icebreakers, has been deferred due to lack of progress in a different project (a treatment facility for liquid radioactive waste, see below) at the same location. A joint Norwegian–Swedish–Russian project to upgrade physical protection for fresh fuel at SEVMASH, the prime nuclear submarine production facility, was cancelled after the United States later initiated a parallel project at the shipbuilding plant.

As of May 2002, approximately 750 million Norwegian kroner (nearly $100 million) had been allocated to implement the plan of action,[37] with about ⅔ of the funding intended for the two first priority areas. Due to delays, however, the amount actually spent has been somewhat lower. The

37 According to exchange rates as of June 2002: 1 UDS = 7.66 NOK.

funding matrix for the Plan of Action since its inception and until August 2001 is shown in Table 2.

Priority Area	1995	1996	1997	1998	1999	2000	2001	Total	%
1	11 777 770	26 203 551	48 578 642	1 798 230	30 102 548	63 402 028	4 755 779	**186 618 548**	**39**
2	3 593 191	10 807 889	22 687 350	69 995 497	12 861 153	12 471 157	2 522 182	**134 938 419**	**28**
3	17 052 211	–	3 707 172	3 305 043	10 771 848	14 121 453	7 545 278	**56 503 005**	**12**
4	4 000 000	4 202 250	22 993 507	18 370 282	2 868 050	4 619 871	7 265 651	**64 319 611**	**14**
5	2 410 395	2 768 023	6 246 977	4 369 008	4 519 081	7 577 500	4 036 289	**31 927 273**	**7**
Total spent	**38 833 567**	**43 981 713**	**104 213 648**	**97 838 060**	**61 122 680**	**102 192 009**	**26 125 178**	**474 306 855**	**100**
Total allocated	**129 502 797**	**100 000 000**	**88 000 000**	**28 000 000**	**0**	**102 192 009**	**147 230 500**	**594 925 306**	

***Table 2**. Funding matrix for the Plan of Action for Nuclear Safety Issues, 1995–August 2001, with percentual distribution of funds spent in the five different priority areas. Figures given in NOK (1 USD is approx. 7.7 NOK).*

Priority areas and some major projects

Priority area 1: Safety measures at nuclear facilities. These projects work towards improving nuclear reactor safety through international cooperation, bettering licensing and supervision activities, backing cost-efficient safety measures, contributing to less dependence on nuclear energy in Northwest Russia, improving Norwegian competence on nuclear safety and effects of nuclear accidents, upgrading early warning systems for nuclear accidents, and, finally, improving and elaborating an international regulatory system for nuclear accidents.

Projects under this priority area have focused mainly on safety upgrades at nuclear power plants near Norway: the reactors at the Kola Nuclear Power Plant, Sosnovij Bor in St. Petersburg, and Ignalina in Lithuania.[38] In addition, funds have been allocated for remedial action for the sarcophagus encasing the plant at Chernobyl in Ukraine. Some of these projects are bilateral, while others are tri- or multilateral.

The bulk of the funds has been allocated to safety upgrades at the Kola Nuclear Power, some 200 km from the Norwegian–Russian border. Two of the four reactors at the plant have been characterized as "high-risk" reactors,[39] and worst-case scenarios indicate that radioactive releases from the plant may reach parts of Norway within four hours. The goal of the Kola upgrading project, initiated in 1993, was to increase operational safety at the plant, while not extending its operational lifetime. As explained below, this has proven a difficult balance to strike. The project is now in its fourth, and probably final, phase. A total of 104 million NOK has been spent on the initial three phases. In addition to the Norwegian contribution, two million Euro has been allocated to the power plant through the Nuclear Safety Account (NAS) administrated by the European Bank for Reconstruction and

38 For a summary of the Norwegian assistance programs at these reactors, see Erlend Larsen and Gunnar Saxebøl, "The Norwegian Assistance Program for Increased Reactor Safety in Eastern Europe", the Norwegian Radiation Protection Authority, Strålevern Rapport 2002:3, June 2002, www.nrpa.no

39 Office of the Auditor General (Riksrevisjonen), "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker", Dokument nr. 3:9 (2000–2001), p. 31.

Development (EBRD).[40] The Kola Power Plant has itself contributed financially; estimates indicate that some two billion NOK was spent on security upgrades at the plant in the period 1987–2000.[41]

The NAS safety fund was established in order to secure and phase out high-risk reactors in the former Soviet Union. However, as Russia has not presented any plans for phasing out old nuclear-power plants (on the contrary, in 2000 Russia adopted a plan to step up its nuclear power in the coming 50 years[42]), no new funds will be channeled through the NAS.

Other major projects under this priority area include improved detection and measurement capabilities of radioactive releases, studies for developing alternative energy sources in Russia, and projects to improve cooperation between Norwegian and Russian civilian nuclear licensing and regulatory authorities.

Priority area 2: Management, storage and disposal of radioactive waste and spent nuclear fuel. These projects aim to create the necessary infrastructure for the safe handling of spent fuel and waste, and to establish the requisite legislative and financial framework. Furthermore, the projects are intended to contribute to the safe handling of spent fuel and dismantling of nuclear submarines and radioactive waste. It is an expressed Norwegian goal to improve international cooperation in these fields.

Most projects in this category have been dedicated to the safe dismantling of Russian nuclear submarines and associated waste and fuel problems in the region. These projects are included in the associated Norwegian–Russian framework agreement – which has eased their implementation as well as reducing problems with taxation and liability issues.

Projects include efforts to empty and decommission the storage facility for spent nuclear fuel from Russian nuclear-powered submarines in Andreeva Bay; plans for the construction and commissioning of a temporary storage facility for solid radioactive waste at this location; possible establishment of an interim storage facility for spent nuclear fuel from naval reactors; design, construction, and commissioning of a specialized self-propelled vessel for the transport of containers with spent nuclear fuel; construction and commissioning of four specialized railway cars for the safe transport of containers with spent nuclear fuel; and modernization and commissioning of an interim storage facility for liquid radioactive waste at *Zvezdochka* shipyard in Severodvinsk, Arkhangelsk.

Moreover, to help enable Russia to accede to the London Convention's prohibition on dumping of radioactive waste at sea, Norway provided for a treatment facility for liquid radioactive waste in Murmansk. The project was conceived in 1994 as a bilateral Norwegian–Russian initiative; the United States joined in 1995. Unfortunately, technical and bureaucratic problems have limited progress within the project.[43]

40 See www.ebrd.com
41 Office of the Auditor General (Riksrevisjonen), "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker", Dokument nr. 3:9 (2000–2001), p. 31.
42 *Ibid*., p. 25.
43 After a testing period, new defects were recently discovered and the official commissioning of the plant was again postponed.

As a matter of convenience, and to secure tax exemption and resolve liability questions, projects not directly related to the dismantling of nuclear submarines were also included in the project portfolio under the Framework Agreement (for more on this agreement, see below) – among them the enhancement of operational safety at the Kola nuclear power plant and the dismantling of the storage ship *Lepse*.[44]

Priority area 3: Radioactive pollution in the northern areas. These projects aim to map, monitor, and assess radioactive pollution in northern waters and the risk of river-transported radioactive pollution.

Cooperation in this field dates back to 1989, when Norway and Russia signed an intergovernmental agreement on environmental cooperation. Three joint Norwegian and Russian expeditions were conducted between 1992 to 1994 in the Barents and Kara Seas to assess the environmental impact of Russian dumping of reactors, spent fuel, and solid and liquid radioactive waste.

The levels of radioactive contamination at Mayak and in the Urals have also been assessed. In addition, joint competence-building projects have been initiated to investigate radioactive leakages and transportation through rivers. Norway also funds the administration of the radioactive assessment group and Russian participation under the Arctic Monitoring and Assessment Program (AMAP).

Priority area 4: Arms-related environmental hazards. Projects under this priority area aim to promote the swift and environmentally safe destruction of weapons of mass destruction, prevent illicit trafficking in nuclear material, ensure high standards of physical protection and control, and promote the peaceful application of weapons-related know-how.

In particular, funds have been allocated to improve the accountability and physical protection of Russia's civilian nuclear-powered icebreaker fleet. These ships use highly enriched uranium. The licensing and supervision activities of the civilian Russian federal inspectorate for nuclear and radiation safety, Gosatomnadzor, have been improved through seminars and the provision of office and computer equipment.

Verification activities under the Comprehensive Test Ban Treaty have been improved through funds to install detectors for chemically inert and short-lived radio-nuclides in northern areas.

Limited funds have also been allocated to the International Science and Technology Center in Moscow to engage former weapon scientists in peaceful activities, but Norway is somewhat reluctant to support research activities under the plan of action (see below).

Norwegian assistance does not encompass export control activities in Russia. To prevent illicit trafficking in nuclear and other radioactive materials, Norwegian customs and coast guard officials have been equipped with so-called "radiation-pagers" – small and passive gamma-sensitive radiation detectors that can be worn on a belt.

44 Lepse is an old storage ship for the civilian nuclear-power fleet. It is used for interim storage of spent nuclear fuel, a large portion of which is damaged. In late September 2002, Norway signed an agreement to clean up the ship, pledging NOK 25 million, out of a Nordic total contribution of approximately NOK 100 million.

No Norwegian funds have been allocated to remedial chemical weapons activities locally. However, according to the Ministry of Foreign Affairs, Norway is prepared to participate in studies to determine the most environmentally safe ways to destroy chemical weapons. To help Russia meet its obligations under the Chemical Weapons Convention, Norway has provided financial support for environmentally safe destruction of chemical weapons outside areas adjacent to Norwegian borders. Some 18 million NOK has been used for the destruction of chemical weapons as part of the Cooperative Threat Reduction Program in Shchuchye in Kurgan oblast, in the Urals. This funding has been channeled through the British Ministry of Defence, which served as a CTR subcontractor.

No funds have been made available under the plan of action for biological weapon non-proliferation activities.

Formal evaluations

Norwegian Plan of Action for Nuclear Safety has formally been evaluated twice.

In 1999, the Norwegian Ministry of Foreign Affairs itself called for an evaluation to assess the extent to which the Plan of Action is compatible with the concerns of the Norwegian Government, and to assess the plan's activities in terms of selection, implementation, outcome, results, cost effectiveness, and relevance.[45] The findings of the this "internal" evaluation were presented in a report released in September 2000, which also included recommendations for improving the performance and impact of activities undertaken under the Plan of Action.

Then, in June 2001, the Office of the Norwegian Auditor General presented its (external) evaluation of the implementation of the Government's Plan of Action for Nuclear Issues.[46] Again, the goal was to assess the progress of the action plan and the extent to which its objectives had been fulfilled, together with an overall assessment of organizational structures. Results of specific projects were identified and analyzed in depth and in light of broader national objectives. The conclusions helped spur subsequent recommendations from the Norwegian parliament's Control and Constitutional Committee for future Norwegian–Russian bilateral cooperation. The committee's recommendations will likely determine the future course of Norwegian support to Russia (for more on this, see below).

The Cooperative Threat Reduction (CTR) Program in the northern region[47]

Given the CTR program's initial objective of assisting Russia in carrying out strategic arms reductions down to START levels, support for Russian dis-

45 Terms of Reference of the Evaluation of the Plan of Action for the Implementation of Report No. 34 (1993–1994) to the Storting [the Norwegian Parliament] on nuclear activities and chemical weapons in areas adjacent to our northern borders, Issued by the Policy Planning and Evaluation Staff, Royal Norwegian Ministry of Foreign Affairs, October 20, 1999. The evaluation resulted in *Evaluation Report 7/2000* from the Ministry, prepared by G. Hønneland and A. Moe, see note 1.

46 Office of the Auditor General (Riksrevisjonen), "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker", Dokument nr. 3:9 (2000–2001).

47 This section has been written by John Kristen Skogan.

mantling of ballistic missile-carrying submarines (SSBNs) was an early priority. In 1993, some 2600 submarine-launched ballistic missile (SLBM) warheads were reported deployed on 52 Russian SSBNs[48] – well in excess of the START II ceiling of 1750 SLBM warheads. The majority of the Russian SSBNs were in the Northern Fleet. Moreover, the Kola-based SSBNs included the most recent types with the larger number of missiles, among them the six *Typhoon*-class SSBNs.[49]

The subsequent expansion of CTR objectives to include, along with nonproliferation, the elimination in general of weapons of mass destruction and their delivery systems, served to enhance the scope for CTR assistance to dismantling of Northern Fleet SSBNs. So, too, did broadening the definition of "elimination" in this respect to mean not just the removal of their weapons and launch devices, but complete dismantling of strategic arms delivery vehicles. In addition to those SSBNs already removed from operational status prior to agreement on START, more were gradually to become decommissioned from the Northern Fleet than the number required to meet START limits.

In the early 1980s, the total number of Northern Fleet SSBNs was reported to be 45; in 1992, it was 36; and by 2001, only 12.[50] By the end of 2000, a total of 183 Russian nuclear-powered submarines had been retired from service, 113 of them from the Northern Fleet.[51] It was clear that complete dismantling of all Kola-based SSBNs retired from service was going to be a sizable operation. Because of the need not only to remove and destroy the nuclear missiles and their launch tubes, but also to remove the nuclear reactors with their nuclear fuels and coolants, the operation called for special caution and would be expensive. Prior to the 1990s, Russia had been ill-prepared, economically and otherwise, to carry out the scrapping of nuclear-powered submarines. The growing numbers of decommissioned nuclear-powered submarines throughout the 1990s soon overwhelmed Russia's limited capacities for dismantling them.

CTR support to the disarming and dismantling of Northern Fleet SSBNs has been both direct and indirect. Initially, technology and equipment for SSBN dismantling were provided to three Russian shipyards, one on the Pacific coast and two in the northwest – *Nerpa* north of Murmansk and *Zvezdochka* in Severodvinsk. However, it soon became apparent that this approach to dismantling would be disappointingly slow. A major part of the problem was that dismantlement workers' salaries were to be paid by the Russian government and were frequently months in arrears.[52] By 1998, only five SSBNs had been dismantled under this arrangement, in the course of the preceding three years. By then, CTR support had already changed to the

48 *The Military Balance 1993–1994*, p.99 and p.236.
49 Each one of the *Typhoon*-class vessels carried 20 missiles armed with 10 warheads per missile.
50 *Jane's Fighting Ships, 1982–83, 1992–93* and *2001–2002*. The number of Kola-based submarines taken out of service as SSBNs during the 1982–1992 period was greater than the reduction in numbers shown here, as the Northern Fleet over the same period received 11 newly built SSBNs (4 *Typhoons* and 7 *Delta* IVs). However, some but not all of the former SSBNs have been converted to other roles.
51 *Nordisk Sikkerhet, Militærbalansen 2001–2002* (Oslo: Den norske Atlanterhavskomité, 2001), p.112.
52 James C. Moltz, "Russian Nuclear Submarine Dismantlement and the Naval Fuel Cycle", *The Nonproliferation Review*, Spring 2000, p.78.

signing of contracts directly with Russian shipyards on a "deliverables" basis: The CTR program would provide payment to the shipyard upon completion of each SSBN dismantling operation.

This new arrangement soon proved far more successful. As of February 2002, a total of 21 SSBNs had been dismantled with direct CTR assistance, and 12 or 13 so far from the Northern Fleet.[53] The CTR program now plans to have 36 SSBNs dismantled by 2007 on the basis of similar contracts with Russian shipyards. Adding the 5 submarines dismantled under the former arrangement yields a total of 41 Russian SSBNs eventually dismantled with direct assistance from the CTR program, estimated at $470 million.[54] Of the 41 SSBNs, 20 are foreseen to come from the Northern Fleet and the remaining 21 from the Pacific Fleet. Among them are five of the six huge *Typhoon*-class vessels.

The destruction of the missiles and warheads removed from dismantled SSBNs does not take place at the shipyards. However, forms of CTR assistance have been given both to the transport to the actual sites of destruction and to the process of destruction. Likewise, the CTR program has indirectly provided support to SSBN dismantling by helping ensure satisfactory disposal of spent nuclear fuel from decommissioned SSBNs and nuclear waste from their dismantling. Part of the motivation here has been that problems and bottlenecks in the handling of spent fuel and nuclear waste from the submarines would cause delays in dismantling operations.

Specifically, CTR funding has been used at the shipyards *Zvezdochka* in Severodvinsk and *Zvezda* near Vladivostok both for the construction of onshore facilities for defueling the reactor cores of nuclear-powered submarines; and to design and install equipment for volume reduction of low-level radioactive waste. Furthermore, in 1998–99, CTR funding was used to repair two Northern Fleet *Malina*-class service vessels that are used for submarine defueling, and for transport and temporary storage of their nuclear spent fuel elements.[55]

The CTR program also provided funds for the reprocessing at Mayak of spent fuel from six SSBNs, in order to prevent the fuel from piling up at the shipyards or at already crammed storage facilities. The arrangement with Mayak included the option to reprocess spent fuel from up to seven additional SSBNs.[56] More recently, the CTR program has signaled its intent to purchase a number of containers for interim storage and transport of naval spent nuclear fuel, including rail transport from Murmansk for storage or reprocessing at Mayak.

Use of CTR funding for submarine dismantling has been confined to Russian SSBNs. Moreover, the U.S. Congress stated in the FY 2000 Defense Authorization Act that no funds appropriated for CTR programs "may be

53 *Ibid.*, and "Cooperative Threat Reduction Scorecard" on the CTR web site at http://www.dtra.mil/ctr/ctr_index.html. This also means that, in the years to come, CTR-assisted SSBN dismantling at the Pacific coast *Zvezda* shipyard will be more extensive than at Russian shipyards in the northwest.

54 Jon B. Wolfsthal, Cristina Chuen and Emily E. Daughtry, *Nuclear Status Report* (Monterey and Washington, D.C.: The Monterey Institute of International Studies and the Carnegie Endowment for International Peace, 2001), p.50–51.

55 Steven G. Sawhill and Anne-Kristin Jørgensen, "Military Nuclear Waste and International Cooperation in Northwest Russia", *FNI Report* 12/2001, p.26.

56 *Ibid.*, and "Russia programs: Spent Naval Fuel Disposition" on the CTR web site at http://www.dtra.mil/ctr/ctr_index.html.

obligated or expended for elimination of conventional weapons or the delivery vehicles primarily intended to deliver such weapons".[57] Despite this prohibition, technology and equipment provided by the CTR program to Russian shipyards, as well as other steps taken by the program in indirect support of the dismantling of SSBNs, may come to assist the dismantling of decommissioned Russian nuclear-powered general-purpose submarines (SSNs and SSGNs) as well.

Arctic Military Environmental Cooperation (AMEC)[58]

Arctic Military Environmental Cooperation (AMEC) is a tripartite arrangement between the United States, Russia and Norway to address deleterious effects from military activities in the northern region. The initiative was taken in 1995 by Jørgen Kosmo, Norway's Defense Minister at the time. AMEC was formally established in 1996 with the signing of the Declaration on Arctic Military Environmental Cooperation.

The declaration applies to all of the Arctic area in principle, but practical actions have been almost exclusively confined to or directed toward northwestern Russia. And while there is no particular focus on radioactive pollution in the declaration, most of the projects planned or carried out within AMEC program relate to the danger of nuclear contamination from military sources in the northern region –in particular, from decommissioned Russian nuclear submarines and their scrapping. This links in with CTR efforts in the region; and several AMEC projects are conducted in a close and synergistic relationship to the CTR program. Formally, however, AMEC is a separate program and is managed as such.

There are five groups of "nuclear" projects in the AMEC program. For the sake of simplicity, these can be combined into four, on the basis of the kinds of radioactive material or sources of radiation on which the projects focus:

(1) spent naval nuclear fuel
(2) liquid radioactive waste (from nuclear-powered vessels)
(3,4) solid radioactive waste (associated with nuclear submarine dismantling)
(5) nuclear radiation in general *(*during nuclear submarine dismantling and related waste management activities)

In addition, AMEC pursues a number of "non-nuclear" projects. Table 3 presents a more detailed list of all AMEC projects and their categorization as presented after the initial phase of planning. Most of the AMEC projects are included as separate projects under the Norwegian Plan of Action.

57 National Defense Authorization Act 2001, 114 *US Statutes at Large* 1654, sec.1303. This prohibition was first included by the U.S. Congress in the FY 2000 Defense Authorization Act, and made permanent a year later.
58 This section has been written by John Kristen Skogan.

Project no.	Project description
	Spent naval nuclear fuel management
1.1	Design and construct interim storage and transportation container
1.1–1	Design and construct temporary storage pad for spent nuclear fuel cask
	Liquid naval radioactive waste treatment
1.2	Design and construct mobile liquid radioactive waste processing facility
	Solid radioactive waste volume reduction
1.3–1	Assess technology for waste volume reduction
1.3–2	Manufacture a mobile pre-treatment facility
1.3–3	Manufacture a decontamination unit for metal wastes
	Solid radioactive waste storage
1.4–1	Assess surface coating technologies
1.4–2	Manufacture steel radioactive waste containers
1.4–3	Manufacture concrete radioactive waste containers
	Radiation monitoring, and personnel and environmental safety
1.5	Equipment transfer, training and exchange of monitoring strategies
1.5–1	Radiation control at facilities
	Problems of non-radioactive waste and spills
2.1	Technologies for the remediation of hazardous waste sites on Arctic military bases
2.2	Review and implementation of "clean ship" technologies

Table 3. Overview of AMEC projects as presented by the year 2000. [59]

All AMEC projects have had their share of unexpected obstacles and delays. The two projects in the first group have probably come closest to fulfilling their stated goals. These projects were conceived very early in the AMEC process and received impetus from the strong impression at the time of grave defueling bottlenecks to future Russian dismantling of nuclear-powered submarines.

As a result of project 1.1, a 40-ton prototype container has been developed, usually referred to as a "cask", for transportation and interim storage of naval spent nuclear fuel. The Russians have started the serial production of 48 units. The CTR program plans to purchase 100 of these storage and transport containers.

Project 1.1–1 has resulted in the construction of a sheltered concrete platform next to the railway track in Murmansk for short-term storage of up to 19 casks of naval spent nuclear fuel. The purpose is to facilitate and expedite the handling of spent nuclear fuel; ships will be able to unload their cargo without waiting for trains to come in; trains will be able to load cargo without waiting for ships to arrive.

The goals of project 1.2 have evolved over time. The original intention was to build a water-mobile facility for the processing of liquid radioactive waste that could operate in temperatures above freezing. Now, the goal is to have a mobile facility with year-round liquid waste processing capability,

59 The table is based on Sawhill and Jørgensen, "Military Nuclear Waste and International Cooperation in North-West Russia", *FNI-report* 12/2001, p.34 (with U.S. Department of Defense, AMEC Program Office, as their source) and "Report to Congress" (1999) on the AMEC web site at http://web.dandp.com/AMEC/index.html – as well as on Appendix II for project figures under the Norwegian Plan of Action.

and, moreover, a facility that can operate during the winter months as part of the integrated radioactive waste processing complex that Russia is planning at the military shipyard *Shkval* in Polyarnyi, north of Murmansk.

Projects addressing the management of solid radioactive waste have made much better progress lately; some are near completion. The design and construction of a steel radioactive waste container under project 1.4 is completed, and 400 units are already being produced at the *Zvezdochka* shipyard. These containers are usable for rail and ship transport, and also for interim storage of radioactive waste. Such storage is foreseen at Polyarnyi in association with the planned complex for processing nuclear waste.

The development, under project 1.3, of a mobile device for solid radioactive waste volume reduction is also nearly complete. The device will be an essential element in treatment systems for such waste.

There has been notable progress in the 1.5 projects as well, including the installation of an automated centralized radiological monitoring system at the *Shkval* shipyard in Polyarnyi and at the newly constructed storage platform for spent nuclear fuel in Murmansk. (The system is based on the Picasso software package, developed in Norway at the OECD reactor project in Halden).

"Non-radioactive" projects also have made some headway. These address, in project 2.1, problems such as oil spills and leakage from lead-acid batteries, as well as remediation technologies appropriate to Arctic areas; and in project 2.2, problems of handling waste water on ships.

Until recently, lack of legal coverage for assistance programs, including exemption from taxes, duties and fees, as well as liability protection for foreign personnel and firms involved on Russian territory, had put rather severe limitations on Norwegian participation in AMEC projects. After a failed attempt to negotiate a trilateral framework, the United States and Russia agreed in 1998 to have the legal coverage stipulated in the 1992 CTR Umbrella Agreement apply to U.S. participation in the AMEC "nuclear" projects (all of which are considered supportive of CTR objectives). The signing later in 1998 of the Framework Agreement between Russia and Norway provided legal coverage for most projects in the Norwegian Plan of Action, although initially for only one AMEC project (project 1.2). Another three AMEC projects (1.1, 1.1–1 and 1.3) were brought under legal coverage in June 2000, and the rest by October 2001.

Negotiations have now been resumed for a trilateral agreement providing separate legal coverage for AMEC projects. U.S. participation in AMEC was scheduled to terminate September 30, 2002.[60] The November 2002 CTR-waiver in the U.S. Senate could ease the prolongation of the program. At the time of writing of this report, however, the AMEC-continuation remains uncertain.[61]

60 *Ibid.*, pt.10 in "Report to Congress".
61 For more on these problems, see e.g. Gunnar Johnsen "Amerikansk Kola-bistand lagt på is" ("U.S. Kola assistance paused"), *Aftenposten,* October 25, 2002.

U.S. Material Protection, Control and Accountability (MPC&A) Program[62]

In the past, highly enriched Russian naval fuel has been particularly exposed to theft,[63] prompting the Northern Fleet to seek assistance in upgrading security at its facilities. Now the U.S. Material Protection, Control and Accounting (MPC&A) program for Russian naval fuel has made strides in reducing the vulnerability of large amounts of HEU and nuclear weapons.[64] Most fresh Russian naval fuel in the northern region is consolidated into a central facility.[65] In addition, the United States has helped develop physical protection upgrades for service ships involved in refueling operations.[66] There are, however, unconfirmed indications that the northern central storage facility for fresh fuel has already reached capacity.

Building on the success of the naval fuel upgrades, the United States has begun helping Russia to upgrade the 42 naval sites where nuclear weapons are stored – a breakthrough for U.S.–Russian weapon security programs. At least 25 Northern Fleet nuclear-weapon storage sites have U.S.-assisted security upgrades underway or completed.[67] Some 4000 nuclear warheads are to be secured by 2005 and work is ahead of schedule.[68] According to the U.S. Department of Energy, these naval nuclear weapon sites also contain some 260 tons of nuclear material.[69]

Arctic Monitoring and Assessment Program (AMAP)

The Arctic Monitoring and Assessment Program (AMAP) was established in 1991. At that time, Ministers from the eight Arctic countries had requested AMAP to examine the levels of anthropogenic pollutants and to assess their effects. Mapping of radioactive contamination in northern areas is thus part of this overall assessment of the state of the Arctic environment. Several AMAP Assessment Reports have been issued.[70]

62 For an extensive summary of ongoing programs, please refer to the database of the Center for Nonproliferation Studies, http://www.nti.org/db/nisprofs/russia/naval/ff_naval.htm

63 Morten Bremer Maerli, "U.S.–Russian naval security upgrades: lessons learned and future steps", *Yaderny Kontrol*, Summer 2002.

64 United States General Accounting Office, "Security of Russia's Nuclear Material Improving; Further Enhancements Needed", GAO–01–312, February 2001. See also Oleg Bukharin, Matthew Bunn, Kenneth N. Luongo, Renewing the Partnership: Recommendations for Accelerated Action To Secure Nuclear Material in the Former Soviet Union", Russian American Nuclear Security Advisory Council, August (2000), p. 60.

65 For the Northern Fleet, the fuel is to be consolidated at Site 49 at Severomorsk. However, fresh fuel remains at least two additional locations in the Northern region: At the civilian Icebreaker fleet and at the Sevmash submarine production facility in Severovinsk.

66 Clay J. Moltz and Tamara C. Robinson, "Dismantling Russia's Nuclear Subs".

67 The number of naval weapon sites in the Northern region remains classified. This figure is an assessment based on interviews with U.S team members. See Morten Bremer Maerli, "U.S.–Russian naval security upgrades: lessons learned and future steps", *Yaderny Kontrol*, Summer 2002.

68 Spencer Abraham, U.S. Secretary of Energy, at the Carnegie International Non-Proliferation Conference, Washington D.C. November 14–15, 2002.

69 United States General Accounting Office, "Security of Russia's Nuclear Material Improving; p. 32.

70 For more on the Arctic Monitoring and Assessment Program, and for ordering of AMAP Assessment Reports see www.amap.no.

Lessons Learned

Norway has been engaged in practical large-scale cooperative measures with Russia to reduce dangers from nuclear activities in adjacent areas since 1995. Formal evaluations show a high degree of correspondence between the official aims of the Norwegian government and the practical measures spelled out in the plan of action. Norway's efforts are held to have contributed to the protection of health, the environment, and trade and business activities,[71] as well as to increased international attention and cooperation – including with the United States and EU. According to the Norwegian Ministry of Foreign Affairs, work associated with the plan of action has given Norway additional insights into Russia's political decision-making environment and its security and safety prioritizing.

And yet, a certain amount of frustration seems to prevail in the Ministry of Foreign Affairs, which administers Norway's cooperative programs with Russia. After seven years of cooperation, it is clear that results have been mixed and only some of the wide ranges of objectives have been fulfilled.[72] A senior Norwegian officer has noted "it looks like everything is supposed to take time, with limited results as the ultimate goal".[73] Moreover, Norway faces a range of underlying dilemmas in its nuclear safety cooperation with Russia,[74] relating *inter alia* to competing priorities, the organization of activities on the Norwegian side, and communication with Russian partners.

It is difficult to provide a clear-cut assessment of the long-term security benefits resulting from Norwegian–Russian bilateral nuclear security and safety cooperation. The projects vary considerably in scope and in funding; general characterizations are therefore likely to lead to over-simplification. There are, however, some general observations and conclusions that can be drawn.

Implementation and follow-up of projects

Results vary widely among the four major areas of the plan of action. They are particularly disappointing in the area of treatment, storage, and disposal of radioactive waste and spent nuclear fuel (priority area 2), but are more promising in priority area 3 – radioactive pollution in the northern areas. This is probably because the latter projects mainly involve assessment and monitoring activities where Russian and Norwegian project participants have mutual interests. These projects have also profited from prior institutional and personal contacts between the parties. It seems easier to manage joint research and monitoring activities than international projects that involve the

71 Office of the Auditor General (Riksrevisjonen), "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker", Dokument nr. 3:9 (2000–2001), p. 1.

72 In short, the range of objectives relate to issues ranging from overarching foreign policy concerns, the international Norwegian environmental profile, to bilateral Norwegian–Russian relations and the protection of health and environment, including vulnerable fisheries in the Barents Sea – and sensitive fish export markets.

73 Ambassador Torbjørn Norendal, March 11, 2002.

74 Royal Norwegian Ministry of Foreign Affairs, "Evaluation of the Norwegian Plan of Action for Nuclear Safety. Priorities, Organisation, Implementation", *Evaluation Report 7/2000*, prepared by Geir Hønneland and Arild Moe, the Fridtjof Nansen Institute, p. 9.

construction of physical objects in Russia, as do many of the priority area 2 projects.[75]

According to the Office of the Auditor General, the lack of prior environmental impact assessments makes it difficult to document both the state of the environment and the actual effects of remedial actions. However, environmental impact assessments seem redundant for some projects (e.g. for physical protection security upgrades). Moreover, an "Environmental Review", prepared by Russian experts,[76] must be carried out before any cooperation involving construction activities.

Liability and tax exemption issues, together with generally poor communication and information flows, have hampered the pace of cooperation and thus the extent to which objectives have been fulfilled. Insufficient budgeting and time allocation have caused delays and overruns at later stages of some of the projects. As mentioned above, some projects have even been abandoned.

Moreover, some projects involve an inherent conflict of goals. Safety measures at the Kola and Leningrad nuclear power plants have reduced the risk of accidents – but the assistance has most likely contributed to extend the lifetimes of these facilities, which Norway would like to see closed down. Thanks to Norwegian safety assistance, Russian parties are now arguing in favor of prolonging operation of the plants.

The Office of the Auditor General has questioned funding allocated under the Norwegian plan of action to basic research, as such activities, according to the auditor, do not directly support the pragmatic and fairly immediate goals of the action plan.[77]

Finally, the Office of the Auditor General questions whether the Ministry of Foreign Affairs has had the overview and resources necessary to follow up, manage, and plan cooperative work in an efficient manner. The Auditor General's evaluation indicates that the Ministry of Foreign Affairs performs only limited evaluations of the projects presented to the Inter-ministerial Group of Senior Officials (IMGSO). It is this group that decides which of the projects to support financially, but imposes few requirements as to follow-up and reporting on the progress of each project.

Relations with Russia

Cooperation and working relations between Norwegian and Russian project participants are generally described as good, with few major differences in how goals, events and results are perceived,[78] and with a high level of mutual understanding of the problems and possible remedial action. More-

75 Royal Norwegian Ministry of Foreign Affairs, "Evaluation of the Norwegian Plan of Action for Nuclear Safety. Priorities, Organisation, Implementation", *Evaluation Report 7/2000*, prepared by Geir Hønneland and Arild Moe, the Fridtjof Nansen Institute, p.11.

76 According to Ambassador Norendal of the Norwegian Ministry of Foreign Affairs.

77 Support to the International Science and Technology Center in Moscow under the plan of action has been criticized by the Auditor General.

78 Many of these exceptions to smooth cooperation seem to involve the Interbranch Coordination Centre Nuklid. Nuklid was established in 1990 to co-ordinate attempts of commercialization within the nuclear sector of the Soviet Union. Nuklid is not formally a part of MINATOM but is organized as a unitary state enterprise (GUP). In practice, it means that Nuklid works on contracts with the Ministry and that the ties between the two are tight. From FNI , p. 11. and p. 25.

over, the Russians have contributed profoundly to Norway's understanding and mapping of the Arctic environment.

Inspection rights have been a proviso for all Norwegian nuclear safety projects, in order to ensure optimal spending of allocated funds. Administrative and bureaucratic problems on the Russian side – including internal disagreement between national agencies, lack of a concise legislative framework and appurtenant laws and regulations, long and inefficient licensing and evaluation procedures, lack of willingness to take on necessary leadership and responsibility, insufficient information, and delays in deliveries – have had negative effects on cooperation.

Russian evaluations tend to be time-consuming, and a large number of agencies are involved in decision-making. Another recurring problem is the tendency for somewhat excessive Russian bids during negotiations for contractual working agreements.[79] Often the Russians see a business opportunity in the assistance provided. While getting tenders is difficult due to the specific competence needed, this serves to prolong and sometimes to complicate contractual negotiations. Moreover, disagreement between different donor-states during multinational cooperation has contributed to slowdowns and additional costs.

There are, however, indications of positive change. According to a centrally positioned Norwegian official, the Russians are now showing greater appreciation for Norwegian demands for transparency – both in terms of access prior to, during, and after project implementation, and with regard to openness in financial transactions.[80]

Years of cooperation have, moreover, initiated sound changes and nuclear safety practices on the Russian side. The long-term effects of building up infrastructure and independent domestic supervision competence (e.g. for GAN) may, however, be harder to evaluate – and perhaps appreciate – than specific, practical measures (like railway casks for spent fuel).

To facilitate bilateral nuclear safety and security cooperation in the Northern areas, Russia has established a new organization, SevRao (The Northern Enterprise for Treatment of Nuclear Waste) – a locally based agency under MINATOM. SevRao will operate in parallel to Nuklid, another entity with close ties to MINATOM. Whether projects are run through SevRao or Nuklid seems to be determined by preferences within the Russian administration. A former vice-admiral of the technical branch of the Northern Fleet heads the new organization. According to Norwegian officials, this may improve regional cooperation between the Northern Fleet and MINATOM, as well as the cooperation between the Northern Fleet and Murmansk Shipping Company.[81]

Norwegian responses to past and present cooperative activities

The formal evaluations described above provided a good basis for adjustments of Norwegian aid and organization under the Norwegian Plan of Action. So far, however, organizational and practical changes seem to have

79 According to Ambassador Norendal of the Norwegian Ministry of Foreign Affairs
80 *Ibid.*
81 *Ibid.*

been minor, and the specific recommendations of the evaluations have been implemented only in part. However, the Ministry of Foreign Affairs has pledged to follow projects more closely, with more strict reporting requirements during implementation and at completion. More thorough investigations will be performed at the outset of projects, including external reviews.

The Inter-ministerial Group of Senior Officials (IMSGO) has been expanded to include expert representatives of two additional institutions: the Institute for Energy Technology (IFE) and the Norwegian Defense Research Establishment (FFI). Their presence as observers, together with representatives of the Norwegian Radiation Protection Authority, is likely to contribute to and strengthen the expert evaluation of incoming project proposals.

Furthermore, the Ministry of Foreign Affairs plans to issue statutes for the activities of the IMSGO. However, no fresh funding has been allocated to administrative project follow-up on the Norwegian side. The current "minimum solution" for follow-up thus continues, without a designated Norwegian secretariat for nuclear aid.

Some of the March 2002 conclusions of the Norwegian Control and Constitutional Committee could become guiding principles for Norway's cooperative nuclear-safety activities with Russia. The recommendations put before the Norwegian parliament for consideration include the following requirements for future projects:[82]

- Independent environmental evaluations of projects before they are adopted and financed by Norway.
- Written provisions that Gosatomnadzor (GAN) should have the right to approve the projects, before, during, and after implementation.
- Written provisions that Norwegian and/or international experts are allowed to inspect the implementation of the projects before, during, and after these are developed, to make sure that installations are used in accordance with their intended purposes.
- No support to be provided for any infrastructure projects that could be used to assist the planned import of spent nuclear fuel to Russia from other countries.
- Written shutdown agreements as a precondition for financial support to safety upgrades at nuclear power plants.
- Increased support to developing alternative energy resources in Northwest Russia.
- Opportunities for Norwegian and Russian NGOs to participate as observers in the joint Russian-Norwegian meetings on implementing nuclear-safety projects. All relevant documents and information should be open to the public, as long as they do not contain information that could damage the national security of the countries.
- No Norwegian support to be provided to projects that involve continuous reprocessing at the Mayak plant.
- Greater economic and political support to the Federal Russian civilian nuclear agency Gosatomnadzor, to improve its position in Russia.

82 Based on Bellona, 20 March 2002, http://www.bellona.no/imaker?id=23467&sub=1

An institutionalized cooperative framework

To solve some of the problems associated with bilateral cooperation, Norwegian authorities signed a framework agreement with Russia in 1998.[83] The agreement ensures *inter alia* that technical assistance provided by the Norwegian side shall be exempt from taxes, customs duties, and other fees in accordance with the legislation of the Russian Federation. It also refers specifically to the Vienna Convention of May 21, 1963 on Civil Liability for Nuclear Damage. The full text of the agreement is presented in Appendix II.

During negotiations for the framework agreement, the Russian counterpart participated actively in determining which projects would be included. Initially, only ten projects related to the handling of spent fuel were included; more have been added since then.[84] Most projects under the plan of action, however, remain outside the purview of this overarching agreement.

Since the framework agreement was negotiated, the Russian Federation has established a law on tax exemption for technical assistance, officially published May 12, 1999.[85] This law applies to all international assistance. Even projects not specifically listed in the framework agreement may thus be exempted from taxation, if they qualify in accordance with the law. Reportedly, however, the evaluation process for granting such an exemption can be a protracted endeavor.[86]

The Norwegian–Russian framework agreement, covering solely liability for nuclear or radiological accident, is somewhat less comprehensive than its U.S–Russian equivalent. However, given that Russia feels that the CTR agreement is too far-reaching, in terms of contractual conditions as well as access and inspection requirements, it appears unlikely that the Russian Duma will accept equally comprehensive agreements with other countries.[87]

To increase international political interest and to coordinate international support, Norway has initiated work on the creation of an international legal framework for project assistance to Russia in the field of radioactive waste management and related issues. The Multilateral Nuclear Environmental Program in the Russian Federation (MNPR) aims to ensure adequate legal protection for environmental waste-management assistance projects in Russia. The United States, nine European countries, the European Commission, and Russia have been negotiating a MNEPR umbrella agreement to facilitate assistance projects to address problems of radioactive waste in Russia. However, failure to obtain from Russia required legal protection for donor assistance have prevented conclusion of the MNEPR. The agreement thus

83 "Agreement between the Government of the Russian Federation and the Government of the Kingdom of Norway on environmental cooperation in connection with the dismantling of Russian nuclear powered submarines withdrawn from the Navy's service in the northern region, and the enhancement of nuclear and radiation safety", May 1998.

84 Added were the project for Effluent treatment facility for liquid radioactive waste in Murmansk and a project for the development of a prototype container for transport/ storage of spent nuclear fuel including pad prototype (Murmansk 80-ton container), together with all the AMEC projects funded under the Norwegian Plan of Action, From Norendal, March 11, 2002.

85 Federal Law, "On Gratuitous Aid/Assistance to the Russian Federation and Amending Certain Legislative Acts of the Russian Federation on Taxes and on Introducing Privileges on Payments into State Nonbudgetary Funds Relating to the Provision of Gratuitous Aid/Assistance to the Russian Federation", May 2, 1999.

86 According to Ambassador Norendal of the Norwegian Ministry of Foreign Affairs

87 *Ibid.*

remains unsigned, despite Norwegian financial pledges and assurance given by the Norwegian Prime Minister in 2000 that a donor conference would be convened once the MNEPR agreement was signed, and despite the fact that without the agreement, it will be difficult for the nuclear part of the Northern Dimension Environmental Partnership (see below) to enter into operation.[88] The draft MNPR agreement is presented in Appendix II.

The June 2002 commitment by the G8 countries to raising up to $20 billion over the next 10 years to fund non-proliferation projects, principally in Russia, could provide additional impetus toward progress in further negotiations on this multilateral environmental aid agreement.[89] Among G8 priority concerns are the dismantling of decommissioned nuclear submarines and the disposal of fissile materials, in addition to the destruction of chemical weapons and providing employment for former weapons scientists.

Effectiveness of the Norwegian approach to funding of cooperative activities

From the outset, there has been broad political support for the plan of action for Norwegian economic support and engagement with Russia in the field of nuclear safety. This has created a sound platform for cooperation. As seen from Table 2, the funding made available to the Norwegian plan of action has fluctuated somewhat over the years, with an annual average of roughly NOK 100 million.

Delays and practical problems in implementing projects in Russia, however, have resulted in funds allocated for cooperation being withdrawn or reallocated to other bilateral activities in recent years. This has, in part, caused a backlog of projects waiting to be implemented, and of course additional frustration on both sides.

For 2003, however, some NOK 350 million, more than three times the annual average, has been allocated to nuclear security and safety initiatives under the Norwegian plan of action.[90]

Future Priorities

Initiatives underway

Norway will likely maintain its strong focus on the safe and secure handling of spent nuclear fuel in the northern region. In future cooperation, emphasis will probably be given to improved accountability and reporting practices. For Norway, it now seems more important to consolidate, finalize, and keep the existing project portfolio running smoothly, than to launch a wide range of new activities.

88 Chris Patten, speech at the Northern Dimension Environmental Partnership Pledging Conference, SPEECH/02/327, Brussels, July 9, 2002, http://europa.eu.int/comm/external_relations/news/patten/sp02_327.htm

89 Cristina Chuen, Michael Jasinski, and Tim Meyer, "The 10 plus 10 over 10 Initiative: A Promising Start, But Little Substance So Far", Research Story of the Week, Center for Nonproliferation Studies, Monterey Institute of International Studies, August 12, 2002, http://www.cns.miis.edu/pubs/week/020812.htm

90 Andreas Nielsen, "Mer til bistand og atomsikkerhet" ("More to aid and nuclear safety/security"), *Dagsavisen,* October 3, 2002.

One newly started project that could demand considerable resources and attention from Norwegian authorities in the coming years is the emptying and discontinuation of the hazardous storage facility for spent nuclear fuel in Andreeva Bay. A project was launched in 1998 to investigate the need for technical means and procedures to empty and decommission this fuel storage facility. Progress has been slow, as no access to the area has been granted until now.

This bay – located only some 50 km from the Norwegian border – is the primary waste storage location for spent nuclear fuel and radioactive waste from the Northern Fleet. It contains about 21,000 spent nuclear fuel assemblies and about 12,000 cubic meters of solid and liquid radioactive wastes.

Across Andreeva Bay, in Zapadnaya Litsa fjord, is one of the five naval bases on the Kola Peninsula from which the nuclear-powered ships of the Northern Fleet operate. Despite Russian interest in Western funds for remedial actions, there has been a pronounced reluctance to allow any foreigners access, or to engage in any form of nuclear transparency. Years of negotiations and cooperation, however, are finally paying off. In June 2002, initial contracts for improving nuclear safety were signed between the Norwegian and Russian parties, and access was granted.[91] A step-by-step approach will focus first on improving infrastructure and living conditions at the naval base. Vast remedial challenges remain, however, once new roads, electricity, and housing have been provided. A great deal of funds – and donor states – are needed. Conservative estimates indicate clean-up costs in the range of $120 million.

Norway has provided 15 million NOK to upgrade existing infrastructure. This is necessary to get equipment and barracks installed in order to empty and close down the hazardous storage facilities. Other Nordic countries stand ready to contribute as well, most likely through the Northern Dimension Environmental Program.[92] According to Norwegian officials, these funds are supposed to be dedicated to improving storage conditions in Andreeva Bay.[93] As yet, however, no such formal commitments appear to have been made by the other Nordic countries.

For Norway, the focus on Andreeva Bay fits in well with its long-term policy goal of increasing regional cooperation. Moreover, it may help eliminate distrust and reduce the excessive secrecy culture within the Northern Fleet.

These recent developments represent nothing less than a breakthrough in Norway's nuclear-safety cooperation with the Russian navy. The next period will be critical, with the challenge of balancing Russian security concerns with the need for project progress, continued international cash flow, and sufficient access to sensitive areas.

91 A representative of the chief administrative officer of the Norwegian county of Finnmark will be inspecting the project progress on a regular basis. This is likely to ensure contact between project participants and the proper implementation of the project.

92 This is according to Nils Bøhmer, Bellona. For more on the Northern Dimension Environmental Program, see http://europa.eu.int/comm/external_relations/north_dim/

93 Deputy Secretary of State Elsbeth Tronstad to Norwegian radio *(Alltid nyheter),* April, 3. 2002.

Recommendations for future cooperative threat-reduction activities

Some of the projects proposed in this section combine nuclear safety and nuclear security efforts. Such an approach may be particularly fruitful, for several reasons: First, it can fill some unfortunate gaps in current cooperation; second, such an expansion of assistance would logically tap into the expertise and groundwork established by ongoing government programs; and third, new projects with a "broader" mandate may form a natural point of departure for additional international support.

Physical protection of spent fuel

As noted, Norway has a particular focus on limiting potential environmental risks associated with large-scale Russian nuclear activities in the region. Other countries, primarily the United States, have focused on threat-reduction activities in the more traditional security/defense-related sense. While such emphasis may be understandable from a geopolitical perspective, it may be hard to draw a clear line between nuclear safety (primarily pollution and accidents) and security (primarily proliferation) in practical efforts at arms control.

One example of the problems of maintaining such a distinct dichotomy is the handling of spent nuclear naval fuel. Initially, the fuel represents primarily a pollution risk. However, long cooling periods and thus reduced radiation levels may make the spent fuel attractive for separation to would-be proliferators, due to the residual plutonium and HEU in the fuel.[94] Moreover, the threat of "dirty bombs" in which radioactive materials are used in conjunction with conventional explosives highlights the risk associated with spent fuel.

At the numerous Russian naval facilities in the region, there are many metric tons of fresh and low-irradiated HEU fuel. All fresh fuel, and parts of the nuclear weapons, are covered by the MPC&A upgrades. U.S.–Russian projects in the naval sector pursue three aims: (1) the consolidation of fissile material, especially fresh naval fuel; (2) physical protection at consolidated sites; and (3) the physical protection of spent-fuel sites.[95] Spent-fuel security upgrades, however, are only partly covered by this cooperation. No onshore storage facilities for spent fuel have been secured – only some of the Northern Fleet's service ships that are involved in the handling of both spent and fresh fuel.

Future expansion of the CTR in the direction of physical protection of spent fuel could be seen in conjunction with the handling of spent fuel in Andreeva Bay and at Gremikha (see below).

Dismantling of attack submarines

Despite the many problems the United States has experienced with its overall assistance programs in the former Soviet Union, it has had notable suc-

94 Knut Gussgard and Ole Reistad, "Russian Spent Marine Fuel as a Global Security Risk", paper presented at the International Conference on Security of Material – Measures to Prevent, Intercept and Respond to Illicit Uses of Nuclear Material and Radioactive Sources, Stockholm, Sweden, 7 – 11 May 2001.

95 Nuclear Status Report, June 2001, p. 59.

cess in its nuclear submarine dismantlement program.[96] As of mid-2002, the United States can point to 21 SSBNs that it has cut up and eliminated. However, there are currently no plans for the United States to cut up the large number of attack (SSNs) and cruise missile (SSGNs) submarines lying idle in Russia's Northern Fleet harbors. Despite dismantlement capacities, it is thus unlikely that the "general purpose" submarine problem will be taken up soon.[97]

As of March 2001, there were 56 decommissioned "general purpose" submarines in Russia's Northern Fleet, 43 of them with fuelled reactors. Of these vessels, 37 are located in the Murmansk region near Norway's coastline, 27 of them with fuel. So far, Norwegian authorities have been reluctant to engage in any dismantling of Russian attack submarines, despite the possible availability of dismantling equipment provided and installed by the United States. With fresh international funds, consideration could be given to a direct offer to the *Nerpa* shipyard to conduct a phased dismantling of SSNs and SSGNs.[98]

Expansion of existing CTR activities in this field could be conducted in concert with renewed AMEC efforts.

Handling of spent fuel in Andreeva Bay and at Gremikha

As indicated, once projects get underway in Andreeva Bay, international funds and donors will be urgently needed to support the range of activities for remedial safe handling of fuel. Conservative estimates for the clean-up costs indicate figures well above what Norway or Russia would be capable of providing (or indeed willing to provide) alone. The transparency opening offered to Norwegian authorities may serve as an opportunity for other interested parties. Obtaining fresh international funds for the handling of spent fuel in the northern region is a pronounced goal for Norwegian authorities.

In addition to the challenges in Andreeva Bay, international assistance for the safe handling of fuel is needed at Gremikha (Iokanga), the second largest onshore storage site of the Northern Fleet at the Kola Peninsula for spent nuclear fuel from submarines. As in Andreeva Bay, storage and radiation protection conditions are poor.[99] The Gremikha naval base is the easternmost Northern Fleet base at the Kola Peninsula, located some 350 kilometers east of the mouth of the Murmansk fjord. There is no road or railway connection to the base. Today, no active submarines based at Gremikha, a fact which could ease the implementation of future cooperative projects.

Given the Norwegian emphasis on Andreeva Bay, Gremikha will most probably receive little specific attention from Norway in the coming years

96 Clay Moltz, Center for Nonproliferation Studies, Monterey Institute of International Studies, "Northern Fleet Nuclear Submarines and Radioactive Waste Problems", Memo to Ambassador Knut Vollebaek, March 7, 2001

97 The remaining decommissioned SSBNs are dismantled at Sevmash and Zvezdochka in Severodvinsk. At Nerpa, the United States stopped work in 1999 and has only one more SSBN on its docket, which will be cut up between May 2000 and April 2001. The *Nerpa* Shipyard, thus, has idle capacity for submarine dismantlement work. From Clay Moltz Memo.

98 As suggested by Clay Moltz in his memo to Ambassador Vollebaek, March 7, 2002.

99 According to Bellona, some 800 fuel elements from pressurized water reactors are stored in Gremikha, containing 1.4 tons of nuclear fuel materials. Six reactor cores from liquid metal reactors are also stored onshore at this location. Spent nuclear fuel remains in the reactors of all of the 17 submarines laid up at piers at the base.

(though Norwegian officials recently have been taken to visit the naval base). Russian authorities are likely to pursue increased participation from other actors. Care should then be taken not to initiate any unfortunate "competition" between the two storage sites. Rather, international efforts should be coordinated and run in parallel, in order to ensure the most safe and optimal solutions.

Establishment of an interim storage facility at Kola

As part of the Russian policy of a closed fuel cycle, spent fuel in the northern areas has been shipped to Mayak facility in the Ural region for interim storage and reprocessing. Norwegian nuclear aid policies have vigorously supported such approaches, in part to get the highly radioactive spent fuel as far away from the border as possible. To this end, specialized railway rolling stock has been provided for the transport of spent nuclear fuel from decommissioned nuclear submarines.

While extended transportation of the fuel itself involves some element of risk, other factors could make an interim storage facility at Kola a more sensible solution. First and foremost, existing storage capacities in the region are highly congested and unsatisfactory, so construction of new facilities seems a paramount priority. The clean-up of both Andreeva Bay and Gremikha is highly likely to require such efforts. Second, the periodic breakdowns in transportation of spent fuel to Mayak and the prolonged shipping procedures create an unfortunate bottleneck for the handling of spent fuel. Third, an onshore radioactive waste storage facility would obviate the need for potentially hazardous sea shipments to Novaya Zemlya, the planned regional repository for (low and intermediate level) radioactive waste. Finally, the establishment of an intermediate storage facility could also allow for proper physical protection and increased accountability of the spent fuel.

End November 2002, Aleksandr Rumyantsev, Russia's minister of nuclear energy, said that the Kola Peninsula in Northwest-Russia is a more suitable location for a repository for low and medium radioactive waste than the originally proposed site at the Novaya Zemlya archipelago in the Russian Arctic".[100]

Pursue options for increased nuclear transparency and accountability

Limited access and lack of transparency have been recurrent problems in the cooperation. Ideally, transparency can help each side understand the other's (non-offensive) nuclear intentions, through knowledge of the size of the other's stockpiles of nuclear weapons and fissile material, the rate of reduction in these stockpiles, and optimal ways to achieve such reductions.[101] The fact that Norwegian officials have finally been granted access to sensitive sites in the northern region is thus an important breakthrough.

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100 Igor Kudrik, "Novaya Zemlya repository plan scrapped", the Bellona Foundation, 29.11.2002, http://www.bellona.no/en/international/russia/nuke-weapons/nuke-test/27489.html

101 Morten Bremer Maerli and Roger Johnston, "Safeguarding This and Verifying That: fuzzy concepts, confusing terminology, and their detrimental effects on nuclear husbandry". *Nonproliferation Review,* Spring 2002. http://www.cns.miis.edu/pubs/npr/vol09/91/abs91.htm

Past lessons of cooperative work may, moreover, create an important platform for future confidence-building. The naval fuel cycle remains a highly sensitive area – yet many traditional problems associated with cooperative work have been solved, or at least circumvented, during the naval MPC&A upgrades. Compared to other bilateral security upgrades, the naval MPC&A-program has made remarkable progress, with U.S. team members now cooperatively installing physical security upgrades, not only at fresh fuel storages but also at nuclear weapon depots.[102] The close working relations established and the consolidation of fuel at centralized storage facilities could create a springboard for an overall Russian naval HEU accounting exercise. As such, the naval MPC&A activities may encourage increased transparency and possibly future non-intrusive verification measures on the highly sensitive fuel cycles.

Moreover, as evidenced by this MPC&A program, a flexible and less adversarial approach is likely to avoid many of the problems that other parts of cooperation have been facing. This approach is thus more likely to achieve the long-term goal of sustained nuclear security sought by all parties. The working relationship, reporting procedures, and contractual framework of the naval physical security upgrades could be assessed, with the goal of possibly applying these approaches more generally in bi- or multilateral cooperation.

Norway's Comparative Advantage

For historical, cultural, political, and geographical reasons, Norway has several advantages in cooperative threat-reduction activities with Russia.

The Cold War divided the two countries, but personal relationships between Norwegians and Russians have been strong for centuries. Trade has created natural cross-border relations in the past, and there are long traditions of cooperation and collaboration in the northern areas. The management and partition of joint resources (primarily fish and gas) in the Barents Sea have also forged negotiations and thus political and bureaucratic connections. Moreover, Norway's proximity to Russia can facilitate efficient project follow-up, with the presence of national representatives at sites prone for upgrades and remediation.

This, together with Norway's status as a non-nuclear weapon state, is likely to create a sound platform for cooperation and aid. One could envision an elevated role for Norway as an initiator and coordinator – and possibly even a "mediator" – for multinational nuclear assistance to Russia. Indeed, this seems to be a role that Norway increasingly is seeking to play in international nuclear-safety projects in northern areas.

Norway has long promoted the need for increased international attention to the environmental threats associated with civilian and military nuclear activities in its neighboring areas with Russia – as seen in the Norwegian efforts to establish a framework agreement on a Multilateral Nuclear Environmental Program in the Russian Federation. Norway has worked closely with other Nordic countries and some Central European countries to improve

102 Morten Bremer Maerli, "U.S.–Russian naval security upgrades: lessons learned and future steps", *Yaderny Kontrol*, Summer 2002.

the situation in the northern areas. Increased cooperation between Norway and the United Kingdom on nuclear remedial actions in Russia is a promising development that may benefit from the UK's own experience with nuclear submarines, fuel handling, and submarine decommissioning.

Moreover, Norway has actively supported the Contact Expert Group (CEG) since its creation. This international advisory group was established to help coordinate multinational efforts with the Russian Federation in waste management projects. Such coordination can help avoid redundancy and duplication, ensure that priorities are properly assessed and made known to international community, and provide points of contacts to facilitate cooperation.[103]

Finally, the formalized working agreements between Norway and Russia that include provisions of tax-exception and liability issues could serve as useful templates for similar bi- or multilateral agreements between Russia and other countries.

Decision-Making Environment

Norway's nuclear cooperation with Russia is managed through four principal networks.[104] The first is at the political level, between the Norwegian and Russian foreign ministries and MINATOM. The second is between the environmental ministries, conducted primarily through the joint Norwegian–Russian Environmental Commission. The third level involves the Norwegian Radiation Protection Authority (NRPA) and its Russian sister organization, the Russian Federal Supervisory Authority for Nuclear and Radiation Safety (Gosatomnadzor, GAN).[105] Finally, defense-related cooperation takes place under the auspices of the Arctic Military Environmental Cooperation (AMEC).

The Norwegian organizational structure for nuclear security and safety cooperation with Russia has been thoroughly described in the evaluation report prepared by the Fridtjof Nansen Institute for the Ministry of Foreign Affairs:[106]

On the Norwegian side, there are two main bodies involved in the coordination and organization of activities under the Plan of Action: the Committee of Deputy Ministers (CDM) and the Inter-ministerial Group of Senior Officials (IMGSO). The former consists of deputy ministers from the following ministries: the Ministry of Foreign Affairs (MFA), the Ministry of Defence (MOD), the Ministry of the Environment (ME), the Ministry of Fisheries (MF), the Ministry of Agriculture (MA), the Ministry of Health

103 http://www.iaea.or.at/worldatom/Programmes/CEG/history.html

104 Steven G. Sawhill and Anne-Kristin Jørgensen, "Military Nuclear Waste and International Cooperation in North-West Russia", the Fridtjof Nansen Institute, FNI-report 12/2001, p. 37.

105 This cooperation has focused on information sharing, competence building and technical support. An agreement between the NRPA and GAN was signed in 1997: *Agreement between Norwegian Radiation Protection Authority and Russian Authority Gosatomnadzor of Russia on Technical Co-operation and Exchange of Information Concerning Safe Use of Nuclear Energy*, October 20, 1997.

106 The following description is taken in its entirety from Royal Norwegian Ministry of Foreign Affairs, "Evaluation of the Norwegian Plan of Action for Nuclear Safety. Priorities, Organisation, Implementation", Evaluation Report 7/2000, p. 23, http://odin.dep.no/archive/udvedlegg/01/01/00133012.pdf

and Social Affairs (MHS) and the Ministry of Trade and Industry (MTI). It is headed by the Deputy Minister of Foreign Affairs.

The CDM normally meets twice a year and is the decision-making body in matters related to the Plan of Action. It usually bases its decisions on recommendations from the IMGSO. The main task of the IMGSO is to evaluate and give its recommendations of incoming project proposals to the CDM. This body is made up of senior officials from the same ministries and from the Norwegian Radiation Protection Authority (NRPA). It is also headed by the MFA.

Since 1995, the IMGSO has usually been convened once a month, and occasionally more frequently. The number of representatives from each institution at the meetings has varied. Most agencies are normally represented by only one senior official whereas the MFA has been represented by officials from various departments within the ministry, in addition to the chairman. The NRPA has also often had several representatives at the meetings. Coordination of the work of the CDM and the IMGSO at the time of writing is carried out by two executive officers and one ambassador in the MFA.

Possible pathways for influencing key Norwegian decision makers

The traditional approaches for influencing decision-makers in Norway include seminars, direct contacts and briefings, and via news reports in the media. Somewhat paradoxically, however, to revitalize interest and get political support, there may be a certain need to "resell" any new and multilateral approaches, as the nuclear-safety deficiencies in Russia – and the problems associated with implementing cooperative projects – have been widely publicized over almost a decade, not least by a highly active NGO community.

Among the most prominent of these groups is the Bellona Foundation, a non-governmental watchdog group based in Oslo. This group started to investigate potential environmental hazards emanating from the nuclear activities of the Northern Fleet in the wake of the break-up of the Soviet Union. Their focused approach, involving an offensive media strategy and active political engagement, was one of the driving forces behind the nuclear-safety interests of the Norwegian government and political community in the early 1990s. In November 2001, Bellona published its third report on potential sources of radioactive contamination of the Arctic, *The Arctic Nuclear Challenge*.[107]

Norwegian authorities can also see the (potential) benefits of NGOs. Although some official Russian counterparts remain highly skeptical of Bellona's activities, the group has received substantial support from the Norwegian government – NOK 25,650,000 since 1995. Bellona's activities have, however, been somewhat controversial; Russian members of the organization have been prosecuted for spying and later acquitted by Russian law enforcement authorities.

An international non-governmental organization that has focused substantial attention on environmental threats from Russian marine reactors is

107 http://www.bellona.no/imaker?id=22347&sub=1

the Center for Nonproliferation Studies of the Monterey Institute for International Studies in California. This highly competent group has produced several papers and reports on the subject, and also manages a comprehensive database on Russian naval reactor developments.[108] However, since it is less connected with the political and bureaucratic environment in Norway, it has probably had less impact on Norwegian nuclear assistance policies.

Conclusion

Many nuclear safety and security challenges remain in Northwest Russia. Years of international cooperation – and substantial funding – are required to deal with the legacy of the extensive naval nuclear activities of the Cold War. Among the more urgent projects in the area that call for international attention are the safe dismantling of nuclear attack submarines and clean-up at naval storage facilities, e.g. at Andreeva Bay; and adequate storage, protection, and control of all stocks of naval nuclear fuel.

For nearly a decade, Norway and other countries have been working cooperatively with Russia to improve the situation. While important progress has been made, much of the foreign support has come with some hard-learned experiences. The dialog and connections established, the cooperative framework institutionalized, and today's understanding of the respective concerns, priorities, and practices of the various actors involved should, however, be able to create a sound basis for new rounds of cooperative and concerted efforts to limit the persistent nuclear security and safety risks in the region.

108 http://www.nti.org/db/nisprofs/russia/naval/ff_naval.htm

Appendix I: Potential Sources of Marine Radioactive Contamination in Northwest Russia[109]

Establishment	Role	Potentially dangerous assets
Zapadnaya Litsa/Andreeva Bay	Naval base	26 operational nuclear submarines 2 inactive nuclear submarines, one with spent fuel 22,700 spent fuel assemblies 2,000 m^3 liquid radioactive waste 6,000 m^3 solid radioactive waste
Vidyayevo (Ura Bay and Ara Bay)	Naval bases	4 operational nuclear submarines 14 inactive nuclear submarines with spent fuel Small amounts of solid radioactive waste
Gadzhievo (Skalisiti) Saida Bay	Naval base Storage facility	Unknown number of nuclear submarines 200 m^3 liquid radioactive waste 2037 m^3 solid radioactive waste Occasional service ships with radioactive waste and/or nuclear fuel on board 12 submarine hulls with reactors
Severomorsk	Naval base	3 decommissioned nuclear-powered battle cruisers
Gremikha	Naval base	17 inactive nuclear submarines 767 spent fuel assemblies, 6 liquid metal cooled reactor cores 300 m^3 solid radioactive waste 1960 m^3 liquid radioactive waste
Nerpa	Shipyard	1 submarine being decommissioned Periodic visit of service ships with spent fuel or liquid radioactive waste on board 300 m^3 solid radioactive waste 170 m^3 liquid radioactive waste
Shkval (Polyarny)	Shipyard	1 submarine in for maintenance 2 service ships with spent nuclear fuels or radioactive waste 7 inactive nuclear submarines with fuel Storage facility for solid radioactive waste 150 m^3 liquid radioactive waste
Sevmorput	Shipyard	2 inactive nuclear submarines Occasional service ships with liquid radioactive waste Storage for solid radioactive waste
Severodvinsk (Zvezdochka, Sevmash)	Shipyards	12,539 m^3 solid radioactive waste 3000 m^3 liquid radioactive waste 4 nuclear submarines for maintenance Dismantling 12 inactive nuclear submarines 4 reactor compartments from submarines already decommissioned
Atomflot (Icebreaker fleet)	Harbor	8 nuclear-powered icebreakers Fresh and spent fuel stored afloat Liquid and solid waste stored afloat and on-shore.
Russian Navy Nuclear Weapon Sites	Some 25 sites	Some nine hundred and twenty eight nuclear warheads About 260 metric tons of nuclear material Exact number of nuclear weapon sites is unknown
Kara and Barents Sea	Dumped nuclear waste	10 reactors with fuel 6 reactors with spent fuel 17 vessels with solid radioactive waste 6,508 containers with radioactive waste

109 From Morten Bremer Mærli, "Proliferation and Pollution Risks from Naval Nuclear Activities in Northwest-Russia", *Physics and Society*, July 2001. Based on Al J. Venter, "Soviet nuclear legacy poses deadly threat", *Jane's Intelligence Review*, October 1999, p. 15, and updated and extended with more recent information.

Appendix II: Contractual Framework

I) The Framework Agreement, signed May 1998

A G R E E M E N T

between the Government of the Russian Federation and the Government of the Kingdom of Norway on environmental cooperation in connection with the dismantling of Russian nuclear powered submarines withdrawn from the Navy's service in the northern region, and the enhancement of nuclear and radiation safety

The Government of the Russian Federation and the Government of the Kingdom of Norway, hereinafter referred to as the "Parties";

Considering the Declaration of 26 March 1996 on the foundations of relations between the Russian Federation and the Kingdom of Norway, the Agreement of

3 September 1992 between the Government of the Russian Federation and the Government of the Kingdom of Norway on environmental cooperation, the Agreement of 10 January 1993 between the Government of the Russian Federation and the Government of the Kingdom of Norway on early notification in case of a nuclear accident and exchange of information on nuclear facilities, the Agreement of 15 December 1995 between the Ministry of Defense of the Russian Federation and the Ministry of Defense of the Kingdom of Norway on defense-related environmental cooperation, the Memorandum of 4 October 1995 on Russian–Norwegian cooperation in the area of nuclear safety, the Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage;

Emphasizing that each state has the obligation to ensure that activities within its jurisdiction or control do not cause environmental damage in other states or in areas outside of national jurisdiction;

Reaffirming their commitment to the protection and preservation of the environment in areas adjacent to the Russian–Norwegian border, on the basis of the principles and priorities of the Declaration of 14 June 1991 on the protection of the Arctic environment, the Declaration of 11 January 1993 on Cooperation in the Barents Euro-Arctic region, the Action Programmed for the environment adopted by the Barents Euro-Arctic Council on 15 June 1994, and the Declaration of 19 September 1996 on the establishment of the Arctic Council,

Have agreed as follows:

Article 1

1. The Norwegian Party shall render free technical assistance to the Russian Party in the form of delivery of equipment, technology transfer, provision of financial means and services in order to contribute to an early, environmentally safe and cost-effective dismantling of Russian nuclear powered submarines withdrawn from the Navy's service in the northern region, including the management of spent nuclear fuel and radioactive waste which is formed thereby, and to enhance nuclear and radiation safety at nuclear power plants and other nuclear facilities.
2. The free technical assistance from the Norwegian Party in accordance with this Agreement is provided on agreement between the Parties within the framework of the Storting's budget appropriations.
3. The Russian Party shall use the free technical assistance provided by the Norwegian Party exclusively for the purposes listed in paragraph 1 of this article.

Article 2

1. The Parties shall cooperate in order to promote the realization of the following projects:
– Emptying and decommissioning of the storage facility for spent nuclear fuel from Russian nuclear powered submarines in Andreyev Bay (Murmansk oblast), and the development of methods for the management of this fuel;
– Establishment of an interim storage facility for spent nuclear fuel from ships' reactors at the production association "Mayak" (Chelyabinsk oblast);
– Design, construction and commissioning of a temporary storage facility for solid radioactive waste at Andreyev Bay (Murmansk oblast);
– Design, construction and commissioning of a specialized self-propelled vessel for the transport of containers with spent nuclear fuel;
– Construction and commissioning of four specialized railway cars for the transport of containers with spent nuclear fuel;
– Modernization and commissioning of an interim storage facility for liquid radioactive waste at the "Zvezdochka" shipyard (Severodvinsk, Arkhangelsk oblast);
– Delivery of a mobile facility for treatment of liquid radioactive waste (Murmansk);
– Dismantling of the floating technical base "Lepse" (Murmansk);
– Modernization of the facility for treatment of liquid radioactive waste at the repair and technical enterprise "Atomflot" (Murmansk);
– Enhancement of operational safety at the Kola nuclear power plant (Polyarnye Zori).
2. If the Parties so agree, other projects may also be added to those listed in paragraph 1 of this article.

Article 3

1. A joint Russian–Norwegian commission, hereinafter referred to as the "Commission", shall be established to coordinate and control the implementation of this Agreement.
2. The Commission shall take and recommend any measures it deems necessary for an effective implementation of the cooperation within the framework of this Agreement, including approval of projects and cooperation programmes proposed by involved organizations of the Parties.
3. The meetings of the Commission shall be held at regular intervals, but at least once a year, alternately in the Russian Federation and Norway, unless otherwise agreed.
4. The competent authorities for the purposes of this Agreement are:
for the Russian Party – the Ministry of the Russian Federation for Atomic Energy, for the Norwegian Party – the Royal Norwegian Ministry of Foreign Affairs.
5. The implementation of projects as foreseen in article 2 shall be based on individual agreements for each project, hereinafter referred to as "project agreements" or "contracts", to be concluded between Russian and Norwegian organizations.
6. The cooperation shall be carried out on the basis of the national legislation of the Parties, as well as conventions to which both Parties have acceded and internationally recognized principles and recommendations for nuclear and radiation safety and environmental protection.
7. The project agreements or contracts shall be endorsed by the competent authorities of the Parties.

Article 4

1. The Norwegian Party shall according to established procedures deliver equipment, materials and other goods, transfer technology and provide financial means and services to Russian recipients or customers within the framework of

this Agreement in accordance with the provisions of each project agreement or contract.
2. The Russian recipients or customers shall receive the equipment, materials and other goods which are provided by the Norwegian Party according to the procedures established in the Russian Federation, and undertakes to use the equipment, materials and goods solely for the purposes specified in article 1, paragraph 1.
3. The Russian Party shall ensure that the free technical assistance provided by the Norwegian Party is used for the implementation of projects listed in article 2 of this Agreement.
4. The design, construction, delivery and commissioning of technical means and objects financed by funds provided by the Norwegian Party shall be conducted in accordance with the legislation, norms and regulations of the Russian Federation. The procedure for execution of the work shall be prescribed by the project agreements or contracts.
5. Training of Russian personnel for the qualified operation of equipment which is delivered shall be foreseen by the respective project agreements or contracts.
6. The Parties shall mutually provide effective protection of intellectual and industrial property rights in accordance with the national legislation of the Parties, and in accordance with international agreements to which they are a party. The recipient or customer and the contractor may agree on additional terms in each project agreement or contract.

Article 5

1. Equipment and materials which are imported into the territory of the Russian Federation as free technical assistance for the implementation of this Agreement, and which are financed by funds provided by the Norwegian Party, shall be exempt from taxes, customs duties and other fees in accordance with the legislation of the Russian Federation.
2. Exemption in accordance with paragraph 1 of this article shall be granted on terms not less favourable than those accorded to technical assistance provided free of charge by any third party.

Article 6

1. Any disagreement concerning the interpretation of individual provisions of this Agreement, or its implementation, shall be resolved through consultations between the Parties. Consultations shall take place not later than three months after one of the Parties has so requested.
2. In case of any divergence between this Agreement and the provisions of project agreements or contracts which are concluded within the framework of this Agreement, the provisions of this Agreement shall prevail.
3. The Parties may conclude additional agreements on any question that might arise in the course of the implementation of this Agreement.
4. The provisions of this Agreement may be amended on written agreement between the Parties.

Article 7

1. At the request of one of the Parties, the Parties shall hold meetings and consultations in order to examine the implementation of the project agreements or contracts.
2. The Norwegian Party is accorded the right to verify and control that equipment, technology and financial means provided free of charge to the Russian Party as technical assistance is used in accordance with the terms of this Agreement. The procedure for verification and control shall be established in the project agreements, contracts or in separate agreements.

3. Each Party shall declare which data and information are to be considered confidential in connection with the implementation of the projects listed in article 2 of this Agreement. Confidential data and information, relating to concrete projects within the framework of this Agreement, shall not be made public, or disclosed to any individual or legal person who does not participate directly in the implementation of this Agreement, without the written permission of the Party that has provided such information.

Article 8

1. The provisions of this Agreement shall not affect the rights and obligations of the Parties under international agreements they have previously concluded, or their membership in international organizations.
2. The Parties will facilitate the involvement of third parties in financing and /or practical implementation of projects listed in article 2 of this Agreement.

Article 9

1. With the exception of claims for damage or injury against individuals arising from their premeditated actions, the Russian Party shall bring no claims or legal proceedings against the Norwegian Party and its personnel or contractors, subcontractors, consultants, suppliers of equipment or services at any tier and their personnel, for indirect, direct or consequential damage to property owned by the Russian Federation. This paragraph shall not apply to legal actions brought by the Russian Party to enforce the provisions of contracts to which it or a Russian national is a party.
2. With the exception of claims for damage or injury against individuals arising from their premeditated actions, the Russian Party shall provide for the adequate legal defence of, indemnify, and shall bring no claims or legal proceedings against, the Norwegian Party and its personnel, contractors, subcontractors, consultants, suppliers of equipment or services at any tier and their personnel in connection with third-party claims in any court or forum arising from activities undertaken pursuant to this Agreement for injury, loss or damage occurring within or outside the territory of the Russian Federation that results from a nuclear incident occurring within the territory of the Russian Federation.
3. Without prejudice to paragraphs 1 and 2 of this article nothing in this article shall be interpreted to prevent legal proceedings or claims against nationals of the Russian Federation or permanent residents on the territory of the Russian Federation.
4. The provisions of this article shall not prevent indemnification by the Parties for damage in accordance with their national laws.
5. Nothing in this article shall be construed as acknowledging the jurisdiction of any court or forum outside of the Russian Federation over third-party claims, for which paragraph 2 of this article applies, except as provided for in paragraph 9 of this article and in any other case where the Russian Federation has pledged itself to acknowledge and execute a legal decision on the basis of provisions of international agreements.
6. Nothing in this article shall be construed as waiving the immunity of the Russian Federation or the Kingdom of Norway with respect to potential third-party claims that may be brought against either of the Parties.
7. The provisions of this article shall – if so requested by the contractor – be incorporated into the project agreements or contracts by the issue, by or on behalf of the Russian Party, of an indemnity confirmation letter to the contractor.
8. In case a nuclear incident has occurred which may lead to the fulfilment of the obligation to compensate damage, the Parties shall hold consultations upon request by one of the Parties.
9. As regards its obligations in this article to the contractors, subcontractors, consultants, suppliers of equipment or services at any tier and their personnel, the Russian Party undertakes to have any conflict, controversy or claim arising out of or in relation to this article, if not settled amicably within three months, refer-

red to and finally resolved by arbitration in accordance with the UNCITRAL Arbitration Rules. The national legislation of the Parties shall not be applied for the resolution of any conflict, controversy or claim.

10. Any payments related to the indemnification in paragraph 2 of this article shall be made promptly and in a convertible currency.
11. The obligations concerning liability for nuclear damage undertaken by the Russian Party in accordance with the present article shall be valid for objects which are the subject of cooperation under this Agreement, and shall remain in effect regardless of any subsequent transfer of ownership of these objects, termination of this Agreement or the expiry of its validity.

Article 10

1. This Agreement shall enter into force on signature and shall remain in force for a period of five years. The Agreement shall be extended for additional five-year periods on written agreement between the Parties at the expiry of each five-year period.
2. Each Party may inform in writing the other Party of its intention to denounce this Agreement at any time. The Agreement shall cease to have effect six months after written notice of denunciation has been received from either of the Parties through diplomatic channels.
3. At the expiry of the validity of this Agreement the Parties shall consult each other concerning the conclusion of projects started during the period when the Agreement was in effect.

Done in the city of Moscow, this day of May 1998 in duplicate, in the Russian, Norwegian and English languages, all three texts being equally authentic. In case of any divergences of interpretation of the texts in Russian and Norwegian, the text in English shall prevail.

For the Government of the Russian Federation	For the Government of the Kingdom of Norway

2) The MNPR Agreement (draft)

DRAFT
FRAMEWORK A G R E E M E N T
on a Multilateral Nuclear Environmental Programme in the Russian Federation

The Parties to this Agreement,

Noting the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management of 5 September 1997 (hereinafter referred as the "Joint Convention");

Noting that the Joint Convention stipulates that spent fuel and radioactive waste within military or defence programmes should be managed in accordance with the objectives stated in that Convention even though they are excluded from that Convention except as provided in Article 3 thereof;

Noting also the Convention on Nuclear Safety of 20 September 1994;

Recalling the importance the Joint Convention attaches to international co-operation in enhancing the safety of spent fuel and radioactive waste management through bilateral and multilateral mechanisms;

Reaffirming the importance the Parties attach to the principles embodied in relevant international conventions on nuclear liability for the provision of international assistance in this field;

Recognizing the work of the Contact Expert Group for International Radwaste Projects established under the auspices of the International Atomic Energy Agency to deal with issues regarding international co-operation in radioactive waste management and related issues in the Russian Federation, and its contribution to the development of a comprehensive International Action Plan;

Desiring to facilitate practical co-operation to enhance the safety of spent fuel and radioactive waste management in the Russian Federation, in particular through the implementation of projects in the Russian Federation that may be identified by the Contact Expert Group for International Radwaste Projects;

Recalling the Declaration of Principles by members and observers of the Barents Euro-Arctic Council representing Denmark, Finland, France, Germany, Iceland, Italy, the Netherlands, Norway, Poland, the Russian Federation, Sweden, the United Kingdom and the United States regarding the Multilateral Nuclear Environmental Programme in the Russian Federation signed at Bodø (Norway) on 5 March 1999 in which the participants declared their readiness to negotiate a multilateral framework agreement covering the necessary conditions for the provision of international assistance in this field;
have agreed as follows:

Article 1. Multilateral Nuclear Environmental Programme in the Russian Federation (MNEPR)

1. The Parties hereby establish a framework to facilitate co-operation in the area of safety of spent nuclear fuel and radioactive waste management in the Russian Federation. This framework shall be referred to as the "Multilateral Nuclear Environmental Programme in the Russian Federation" (MNEPR). The MNEPR

shall apply to projects undertaken between Contributors and Recipients or any other form of co-operation agreed by them. It may also apply to projects or any other form of co-operation in other areas of nuclear activities, including nuclear safety, if so agreed by the Parties concerned.

2. Assistance activities under the MNEPR shall seek to avoid duplication of, and shall be complementary to, activities under other multilateral or bilateral funds, agreements, mechanisms or arrangements.

Article 2. Definitions

For the purposes of this Agreement the following terms shall have the following meaning:

Technical aid (assistance): Any form of gratuitous aid and/or contribution provided under this Agreement or under any Implementing Agreement, or otherwise agreed to by the Russian Party and the Contributing Party or Parties (hereinafter referred to as "Assistance").

Contributor: Any Party other than the Russian Party or any entity authorized by such Party to provide Assistance under the MNEPR.

Implementing Agreement: An agreement between one or more Recipients and one or more Contributors for the provision of Assistance for the realization of a project under the MNEPR.

Recipient: The Russian Party or any other Russian entity authorized by the Russian Party to serve as beneficiary of Assistance and partner for the realization of a project under the MNEPR.

Article 3. Modes of co-operation under the MNEPR

1. Assistance under the MNEPR may be provided through:
   (a) Implementing Agreements between one or more Recipients and any one of the Contributors (Bilateral mode);
   (b) Implementing Agreements between one or more Recipients and several Contributors whereby a common financing arrangement will not be established (Multilateral simple mode);
   (c) Implementing Agreements between one or more Recipients and several Contributors whereby a common financing arrangement will be established (Multilateral fund mode);

Or (d) any other mechanism agreed by the Recipient(s) and Contributor(s) concerned.

2. Except as otherwise provided in this Agreement, the terms and conditions of this Agreement shall apply to all Assistance provided under paragraph 1. The provisions of this Agreement may also apply to activities undertaken before its entry into force if so agreed by the Parties involved in those activities.

3. The provision of Assistance by the Contributors under this Agreement shall be subject to availability of appropriated funds.

Article 4. MNEPR Committee

1. To facilitate co-operation and to exchange information under the MNEPR, the Parties hereby establish the MNEPR Committee. The MNEPR Committee shall be composed of one authorized official/governmental representative of each of the Parties, who shall also serve as a contact point for all questions of relevance to the MNEPR.

2. The MNEPR Committee may, discuss the development and implementation of projects and any other form of cooperation under this Agreement; discuss relevant activities under other bilateral or multilateral agreements or arrangements; co-ordinate funding for projects under Article 3.1 (c); identify obstacles and problems encountered in the implementation of projects, and make recommendations regarding their resolution; establish working groups as required for the functioning of the MNEPR Committee;
   discuss and make recommendations on other matters relevant to the operation of MNEPR activities;
   invite States, intergovernmental organisations or regional economic integration organizations being subject to public international law to accede in accordance with Article 16.
3. The MNEPR Committee shall adopt its Rules of Procedure.
4. The MNEPR Committee shall elect two chairmen for twelve-month periods from among representatives of the Parties, one from among the Contributing Parties and one representing the Russian Party.
5. The MNEPR Committee may decide to admit as Observers any interested State, inter-governmental organisation or regional economic integration organization being subject to public international law not party to the Agreement. Where a Co-ordinator has been designated according to Article 5, that Co-ordinator shall be admitted as Observer to meetings of the MNEPR Committee, where relevant.
6. Decisions and recommendations of the MNEPR Committee shall be made by consensus.

Article 5. Co-ordinator of multilateral funding under the MNEPR

1. The Contributing Parties to a common financing arrangement, as referred to in Article 3.1(c), may designate a Co-ordinator for such an arrangement.
2. The rights and obligations of the Contributing Parties under this Agreement apply equally to the Co-ordinator where the Co-ordinator performs activities on behalf of the Contributors.

Article 6. Specific undertakings

1. The Parties shall promote activities necessary for the implementation of projects under the MNEPR.
2. The Russian Party shall ensure the prompt issuance of, inter alia, licences, permits, approvals and the prompt customs clearances necessary for the efficient implementation of projects. The Russian Party shall ensure the provision of data and information necessary for the implementation of specific projects within the framework of this Agreement. The Russian Party shall grant access to plants, sites and facilities necessary for the implementation of specific projects within the framework of this Agreement. Should such access be restricted according to the provisions of the legislation of the Russian Federation, mutually acceptable procedures shall be developed in the Implementing Agreements. The Implementing Agreements shall also define the procedures for, and the scope of, the information to be transferred.
3. The provision of Assistance shall be complemented by Russian resources. Such resources may be contributed in-kind or otherwise for the implementation of projects under the MNEPR.

Article 7. Claims, Legal Proceedings and Indemnification

1. This Agreement is supplemented by a Protocol containing provisions on claims, legal proceedings and indemnification in respect of claims against Contributors and their personnel or contractors, subcontractors, consultants, suppliers or subsuppliers of equipment, goods and services at any tier and their personnel, for any loss or damage of whatsoever nature arising from activities undertaken pursuant to this Agreement.
2. The Protocol and its Annex shall not apply to any Party that does not become a party to the Protocol.

3. Any Party that does not become a party to the Protocol may conclude with the Russian Party a separate agreement covering claims, legal proceedings and indemnification in respect of claims for any loss or damage of whatsoever nature arising from activities undertaken pursuant to this Agreement.

Article 8. Use and retransfer of Assistance

1. Unless the written consent of the Contributor has first been obtained, the Recipient shall not transfer title to, or possession of, any Assistance provided pursuant to this Agreement to any entity, other than an officer, employee or agent of that Contributor or that Recipient and shall not permit the use of such Assistance for purposes other than those for which it has been furnished.
2. The Russian Party shall take all reasonable measures within its power to ensure the security of, ensure the appropriate use of, and prevent the unauthorised transfer of Assistance provided pursuant to this Agreement.

Article 9. Exemption from taxes or similar charges

1. The Russian Party shall exempt Assistance provided under this Agreement from customs duties, profits taxes, other taxes and similar charges. The Russian Party shall take all necessary steps to ensure that no local or regional taxes are levied on Assistance provided under this Agreement. These steps will include the provision of letters from competent local and/or regional authorities confirming that no taxes will be levied on Assistance provided under this Agreement. Such letters of confirmation covering localities and regions where projects under this Agreement will be carried out shall be deposited with the Depositary before the start of implementation of the projects.
2. The Russian Party shall exempt remuneration to foreign citizens and to other persons not ordinarily resident in the Russian Federation for work undertaken and services performed by such persons for the implementation of this Agreement from income tax, social security tax contributions, and similar charges.
3. The Contributing Parties and their personnel, their contractors, subcontractors, suppliers and subsuppliers may import into, and export out of, the Russian Federation equipment, supplies, materials or services required to implement this Agreement. In addition to the provisions regarding Assistance, temporary importation and exportation shall not be subject to customs duties, license fees, undue restrictions, taxes or similar charges.
4. The Parties agree that no project will be initiated or continued if Assistance under that project will be subject to taxation in the Russian Federation. Such taxation is a valid reason for suspension of that project.
5. In addition to the preceding paragraphs, persons and entities participating in the implementation of the programmes in the framework of this Agreement within the territory of the Russian Federation are entitled to tax exemption in regards to equipment and goods purchased within the territory of the Russian Federation for the implementation of the projects or the programmes in the framework of this Agreement, as well as works done and services rendered within the territory of the Russian Federation.
6. The Russian Party shall be responsible for procedures ensuring the implementation of this Article. Necessary certificates shall be issued by the relevant competent authority.

Article 10. Accounts, Audits and Examinations

1. Each Recipient shall maintain proper accounts of all Assistance funding received from Contributors, and furnish such accounts, together with full supporting documentation, to the Contributor or Contributors concerned at regular intervals, as specified in the relevant Implementing Agreement or otherwise agreed.
2. Upon request, representatives of a Contributor shall have the right, within sixty days of making the request, to examine the use of any Assistance provided by that Contributor in accordance with this Agreement, at sites of their location or use if possible, and shall have the right to audit and examine any and all related

records or documentation for a period of seven years after the completion or early termination of the project in question, unless another period is specified in the Implementing Agreement. The practical details of such audits and examinations shall be set out in the Implementing Agreements.

Article 11. Intellectual Property

The Parties shall provide in Implementing Agreements, as appropriate, effective protection and allocation of rights to intellectual property transmitted or created under this Agreement.

Article 12. Status of personnel and entry and exit of personnel

1. The Russian Party shall facilitate the entry and exit of employees of the Contributing Parties to this Agreement and their personnel and contractor, subcontractors, consultants, suppliers and subsuppliers and their personnel into and out of the territory of the Russian Federation for the purpose of carrying out activities in accordance with this Agreement.
2. The Russian Party shall accredit military and civilian personnel of the Contributing Parties, including employees of the Commission of the European Communities present in the territory of the Russian Federation in order to carry out activities related to the provision of Assistance under this Agreement, as administrative and technical personnel of the respective diplomatic missions, the mission of the Commission of the European Communities and the missions of intergovernmental organizations, in the Russian Federation. After entry into force of this Agreement, the Parties will consult on the number of such personnel covered by this provision. The accreditation of such personnel shall have no effect on the number of accredited personnel permitted at Russian diplomatic missions in the Contributing Parties.
3. The Russian Party guarantees that the contractors, subcontractors, consultants, suppliers, subsuppliers and their personnel as referred to in paragraph 1 may import and re-export out of the territory of the Russian Federation all of their personal household effects as well as foodstuffs for their personal use without being liable to any customs duties, taxes, or charges having equivalent effect. Duty-free import into and re-export out of the Russian Federation of one motor vehicle per family is allowed, provided that the vehicle is used only within the period of the relevant contract and is re-exported at the end of this period.

Article 13. Settlement of Disputes

Any disagreement between two or more Parties concerning the interpretation of this Agreement, or its implementation, shall be resolved through consultations. Consultations shall take place not later than three months after one of the Parties submits such a request in writing to the other Parties.

Article 14. Awarding of Contracts

In the event that a Party awards a contract for the acquisition of goods and services, including construction, to implement this Agreement, such contracts shall be awarded in accordance with the laws and regulations of that Party, or such other laws and regulations as that Party may choose. Russian companies can also be used as contractors or subcontractors.

Article 15. Modifications and Amendments

1. Any modification or amendment to this Agreement, and any additional protocol to it, may be made by agreement among the Parties to this Agreement.
2. Any modification or amendment pursuant to this Article shall be subject to ratification, acceptance or approval by all of the Parties. Modifications or amendments shall enter into force for all Parties thirty days following the date of receipt by the Depositary of the last notification of ratification, acceptance or approval.

Article 16. Accession

1. This Agreement shall be open for accession by any State, inter-governmental organisation or regional economic integration organization being subject to public international law upon invitation by the MNEPR Committee.
2. The Agreement shall enter into force for the acceding party thirty days following the date of receipt by the Depositary of the acceding party's instrument of accession and the last of the notifications by the Parties expressing concurrence.

Article 17. Depositary

The Secretary General of the Organisation for Economic Co-operation and Development is hereby designated as the Depositary. The Depositary shall fulfil its duties in accordance with Article 77 of the Vienna Convention on the Law of Treaties adopted on 23 May 1969.

Article 18. Entry into force, duration, withdrawal and termination.

1. This Agreement shall be subject to ratification, acceptance or approval. Instruments of ratification, acceptance or approval shall be deposited with the Depositary. It shall enter into force on the thirtieth day following the date of receipt by the Depositary of such instruments by the Russian Party and one other Signatory, and shall remain in force for a period of five years from that date. For each Signatory depositing such an instrument thereafter, this Agreement shall enter into force for it thirty days following the receipt by the Depositary of such instrument and shall remain in force until the expiration of its original five year period.
2. This Agreement shall be renewed automatically for further periods of five years unless a Party requests the Depositary at least ninety days before the expiration of the five year period to convene a meeting of the Parties to consider the termination, modification or amendment of this Agreement.
3. Any Party may withdraw from this Agreement upon ninety days written notification to the Depositary. The MNEPR Committee shall immediately be seized of the matter and shall make recommendations to the Parties on the further continuation of the Agreement.
4. The obligations under Article 8, Article 9 [first] [second,] third, fourth [fifth] and sixth paragraph, Articles 10 and 11, Article 12 first and third paragraph, and Article 13 of this Agreement shall remain in effect regardless of any subsequent transfer of ownership of the object of co-operation, and regardless of any termination of, or withdrawal from, this Agreement, or the expiry of its validity.
5. Notwithstanding any termination of this Agreement, it shall continue to apply to any Implementing Agreement which the Parties to such Implementing Agreement agree to continue, for the duration of such Implementing Agreement.
6. Where a Party withdraws from this Agreement but continues to be a Party to an Implementing Agreement, this Agreement shall continue to apply to such Party with respect to its participation in such Implementing Agreement.

Done at on in one original in the English, French and Russian languages, all texts being equally authentic. In the event of any dispute or divergence in relation to this Agreement the English text shall prevail for the purposes of interpretation.