# PROTECTING AGAINST THE SPREAD OF NUCLEAR, BIOLOGICAL, AND CHEMICAL WEAPONS

# PROTECTING AGAINST THE SPREAD OF NUCLEAR, BIOLOGICAL, AND CHEMICAL WEAPONS

*AN ACTION AGENDA FOR THE GLOBAL PARTNERSHIP*

## Volume 3: International Responses


Project Directors
Robert J. Einhorn
Michèle A. Flournoy



Principal Project Sponsor
Nuclear Threat Initiative,
Washington, D.C.




January 2003

# About CSIS

For four decades, the Center for Strategic and International Studies (CSIS) has been dedicated to providing world leaders with strategic insights on—and policy solutions to—current and emerging global issues.

CSIS is led by John J. Hamre, former U.S. deputy secretary of defense. It is guided by a board of trustees chaired by former U.S. senator Sam Nunn and consisting of prominent individuals from both the public and private sectors.

The CSIS staff of 190 researchers and support staff focus primarily on three subject areas. First, CSIS addresses the full spectrum of new challenges to national and international security. Second, it maintains resident experts on all of the world's major geographical regions. Third, it is committed to helping to develop new methods of governance for the global age; to this end, CSIS has programs on technology and public policy, international trade and finance, and energy.

Headquartered in Washington, D.C., CSIS is private, bipartisan, and tax-exempt. CSIS does not take specific policy positions; accordingly, all views expressed herein should be understood to be solely those of the author(s).

This publication has been principally supported with funds from the Nuclear Threat Initiative. Its contents represent the views, findings, and opinions of the authors and are not necessarily those of the Nuclear Threat Initiative.

**Cover Photo Credit**
Globes
©Kenny Johnson/Gettyimages



*Library of Congress Cataloging-in-Publication Data*
Protecting against the spread of nuclear, biological, and chemical
weapons : an action agenda for the global partnership / project directors,
Robert J. Einhorn, Michèle A. Flournoy.
p. cm.—(CSIS report)
Includes bibliographical references.
Contents: v. 1. Agenda for action—v. 2. The challenges—v. 3.
International responses—v. 4. Russian perspectives and priorities.
ISBN 0-89206-418-8 (set : alk. paper)—ISBN 0-89206-419-6 (v. 1 : alk. paper)—
ISBN 0-89206-420-X (v. 2 : alk. paper)—ISBN 0-89206-421-8 (v. 3 : alk. paper)—
ISBN 0-89206-422-6 (v. 4 : alk. paper)
1. Arms control. 2. Weapons of mass destruction.
I. Einhorn, Robert J. II. Flournoy, Michèle A. III. Center for
Strategic and International Studies (Washington, D.C.) IV. Series.
JZ5665.P76 2003
327.1'745—dc21 2002155212

**The CSIS Press**
Center for Strategic and International Studies
1800 K Street, N.W., Washington, D.C. 20006
Telephone: (202) 887-0200
Fax: (202) 775-3199
E-mail: books@csis.org
Web site: http://www.csis.org/

# Contents

# About the Project

Since the end of the Cold War, the United States, Europe, and others have worked with the successor states of the Soviet Union to account for, secure, and dismantle nuclear, biological, and chemical weapons, agents, materials, and infrastructure, as well as to help former weapons scientists and specialists reintegrate into civilian work. In large part, these programs have been successful, but there is much unfinished business.

In June 2002, leaders of the Group of Eight (G-8) nations announced a global partnership against the spread of weapons and materials of mass destruction. In the words of former U.S. senator Sam Nunn, "This global partnership represents a major step in the right direction in terms of how the United States and its partners and allies must work together to prevent dangerous groups from gaining control of the most dangerous materials—materials that could be used to carry out catastrophic terrorism."

The project—Strengthening the Global Partnership: Protecting against the Spread of Nuclear, Biological, and Chemical Weapons—seeks to reinforce and expand upon the objectives of the G-8's Global Partnership against the Spread of Weapons and Materials of Mass Destruction, by advancing support in Europe, Asia, and North America for assistance programs aimed at reducing the threats posed by nuclear, biological, and chemical weapons and materials.

Over the last year, CSIS has led a consortium of 15 influential policy research organizations in Europe, North America, and Asia as part of a three-year project, sponsored by the Nuclear Threat Initiative (NTI), aimed at strengthening future threat reduction efforts. The consortium has concluded a major assessment, published here, that identifies shortfalls and lessons learned from existing threat reduction programs; recommends future programmatic objectives; and proposes how best to accomplish the remaining tasks.

Based on the findings and recommendations of this study, during the second phase of the project, consortium partners will actively reach out to key constituencies—government officials, parliamentarians, journalists, scholars, and other opinion leaders—to promote governmental and public support for the goals outlined by the G-8 in June 2002 and, in particular, to ensure that the Global Partnership's ambitious funding target ($20 billion over 10 years) is met.

This four volume set, entitled *Protecting against the Spread of Nuclear, Biological, and Chemical Weapons: An Action Agenda for the Global Partnership,* is designed to assist the reader in assessing threat reduction programs to date and identifying priorities for the future. The assessment consists of four volumes:

Volume 1: Agenda for Action
Volume 2: The Challenges
Volume 3: International Responses
Volume 4: Russian Perspectives and Priorities

For more information on the project, please visit our Web site at <http://www.csis.org/isp/sgp/index.htm>

## Project Partners

Canada—Centre for Security and Defence Studies, Carleton University
European Union—EU Institute for Security Studies
France—Fondation pour la Recherche Stratégique
Germany—Stiftung Wissenschaft und Politik
International—Stockholm International Peace Research Institute
International—International Institute for Strategic Studies
Italy—Landau Network–Centro Volta/Union Scienziati Per Il Disarmo
Japan—Japan Institute of International Affairs
Netherlands—Netherlands Institute of International Relations "Clingendael"
Norway—Norwegian Institute of International Affairs
Russia—PIR Center for Policy Studies in Russia
Russia—Institute of World Economy and International Relations (IMEMO)
Sweden—Swedish Institute of International Affairs
United Kingdom—Centre for Defence Studies, King's College London
United States—Center for Strategic and International Studies

CHAPTER 1

# Canada

*John B. Hay*
Centre for Security and Defence Studies, Carleton University

Peacefully sheltered in Canada's Rocky Mountain foothills, Kananaskis seemed far distant from the menace of terrorism or nuclear calamity. But the G-8 summit of 2002 marked a potentially important advance in cooperative threat reduction (CTR) in Russia—and signaled a dramatic expansion in the scale of Canada's own CTR engagement.[1]

In truth, the setting was fitting. Canadian participation in CTR with Russia, Ukraine, and the other former Soviet states has been framed from the start in a succession of G-7/8 pronouncements and arrangements. Multilateralism has remained since 1992 the constant and prevailing characteristic of Canadian contributions to cooperative threat reduction. Taking Canada's turn in the G-8 chair for 2002, Prime Minister Jean Chrétien was practicing customary Canadian brokerage diplomacy as he and his officials struggled to assemble a complex G-8 compromise on counterterrorism, nuclear nonproliferation, and the suppression of chemical weapons.

After months of hard bargaining (and a last-hour meeting between Presidents George W. Bush and Vladimir Putin), the Kananaskis summit finally proclaimed agreement in the "G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction." It was an extraordinary accord, not least in the explicitly detailed conditions it placed on Russia's new and full inclusion in the G-8 itself. And it carried threefold significance for Canadian CTR policy. First, it suggested future Canadian CTR priorities—namely, the four "priority concerns" specified by the G-8 leaders' statement: destruction of chemical weapons; dismantlement of

1. Primary sources for this chapter consist chiefly of Canadian government documents and interviews in August and September 2002 with Canadian government officials. (Published scholarly material on Canadian CTR activity is remarkably sparse and fragmentary.) Officials spoke on the usual condition of anonymity. The most significant of the open Canadian government documentation can be found online. Various G-8 documents are accessible at <http://www.G8.gc.ca/>. Material on Canadian arms control, nuclear safety, and MOX policies is available from the Department of Foreign Affairs and International Trade at <http://www.dfait-maeci.gc.ca/nndi-agency/>. Some scholarly commentary and documentation on G-7/8 summitry, with helpful links, can be found at <http://www.G7.utoronto.ca/>. The Canadian government's response to the 1998 Commons Committee report, "Canada and the Nuclear Challenge," can be found at <http://www.dfait-maeci.gc.ca/nucchallenge/ANNEXB-e.htm>.

decommissioned nuclear submarines; disposition of fissile materials; and employment of former weapons scientists. Second, the statement committed Canada implicitly to enlarge its CTR investment substantially. And third, the G-8 accommodation demonstrated some of the limits and opportunities of Canada's middle-power, multilateral CTR approaches.

In describing the Canadian experience in cooperative threat reduction, analyzing its origins and outcomes so far, and outlining priorities and prospects for imminent Canadian government action, two defining features emerge besides the multilateral nature of Canada's involvement. First, the Canadian financial commitment over some 10 years has been remarkably modest: C$120.3 million (roughly U.S.$77.6 million) for the Canadian nuclear program in Central and Eastern Europe, committed in the years 1992 to 2002, for disbursements scheduled to be completed in 2007. The second noteworthy feature of the Canadian program is that most of it—C$97 million—has been allocated not to Russia but to Ukraine. Explanations for the size and direction of Canadian commitments are explored below, in part to emphasize the change in Canadian policy signified by the Kananaskis "partnership."

## Threat Assessments and Responses

By 1992, when G-7 leaders gathered in Munich, the compounding risks growing in post-Soviet civil and military nuclear operations were already desperately evident. At the time, Canadian officials shared the generally accepted G-7 threat assessment, and that assessment has scarcely varied since. The 1986 Chernobyl accident and its aftermath had given appalling proof of the dangers. Soviet-built facilities were decrepit and decaying; management and physical security systems were increasingly and alarmingly undependable; and stocks of fissile material (some from decommissioned nuclear arsenals) represented a mounting risk. Altogether the threats divided into three broad categories: reactor accidents; leakage of fissile (and chemical weapons) materials and equipment, leading to proliferation; and the feared brain drain of nuclear experts, simultaneously raising the risk of proliferation elsewhere while depleting management and security capacities in Russia and the Newly Independent States (NIS).

The G-7 in Munich responded with joint commitments of funds and advice, in which Canada took part from the start. Initial Canadian contributions concentrated on analyses of reactor safety, regulatory reform, and plutonium disposition. The main objectives, shared in other G-7 governments albeit with varying degrees of priority, were to enhance the security of aging reactors until they could be closed; foster the creation of competent, independent regulatory agencies in a culture focused on safety; and help Ukraine close Chernobyl safely and quickly. To those ends (and others) the G-7 in 1992 established its own nuclear safety working group, on which Canadians have taken part ever since.

With a population and economy about one-tenth the size of the United States or Europe, Canada was never likely to rank among the biggest or most influential participants negotiating and executing CTR with Russia and its nearby neighbors.

(Nor does Canada share the geographic proximity and local familiarity that shapes policy in similarly endowed Nordic countries, with which Canada frequently aligns itself.) On the other hand, Canadian attitudes and skills are informed by 50 years of vigorous nonproliferation diplomacy, a long-standing civil nuclear program, pre-1992 contributions to Chernobyl recovery—and an urgent, shared interest both in suppressing weapons of mass destruction and supporting peaceful political and economic transformation in Russia and the NIS.

These factors (and institutional/political habit) go far to explain why nearly all Canadian engagement in CTR has been conceived and conducted multilaterally. These were the approaches and techniques that promised maximum effect from the modest means at Canada's disposal—inducing others to do in combination what Canada could not hope to do alone.

But why mostly in Ukraine, instead of Russia? One reason is that closing and securing Chernobyl would itself consume enormous resources, and even before 1992, Canada had been sharing that effort. Another reason, Canadians acknowledge, was that Russians resisted interventions by nonnuclear-weapons states—no matter how benignly motivated. Redefining their own post-Soviet identity themselves through their national crises of the 1990s, Russian authorities preferred the reputational and other gratifications of dealing with the superpower in Washington, especially on questions defined as strategically sensitive. A third reason for the Ukraine focus was peculiar to Canadian domestic politics: some 1.2 million Canadians claim Ukrainian roots, and long and significant bilateral financial and political relationships have developed as a consequence. (Canada was first in the West to recognize Ukraine's post-Soviet independence.) If Russians were reluctant to accept Canadian aid in many nuclear matters, Ukrainians were more welcoming.

## Program Profile and Funding History

A short summary of Canadian funding commitments to nuclear programs in Central and Eastern Europe—almost every one of them coincident with G-7/8 summits—suggests both the objectives and content of Canadian policy.

### For Russia:

- 1992 (G-7 Munich summit): C$16.3 million committed, mainly for nuclear safety and engineering assistance; regulatory cooperation; a plutonium disposition study; and contributions to a first tranche for the Nuclear Safety Account of the European Bank for Reconstruction and Development (EBRD). Implementing agencies included Atomic Energy of Canada Ltd. (AECL), a Crown corporation, and the Canadian Nuclear Safety Commission (CNSC)—formerly the Atomic Energy Control Board—Canada's nuclear regulatory agency. These project commitments are now spent. But cooperation with Russia continues—particularly at the policy level, where encouraging a safety culture in nuclear operations and regulation remains a priority.

### For Ukraine:

- 1992 (G-7 Munich): C$1.3 million, for radiation surveys and regulatory cooperation. Implementers included AECL and CNSC.
- April 1994: C$25.0 million, of which C$6.1 million was for Chernobyl remediation and C$15.4 million for the Science and Technology Center in Ukraine—reemploying nuclear scientists. Implementers included Ontario Hydro, Environment Canada (a Canadian government department), and the University of Manitoba.
- July 1994 (G-7 Naples): C$19.5 million, of which C$12 million was for the EBRD Nuclear Safety Account and C$7.3 million for hydro/thermo power rehabilitation. Implementers: Hydro-Quebec and Saskatchewan Power.
- June 1997 (G-7 Denver) and July 2000 (G-7 Berlin): U.S.$33 million (about C$51.2 million) pledged for the Chernobyl Shelter Implementation Plan (SIP) over 10 years through the EBRD. These SIP disbursements are scheduled to be completed in 2007 and are principally for securing the sarcophagus around Chernobyl Unit 4.

Thus, the funding commitment to Russia and Ukraine totals C$113.3 million. A further C$7 million has been committed to various smaller Canadian contributions, including reactor analyses and strengthening regulatory agencies in Lithuania, Bulgaria, Hungary, Slovakia, and the Czech Republic.

The grand total for Canadian nuclear safety commitments or pledges is C$120.3 million, of which about 60 percent has been allocated to the EBRD's Nuclear Safety Account and its Chernobyl Shelter Implementation Plan. By 2002 the SIP allocation was one of two Canadian project commitments not yet completed; it was due to receive C$6 million yearly until completion in 2007. The other commitment still outstanding, Canada's contribution to the Science and Technology Center in Ukraine, is to be completed in 2004–2005.

In addition, Canada announced in early 2002 a C$5 million one-time contribution to Russia for infrastructure aspects of chemical weapons destruction. By late 2002 detailed plans for that spending were still under discussion with Russian authorities.

## Testing MOX

In 1996, at the G-8 Moscow summit on nuclear safety and security, Prime Minister Chrétien announced Canadian agreement in principle to consider using U.S. and Russian weapons-grade plutonium as fuel in Canadian reactors. Since then, no part of Canada's CTR activity has aroused more intense public controversy. (In fact, Canadian public opinion on these questions has otherwise been rarely heard.) By late 2002, however, it appeared that the issue so earnestly contested in Canada might yet be rendered moot by dwindling interest in Washington and Moscow.

The logic underlying Chrétien's announcement was simple enough. Weapons-grade plutonium, drawn from dismantled U.S. and Russian warheads, would be

converted to plutonium oxide and combined with uranium oxide as fuel in Canadian Candu reactors. MOX (mixed oxide) fuel would serve to generate electricity in Canada—and Canada would thereby make a practical contribution to nuclear arms reduction and nonproliferation.

Nor was the engineering especially novel. In normal operation, some of the ordinary natural uranium fuel in the heavy-water Candu is transformed into Pu-239; about half the energy produced by regular Candu fuel is generated by plutonium. Spent fuel from MOX would resemble normal Candu spent fuel. Even though the proportion of plutonium in it would be somewhat higher than the usual 0.3 percent (but not exceeding 1 percent), the MOX process would still yield a net reduction in plutonium at the end of the fuel cycle. This reduction in volume, along with the dilution of the plutonium in other isotopes and the high radiation levels of discharged fuel bundles, would arguably make weaponizing used MOX fuel more risky, technically harder, and more costly than alternatives. All of which would mean that weapons-grade plutonium run through Canadian Candu reactors would be less attractive to proliferators—and less accessible under the safeguards that apply to all Canadian reactors.

MOX studies were under way even before the prime minister's Moscow intervention. AECL and Ontario Hydro had been working on MOX with U.S. and Russian experts since 1994, concluding by 1996 that further tests were justified. In December 1996, the U.S. Department of Energy, which had sponsored the original feasibility studies at AECL and Ontario Hydro, reaffirmed the MOX-Candu scheme as one of two possible plutonium-processing options. (The other was vitrification or ceramic immobilization.) Meanwhile, a parallel Russian-Canadian study had been launched into the potential for fabricating MOX bundles in Russia for shipment to Candu reactors; that study, conducted by AECL with Russia's MINATOM, was cofinanced by the Canadian government.

Following that Moscow summit, tests financed by the U.S. Energy Department began at AECL's research reactor at Chalk River, Ontario, with fuel bundles manufactured from Russian and U.S. plutonium. Canadian authorities have said these tests will take several years to ascertain the technical feasibility and economic viability of a commercial MOX fuel program. (There is no Canadian government subsidy intended for any long-run use of MOX.) Authorities also insist that any eventual MOX fuel program would first have to meet all federal and provincial health, safety, transport, security, and environmental requirements, including full opportunity for public consultation.

The tests have nonetheless ignited a noisy and recurrent (though it must be said, sporadic) opposition to the whole MOX project. Hostility is grounded mostly on environmental/health hazards and on doubts as to the proposal's utility as a contribution to nonproliferation or arms control. In December 1998, the Foreign Affairs Committee of the House of Commons—controlled by members of the governing Liberal Party—went so far as to recommend that the government "reject the idea of burning MOX fuel in Canada because this option is totally unfeasible . . . ." This recommendation, included in a wide-ranging report on disarmament and nonproliferation, amounted to an extraordinarily explicit challenge from the government's own members of Parliament. But the government expressly and formally

refused the committee's recommendation in April 1999, repeating that MOX "is viewed internationally as a feasible option and could make a valuable contribution" to the safe disposal of weapons-grade plutonium.

In any case, the option's future may be overtaken by events. Canadian officials in late 2002 said MOX test results could be expected in 2003. But there was already a sense that interest in the Candu plan was by now declining in Moscow and Washington. The role of Canada as a trusted third party seemed less urgent than previously, insofar as U.S.-Russian relationships were improving particularly after the terrorist attacks of September 11, 2001. In addition, Russia's own capacity for processing plutonium was beginning to look more promising. Regardless of ultimate MOX test results, there was now only a receding probability that Russia would be asking for any long-term MOX commitment from Canada.

## Canada's Comparative Advantage: Assets and Limitations

Even if the MOX experiment were not to lead to commercial use of weapons-grade plutonium in Canadian reactors, the episode does illustrate a significant Canadian asset in CTR collaboration: its reputation as a trustworthy and competent interlocutor in negotiation. Chrétien's intercession in 1996, with the offer to test MOX fuel, may have served in a modest way to facilitate Russian-U.S.-European agreement. National reputations are hard to measure, easy to exaggerate, and readily lost. But it is at least plausible that skilled Canadian intervention from time to time has had a productive effect in multilateral settings. (At and after the 1995 G-7 summit in Halifax, for example, Chrétien was instrumental in concluding a three-way memorandum of understanding between the G-7, European Union, and Ukraine on the closure of Chernobyl.)

Reputation in this case consists of more than diplomatic art. Canadian governments can properly claim an authentic interest, history, and competence in the realms of arms control, nuclear nonproliferation, and the technology, management, and safe regulation of civilian nuclear reactors. Canada has been an energetic adherent to the Nuclear Non-Proliferation Treaty and was first to sign the 1991 Convention on Nuclear Safety. There is, moreover, the reputational value of Canada's own domestic political, constitutional, and economic arrangements—stable, democratic, and successful. It is not a bad thing, when advising others how to govern their affairs, to show proof of efficacy.

In comparison to some other countries, Canada has also enjoyed the advantage of considerable institutional coherence and consistency. There have not been the bureaucratic-political strife and reversals common in Washington, or the instabilities of coalition politics familiar in some European capitals. In the smaller, simpler Ottawa environment, decisions are easier to reach and easier to carry out. (This is true for reasons of political culture and institutional structure, and truer still because the Liberal Party by 2002 had commanded uninterrupted parliamentary majorities since 1993.) Coherence also derives from the practiced relationships that

have matured among domestic political, legal/regulatory, and corporate entities—including electric utilities and reactor operators owned by provincial governments.

A single small qualifier here deserves mention. In 1995 the foreign affairs minister of the day (André Ouellet) removed project-execution responsibility for all economic and technical cooperation in Central and Eastern Europe from the Department of Foreign Affairs and International Trade (DFAIT) and placed it in the Canadian International Development Agency (CIDA). Policy formulation and diplomacy remained in DFAIT; project delivery and accountability for the results were left to CIDA. The change had two explanations. First, project delivery was and is CIDA's forte as an aid agency, not DFAIT's. The second (and unadmitted) explanation was that Ouellet was happy to reduce DFAIT's involvement in an area that was already causing dissension within the department. But it is fair to say that CIDA managers have never been wholly or unanimously comfortable with these European obligations, which did not automatically coincide with CIDA's concentration on developing countries.

An unintended effect of this arrangement (aside from periodic disagreements between CIDA and DFAIT) might have been to depress total Canadian spending on CTR in Russia and the NIS. Formally, there has been no competition between CTR commitments and Official Development Assistance allocations; the two are separate for government accounting purposes. Still, successive CIDA ministers and their senior officials would be understandably reluctant to argue for bigger spending in Europe while government spending on their own core interest—development in poor countries—was suffering repeated budget cuts. DFAIT, with other priorities and no direct hand in project operations, had not much incentive to enrich CIDA's CTR budget. In short, CTR had no dependable or powerful advocate in the yearly competition for scarce government resources—except, that is, when the prime minister himself seized the brief.

The disadvantages Canada has brought to CTR are rather obvious and easily summarized: a middle power's relatively small pool of expertise in the making of both foreign and nuclear policy; limited available financing, as a middle power in a decade of antideficit stringency; and a lack of standing, as a nonnuclear-weapons state, in dealing with Russia on subjects touching nuclear arms and remnant superpower sensitivities.

Returning once more to the resource issue, it is worth adding that scant funding is not just an operational constraint (of the kind that every government almost always faces). Canadian officials, in this and other foreign and defense policy fields, are alert to the danger that chronic discrepancies between Canadian attempts at influence and actual Canadian spending on results will expose the government to suspicions of hypocrisy. This danger itself has represented a limit on Canadian participation, since commitments and recommendations have always to be hedged within the confines of predictably deliverable resources.

## Judging Outcomes

Even by the ordinarily mobile standards of foreign policy evaluation, it is exceptionally hard to assess reliably and independently the outcomes of Canada's CTR engagement. For one thing, all governments treat nuclear questions secretively—the Russian and Ukrainian governments no less than others. In addition, confusion and misinformation are inherent elements of the threat-reduction problem in Russia and the NIS. There is also the long lag between policy cause and practical effect, complicated by the usual uncertainties of diagnosing causal connections. Finally, in the Canadian case, it is impossible to distinguish national outcomes from the joint (and interacting) outcomes of all the many-sided partnerships in CTR over a decade and more.

In Ukraine—the focus of Canadian activity—Canadian officials themselves credibly describe performance as persistently difficult. Some progress has been recorded. At Chernobyl, for instance, radiation-waste treatment and storage facilities were due for completion at the end of 2003. (The reactor operation itself was closed in December 2000.) The Science and Technology Center in Ukraine has been expanding operations with the active participation of Canadians. Some regulatory reforms have been accomplished.

Overall, however, conditions in Ukraine can be seen from a Canadian perspective as disappointing and frustrating. Nuclear Safety Account projects and the Chernobyl Shelter Implementation Plan have experienced serious and continuing implementation delays on the ground. No less ominously, Ukraine has made only slow progress in developing a nuclear safety culture strong enough to make the adoption and enforcement of safety standards self-sustaining.

Much of this difficulty is ascribed to an absence of political commitment, aggravated by predatory corruption and by a chaotic turnover of ministers and senior government officials. Donor governments have intervened personally with President Leonid Kuchma for action on chronic problems; for SIP and Nuclear Safety Account projects, the EBRD has been drawn into atypical project management and crisis-resolution roles. Outcomes in Ukraine seem frustrated for the most part by Ukraine's own bad governance.

Conditions in Russia were similarly difficult from 1992 to 2000 but were looking more promising in 2002. Canadian officials had detected a sudden and significant change in Russian attitudes to nuclear safety cooperation through 2001, an improvement greatly amplified after September 11. It appeared clear that President Putin had personally resolved to enhance CTR collaboration—and to strengthen relationships with the U.S. government. A virtual impasse in Russian–G-7 nuclear cooperation was consequently overcome, and an unusually constructive dialogue opened up.

Degrees of progress had already been achieved, of course. It was generally accepted that substantive safety improvements had been made to Soviet-designed nuclear plants, and the regulatory environment was better. But serious governance troubles remained, not least in contests between MINATOM and the Russian nuclear regulator. Among the internal disputes most salient to G-7 governments was the issue of closing or extending the life of Russia's older (and least safe) reac-

tors; it was partly on this point that G-7-Russian CTR relations had reached the impasse of 1998–1999, and they were still stalled two years later.

Putin's initiative through 2001 was presumably not motivated solely by the imperatives of nuclear safety. He was plainly eager for the economic and political rewards of closer relations with G-7 leaders, especially in the United States, Europe, and Japan. (On a much smaller scale, a similar incentive had earlier operated in Lithuania and Bulgaria, where governments avid for EU membership sought to enhance their credentials by agreeing to nuclear safety reforms.) At the same time, particularly after September 11, some G-7 governments relaxed their earlier demands for Russian reactor closures. There was a spreading G-7 consensus that Russian authorities were adamant in extending reactor life spans—and that cooperation on safety would serve everyone better than leaving Russia to its own devices.

It was in this fluid diplomatic context that Canada assumed the G-7/8 chair in January 2002. And it was the diplomacy of the Kananaskis summit that decisively reshaped priorities and prospects for future Canadian participation in cooperative threat reduction.

## Kananaskis and After: Priorities and Prospects for Canada

Canada's participation in cooperative threat reduction can only be understood in the dynamics of multilateral CTR negotiations and execution. This was acutely so in 2002, when Canada happened to hold the chair of the G-8 just as those eight governments were straining to define a new level of intensity in post–9/11 CTR collaboration. The challenge for Prime Minister Chrétien was to induce an accommodation of the contending interests of his guests while protecting the essentials of his own (separate and different) G-8 objectives.

President Putin arrived in Kananaskis with the evident objective of winning full and unqualified Russian privileges at the G-8 table, finally dissolving the last distinctions between G-8 and G-7. Embedded in this objective was securing a Russian place in the G-7's nuclear safety working group, set up in 1992. Russia's overarching interest was to attract G-7 investment in the political and economic transformation of Russia itself. But to accomplish this, in the aftermath of September 11, Putin had to sign Russia onto the antiterrorism campaign in ways convincing and appealing to the Bush administration. Among Putin's many problems, moreover, was a noticeable lack of enthusiastic support in much of Russia's domestic nuclear establishment.

President Bush was determined at Kananaskis to secure the G-7/8 coalition against terrorism. The United States was specifically aiming to reinforce Russia's nuclear safety (and chemical weapons) regime, particularly to prevent proliferation among terrorist organizations and terrorist-tolerant governments. The U.S. administration was therefore insisting on explicit, enforceable measures to be taken by Russia as the condition of proffered U.S.–G-7 funding for expanded CTR projects in Russia.

For his part, Chrétien's paramount objective had nothing to do with CTR or Russia. He was laboring primarily to get G-8 approval for combined action on African development—an enterprise he had spent months promoting. But under the pressure of circumstances (and of his own officials), the prime minister first needed to facilitate a U.S.-Russian agreement on nuclear and chemical weapons control—both on its own merits and to create the negotiating conditions for agreement on Africa (in which Chrétien showed markedly more interest than others in the G-8). To achieve this, Chrétien had to bring along Japanese and European leaders who had expressed their own diverse degrees of concern for Russian nuclear safety, weapons of mass destruction, and terrorism—and who themselves were coping with varied domestic political constraints.

On this issue at least, the G-8 sherpas had not been able to deliver a pre-agreement to the summit. Reaching compromise took tough bargaining at the top—among all eight leaders on the first morning at Kananaskis and in a bilateral Bush-Putin confrontation. The eight reached consensus in the end, constructed in part on Canadian suggestions. (It was said that Canadian officials helped craft the six "principles" at the heart of the G-8 "Global Partnership".)

The G-8 agreed to raise "up to" U.S.$20 billion for projects over 10 years, of which the United States would provide half. In exchange, Putin accepted what were blandly termed "guidelines" for cooperation—in fact, unusually detailed and specific conditions (audits, environmental standards, tax exemptions, procurement rules, and the like), combined with procedures for reviewing compliance.

Putin had also won for Russia a new equality in the G-8: membership on a reconstituted G-8 "nuclear safety and security group" and, as set out in a separate statement, full equality in the G-8 itself, complete with its own turn in the chair for 2006.

No attempt is made here to gauge precisely Canada's influence in this negotiated outcome. But in the course of presiding at the success, the Canadian government had informally and provisionally made a costly offer of its own: $1 billion in Canadian funding to CTR over 10 years, as a contribution to the G-8 $20 billion. (By late 2002 the Canadian commitment had still not been publicly affirmed by any minister or in any authoritative statement. It was not even perfectly certain if the "$1 billion" should be counted in U.S. or Canadian dollars—a difference, at fluctuating 2002 exchange rates, of as much as 35 percent. It was also apparent that the Canadian offer, like the more public U.S. pledge, was contingent on the materialization of commitments from other G-8 governments. Canadian officials expected that negotiating delivery of these mutually conditional promises would take at least several months.)

In either currency, however, $1 billion would radically enlarge the Canadian CTR involvement from the C$120.3 million already committed to nuclear safety. In the early months after the Kananaskis summit, no priorities for new Canadian approaches had been announced (although DFAIT quickly began to increase staffing for added CTR activity). But it is likely that future Canadian activity will reflect the four listed priorities in the G-8 leaders' "Global Partnership" statement, partly because these are priorities shared by Canada and partly because in the main they fit Canadian experience and capacity. Two of the four priorities—disposition of fis-

sile materials and employment of nuclear scientists—would be familiar policy objectives for Canada. A third, destruction of chemical weapons, had been addressed in an earlier C$5 million Canadian commitment to Russia. Only the handling of decommissioned nuclear submarines would introduce a new activity for Canadians.

Even so, the sheer size of the spending increase would alter the Canadian program both in kind and volume. Qualitatively, it would redirect Canadian funding with far more focus on security and weapons of mass destruction; it would also expand Canadian activity in Russia significantly. Quantitatively, it would multiply annual expenditures on CTR potentially by about eightfold. As Canadian ministers and officials contemplated their program options (and other G-8 governments did the same), larger Canadian contributions looked most probable in fields of reactor security; nuclear-waste management; and regulatory/legal reform, including export and border controls.

One last point on Kananaskis, pertinent to Canadian priorities: The agreement with Russia was achieved partly because it answered national objectives that had little directly to do with nuclear safety; for Russia, it bought full membership in the G-8. Ukraine, without such a pressing extrinsic interest in accommodating Western concerns for safety in its civil nuclear program, has so far shown a less urgent impulse to reform. As the largest recipient in Canadian threat reduction engagement so far, Ukraine continues therefore to represent a complicated and unsolved policy puzzle.

## Findings and Recommendations

The foregoing analysis, along with the observations of Canadians experienced in the diplomacy and delivery of CTR programs, points to five recommendations for policy and action.

1. CTR participants will need to redouble efforts to improve domestic governance in recipient countries. Experience proves that the worst impediments to nuclear safety and nonproliferation are neither financial nor technical, but lodged in misgovernment. Transparency, accountability, effectiveness, and efficiency—these are the tenets and attributes of successful governance in any context. But these qualities apply specifically to reinforcing nuclear safety, buttressing nonproliferation, and suppressing chemical weapons. Future programs will have to encourage and inform the culture and procedures of responsible government as much as the technologies and logistics of safety and nonproliferation. Promoting practices of democratic governance, including public administration and legal/regulatory approaches, falls squarely within Canadian experience and expertise and reflects priorities in other realms of Canadian foreign policy and development aid.
2. Crucial contributions to better governance, with better results, remain to be made by nongovernmental organizations, scholars, business, and others outside the formal government structures of donor and recipient countries. Targeted,

collaborative interventions by NGOs and others can be uniquely helpful where official, foreign governmental intrusion is less welcome. The collaborative experience itself can serve to build trust while dispelling suspicion. Furthermore, wider and better-informed public participation and academic engagement in these matters will foster the culture of safety—and of probity—that true security requires.

3. It might be that Russia's adhesion to shared values and enforced standards of cooperative threat reduction—as a full and equal partner—will encourage other governments to adopt similar reforms. But in any event, it must be a priority of G-8 governments to engage Ukrainians and others in urgent remedial action, both to secure nuclear facilities and management and to improve governance. The risks and potential costs of failure in these respects are insupportable.

4. G-8 partners will have to compile and systematically maintain real-time accounts of CTR projects and plans, integrating the work of governments, the G-8 apparatus, the EU, EBRD, and others. As it is, implementing the $20 billion Kananaskis commitment could take a year simply to collate national capacities and spending proposals. The organizing challenge here is huge; nuclear facilities are vast, complicated, and enormously expensive; chemical weapons operations (not to speak of biological weapons) are invariably deeply secret. These facts argue all the more powerfully for informed, cost-saving, results-oriented coordination of CTR activities.

5. The Canadian government and Parliament should consider enacting a Canadian analogue to the U.S. Nunn-Lugar legislation: an authoritative, binding statement of the ends, means, and rationale of CTR and its importance to Canada. Preparation, debate, and passage of such an act could greatly strengthen popular support and understanding of Canada's CTR participation. Such an exercise would also improve domestic continuity and coordination of the accelerating Canadian spending program anticipated over the next 10 years. These impending spending decisions will inevitably activate bureaucratic and political interests and rivalries; a statutory framework would impose a certain discipline on decision processes and endow the decisions themselves with an added measure of legitimacy. More than that, an act of Parliament can confirm cooperative threat reduction as an enduring and important national obligation—an expression of Canadian values and an investment in Canadian security.

CHAPTER 2

# European Union

*Kathrin Höhl, Harald Müller,* and *Annette Schaper*
(*Burkard Schmitt,* editor)
European Union Institute for Security Studies

## Introduction

To strengthen the security structure of an erstwhile enemy, and a country that hard-nosed defense analysts and military planners—think of the last two U.S. nuclear posture reviews—still view as a potential threat, is quite an unorthodox and innovative way to address one's own security concerns. Yet cooperative threat reduction (CTR) has become part and parcel of Western security policy. A considerable number of NATO and European Union (EU) member states are involved in this sort of activity, as is the EU itself, including its most genuine European actor, the European Commission (EC).

Examining the EU's own CTR programs in the field of weapons of mass destruction (WMD) and missiles, requires an appreciation of the EU as a very special political animal. All other CTR actors are nation states. The EU, in contrast, consists of a unique institutional setup. Security policy is still largely exempted from the supranational decisionmaking of Pillar I, where the commission has the authority to take legislative initiatives and disposes of executive and regulative competences, the council votes according to qualified majority rule, and the parliament is involved. Rather, security policy remains embedded in the intergovernmental system of Pillar II, with the council and its working committees dominating, the commission only associated and competing with the high representative for the Common Foreign and Security Policy (CFSP), and the parliament on the sidelines. If the commission wants to operate in this field, it has to do so with caution and circumspection, lest its efforts raise the suspicion of member states, which could then block it on a constitutional basis.

Moreover, policy fields are neither exclusively divided among the pillars nor between the EU and its member states. Clearly, member states do not abandon their own particular policies once the EU becomes involved. As a consequence, EU and national policies coexist in a strange relationship somewhere between complementarity, competition, parallelism, and at times, even contradiction. The restless ingenuity of European diplomats has created tools to embrace these complex rela-

tionships—chief among them, "common strategies," "joint actions," and "common positions."

This complex setup makes allocating resources surprisingly difficult. At the national level, responsibilities are clearly assigned, and a given ministry knows that a particular plan has to be subsidized out of its budget. The question is then to what level. If there were a division of authority between two national ministries, they would compete in order to reap prestige or to relinquish a financial burden. In the EU context, however, funding always prompts the question of whether the commission, with its significant budgets and flexibility (due to its discretionary authority), is intruding into areas reserved for the sovereign domain of the member states.

These factors form a critical background to this study, since the EU's institutional structure and the purposes behind it shape the possibilities and preferences of those conducting CTR-related programs. Without them, the course and content of policies cannot be wholly understood.

This chapter assesses the proliferation threat as seen from Europe and tries to characterize some specifically "European" ways of thinking about proliferation and the relationship to Russia. "European" in this context is generally taken to represent middle-of-the-road thinking in the security debate within the EU. On most issues, there is no joint doctrine that could clearly be identified as incorporating, with formal acceptance and uncontestable proof, what "the Europeans" think. Most of the time, a member state will have a national position that deviates from this middle-of-the-road thinking, as is likely to be the case for sectors of public opinion.

The chapter also presents the legal and institutional framework of European-Russian relations in which CTR programs are embedded; provides a short list of the projects that exist in each sector (nuclear, biological, chemical), and then discusses some of them in detail. Since most of these efforts are rather recent, the conclusions are fairly tentative. This chapter concludes with a look toward the future, including policy recommendations.

# The EU Joining the CTR Effort

## Development of an EU Nonproliferation Policy

Security and foreign policy were not initially part of the European integration project. However, nuclear nonproliferation was indirectly included in the Treaty of Rome by way of the EURATOM Treaty, which made it obligatory for all member states to submit civilian nuclear energy activities to EURATOM inspections. Beyond this particular rule, it was only after 1981 that a working group on nonproliferation was created within the framework of European Political Cooperation, a loose, informal, and largely arcane method of coordinating foreign policies of the member states.[1]

In 1986, the Single European Act (SEA) became the legal basis for intergovernmental cooperation in the field of foreign policy. The working group quickly expanded its activities and developed into a consultative body covering the whole field of nuclear proliferation. Joint policy statements became routine in International Atomic Energy Agency (IAEA) general conferences and UN sessions devoted

to the issue. Disagreements in substance, while still existing, have diminished over the years (with the notable exception of the use of civilian nuclear energy). In 1990, the council issued a substantial foreign policy statement on nonproliferation and, for the first time, caucusing took place during the Nuclear Nonproliferation Treaty (NPT) review conference.

In 1992, all member states adopted an export policy that excluded significant transfers to countries where not all nuclear activities were under IAEA safeguards ("full-scope safeguards condition"). In the following years, the EU developed initiatives for revamping the verification system of the IAEA and was also active in the revival and enhancement of the Nuclear Suppliers Group. The EU approached the extension of the NPT in 1995 with the common objective of ensuring that the treaty's lifespan become indefinite and mounted a highly successful joint action to persuade other countries to support this position. Following the 1995 conference, the EU worked—despite the concerns of a somewhat reluctant United States—to realize the "constructive dialogue" the conference had requested between nuclear suppliers and recipients. Finally, in 2000, the EU approached the NPT review with a fully developed common position, outlining a general policy for all fields of the NPT and agreeing on some substantial proposals, even in the field of nuclear disarmament.

Following the SEA, a working group on chemical and biological weapons was also founded. It provided a forum for consultation and policy coordination in these increasingly important and active fields. Under the Maastricht Treaty, the various working groups were pulled together in the Committee on Nonproliferation (CONOP) that was charged with CFSP development in the whole area of WMD and missile proliferation.

## The "New" Proliferation Risks

Throughout this period of evolution, Europeans began developing their own assessment of the proliferation of WMD. Some member countries fall within the range of missiles and WMD from states at the southern and southeastern periphery of the EU.[2] The threat would become graver should proliferators extend the range of the missiles or acquire more sophisticated weapons technology.[3]

From the European perspective, however, proliferation is understood predominantly in a regional context: Proliferating countries watch their neighbors with

1. There were two immediate reasons for tackling the nonproliferation problem. First, the Europeans felt that they needed some counterweight to what was seen as an increasing U.S. tendency to impose unilaterally homemade nonproliferation rules or to reinterpret agreed ones in a rather idiosyncratic way. Second, the awkward situation of those members who had begun participating in the Nuclear Suppliers Group had to be resolved; these member states started committing themselves to export controls on some materials that, under the EURATOM Treaty, should circulate freely in the European Common Market.

2. Greece—at least parts of it—is likely to be within reach of the Iranian Shahab III missile. Parts of Italy—notably the southern islands—are within range of the Libyan SCUD. Both countries are reportedly in possession of chemical weapons and working on biological weapons. No evidence is in the open domain whether chemical weapons (CW) capabilities have been successfully weaponized into warhead designs.

distrust and try to match their capabilities, with the primary objective of ensuring national and regime survival. There may also be the intention—in Iraqi pre-1991 thinking in particular—of employing WMD capabilities to ensure regional predominance.

This regional context is not an excuse for complacency, particularly in light of apparent Iranian efforts to extend the range of its missiles beyond anything that could be justified in a regional deterrence constellation. At the same time, it counsels some prudence in presuming that the present situation and the near-term future are times of clear and present danger.

Regional context motivates Europeans to put considerable confidence in the idea that leaders of proliferating states can be deterred from aggression toward Europe by the existence of overwhelming capabilities in the Western Alliance. In addition to deterrence, Europeans put strong emphasis on working through various multilateral regimes and bilateral relations to constrain countries that present a risk. Europe maintains quite viable relations with most Middle East actors.[4] This includes, *inter alia,* Italy's leading role in normalizing relations with Libya and helping the aging Colonel Mu'ammar Qadhafi find his way back to an acceptable international role, as well as the joint approach to Iran under the label of "critical dialogue." Relative to the United States, the European approach amounts to a more balanced position in the Middle East conflict, an attitude that in turn strengthens relations with Egypt and especially Syria.

Given these considerations, the sense of urgency and immediacy typical in U.S. discourse is not characteristic of the European approach. Proliferation challenges from North Africa and the Middle East that would affect the security of European territory are viewed as real but remote. And though proliferation is seen as a general risk for regional stability and, by upsetting balances and enhancing tensions in crucial regions, for world order as well, Europeans think the diplomatic tools they have at hand are sufficient to address the various countries considered to be proliferators. They do not perceive any sense of hostility or enmity with any of the allegedly dangerous countries (the Iraqi case is a partial exemption). Thus, active diplomacy that puts proliferation in a broader regional, political, and economic context appears to be a viable road for the time being.

Obviously, this situation would change in the event of a sudden and rapid expansion of proliferators' capabilities. This seems extremely unlikely, however unless additional help is offered from outside, beyond the North Korean and Chinese assistance reported in some of the countries in the region. It is, however, in this context that concern about the military complex of the Russian Federation enters

---

3. Alleged North Korean assistance to Libya, Syria, Iran, and Iraq is of concern in this context, as is the concept of an intermediate-range Shahab IV missile for Iran that would cover a considerable part of Europe, including parts of Germany and France, and of course, rumors about Iran's nuclear weapon ambitions and a steady revival of Iraq's weapons of mass destruction programs. Wyn Bowen, *The Politics of Ballistic Missile Nonproliferation* (Basingstoke: Macmillan, 2000); Federation of American Scientists, *Missile Proliferation Summary*, <http://www.fas.org/irp/threat/missile/summary.htm> (accessed June 17, 2002).

4. Philip Gordon, *The Transatlantic Allies and the Changing Middle East* (Oxford: Oxford University Press, 1998).

European consideration. Given the vast resources of weapons, weapon materials, technology, and know-how in Russia, the smooth development of the European security environment depends on Russian success in controlling these dangerous resources. The reported assistance to the Iranian missile program by Russian firms makes this point particularly salient,[5] yet Russian work on the Busheer nuclear reactor, for example, is viewed with more sanguinity in Europe than in the United States.

Regarding the risks of Russian involvement in WMD proliferation, Europe received a loud wake-up call between 1992 and 1995, when numerous cases involving the illegal trafficking of fissile and radioactive material were reported.[6] Most of these cases involved radioactive materials like strontium, cadmium, or osmium; more than 20 involved fissile material.[7] Most of that was natural or low-enriched uranium, obviously fuel for power reactors. In around 10 cases, small volumes of weapons-grade material were found, ranging from milligram amounts of plutonium (Pu) to several kilograms of highly enriched uranium. In no case was there enough material for a nuclear weapon.[8]

The fight against WMD terrorism took on new and unexpected intensity after September 11, 2001, and will certainly now strengthen the arguments for CTR in the European context.[9] Al Qaeda's interest in WMD and its incipient efforts to obtain the necessary ingredients and weapons concepts have been noted with great concern.[10] Again, the risk that disgruntled weapons experts from the former Soviet

5. Robert Einhorn and Gary Samore, "Ending Russian Assistance to Iran's Nuclear Bomb," *Survival* 44, no. 2 (Summer 2002): 51–70.

6. Really reliable statistics are hard to obtain. The IAEA and EURATOM as well as individual countries keep records, but not all cases are reported to both organizations; a huge number of cases involve unproven rumors and hoaxes. Annette Schaper, "Nuclear Smuggling in Europe-Real Dangers and Enigmatic Deceptions," paper presented at the Forum on Illegal Nuclear Traffic: Risks, Safeguards and Countermeasures, Villa Olmo, Como, June 11–13, 1997; William Potter, "Before the Deluge? Assessing the Threat of Nuclear Leakage from the Post-Soviet States," *Arms Control Today* (October 1995): 9–16.

7. These substances contain the risk of considerable health hazards to those that have been exposed to them, but they were treated in a relatively dismissive way in the public discussion, because the main concern was the possibility that weapons-capable material could also enter the black market. From today's vantage point, however, concern must certainly be greater because radioactive materials could also be used for terrorist purposes, exploiting the negative health effects of radiation. The term "dirty bomb" defines a device where radioactive material is spread over a larger area through igniting conventional explosives.

8. It is noticeable that Germany accounted for the largest number of cases by far, and after 1995, the number of trafficking incidents reported decreased sharply. Both circumstances are subject to different interpretations. It is unclear yet whether the decline in incidents signals enhanced security and competence in the nuclear sector of the former Soviet Union, or smarter strategies by the criminals, or the choice of alternative, less well-controlled routes than those through Western Europe. A lot of cases could be explained by rumors among criminals that nuclear smuggling could earn them a fortune; the rumors were reinforced or encouraged by certain press articles. The resulting "smuggling boom" faded after 1996.

9. Michael Barletta, *After 9/11: Preventing Mass-Destruction Terrorism and Weapons Proliferation* (Monterey, Calif.: Center for Nonproliferation Studies, 2002).

10. Stefan Leader, "Osama bin Laden and the Terrorist Search for WMD," *Jane's Intelligence Review* (June 1999): 34–37.

Union could be induced to assist Islamic terrorists in their endeavors, or that weapons, materials, or technology could pass from Russian territories to Al Qaeda camps and laboratories—wherever they may exist after their assets in Afghanistan were lost—adds urgency to CTR projects, meriting enhanced funding and acceleration.[11] Over the last few years, the EU has put into place the framework within which these projects can be successfully pursued.

## Entering the Scene

The nuclear trafficking events in the first half of the 1990 nudged European governments into action. The EU entered the CTR area in the mid-1990s, although the European effort has remained far below the level of that in the United States.

The European Commission had already developed a program of Technical Assistance in the Commonwealth of Independent States (TACIS) that could serve as the framework for CTR activities. EURATOM, as a specialized part of the commission, bears authority over, and responsibility for, all fissile material circulating in the civilian fuel cycle in the EU and has taken on the function of the State's System of Accounting for and Control of Nuclear Material (SSAC).[12] In addition, its mission is to foster cooperation on nuclear safety (though the operative authority is with the member states). EURATOM therefore has a legitimate interest in the field of radioactive materials.

The Pillar II institutions became involved in CTR as nuclear trafficking was put on the agenda of international organizations such as the Nuclear Suppliers Group, the G-8, the IAEA, and even the nuclear nonproliferation review conferences. Because all these fora come under the Common Foreign and Security Policy, CONOP has had to deal with CTR regularly since about 1994. For example, the drafting of the joint action on CTR, as well as a political evaluation, took place mainly in that committee. Member states report on their own initiatives in this area, and European positions for international events such as conferences on nuclear trafficking or nuclear terrorism or G-8 meetings on CTR issues are coordinated and developed by CONOP. Coordination with the commission is ensured by the regular presence of a commission representative as a CONOP member.

Two areas of CTR were particularly suitable for EU involvement. The first was the International Science and Technology Center (ISTC), the main instrument for providing employment to scientists that have been working in the WMD and missile programs of the former Soviet Union. Support is given for projects that promise interesting contributions to civilian science engineering or appear to hold commercial promise. The commission, with its technical expertise, financial flexibility, and backup from nuclear research centers (that can help evaluate incoming research

11. Jon Wolfsthal and Tom Collina, "Nuclear Terrorism and Warhead Control in Russia," *Survival* 44, no. 2 (Summer 2002): 51–84.

12. IAEA safeguards in nonnuclear weapon states require the establishment and maintenance of a State's System of Accounting for and Control of Nuclear Material (SSAC), whose correctness is verified by the IAEA. It is a legal function of a national authority, based on technical material control and accountancy measures. Normally, an SSAC is run nationally.

proposals), was an ideal partner for this endeavor and assisted and cofunded the ISTC from the beginning.

The second area where the EU became "naturally" involved is the civil nuclear sector. The EU not only had long experience in nuclear safety, it also had a keen interest in preventing a second Chernobyl catastrophe that might again unleash radioactive clouds over Western Europe. Consequently, the EU, led by the commission, has become the leading provider of assistance for nuclear safety in the former Soviet Union.[13]

Of course, safety is only indirectly related to proliferation and terrorism concerns. Nevertheless, it has some direct impact. Measuring instruments aimed at detecting or preventing radioactive leaks may also serve the purpose of physical security, as can reliability checks, even when designed with safety in mind. Regulations addressing the accounting of materials and the safe storage of nonfissile radioactive material and spent fuel also help to deny unauthorized persons access to these materials. Moreover, the supply of technology and equipment to enhance the inherent safety of nuclear plants tends to make the sabotage of nuclear facilities more difficult. From this vantage point, TACIS has extended, since 1992, into some programs that were more directly geared toward nuclear nonproliferation and threat reduction.

In the nuclear field, EU involvement has been facilitated by the fact that the EURATOM Treaty defines (civil) nuclear energy as an integration priority and has established a particular organization (EURATOM, as part of the commission) to take responsibility for it. Involvement in other WMD-related areas, where no comparable legal and institutional basis exists, has been less evident.

In the biological and chemical field, the commission could use its competence in regard to dual-use goods to gain influence over materials, equipment, and technology related to biological and chemical weapons development (though dedicated weapons agents and ready weapons do not, of course, fall within the purview of the commission). Since missile technology is less dual use and more military oriented, only minor parts of it come under community law and commission authority. It is hardly surprising therefore that no CTR activity concerning missiles has been recorded so far by the EU.

The Chemical Weapons Convention (CWC) and the work of the Organization for the Prohibition of Chemical Weapons (OPCW) have provided the forum in which ideas for CTR projects could evolve. Regular caucusing by the EU permanent representatives to the OPCW took place in The Hague, and CONOP coordinated national policies. As it became obvious in the late 1990s that Russia lacked the technical and financial means to destroy its chemical weapons according to the schedule prescribed by the convention, the EU and its member states started to develop projects that would help accelerate the process. Again, the commission's TACIS program became the vehicle for the EU's activities.

---

13. The matter is never far from controversy, however, particularly as some staunchly antinuclear governments—led by Austria and, since 1999, Germany—object to safety measures seen as motivating, encouraging, and facilitating the further use of nuclear energy.

The Biological Weapons Convention (BWC) lacks both a verification system and an organization charged with operating it and watching over the other aspects of the BWC. CFSP has therefore remained focused on preparing review conferences and coordinating positions for negotiations on a compliance protocol. It took the additional impetus of the council decision on a common strategy toward Russia and its implementation through the EU-Russian agreement, to get some minor activities, beyond ISTC support, off the ground.

## The Legal Framework

Russia is of overriding importance in the foreign relations of all EU countries. However, member states' geography, history, and preferences differ, and therefore their political priorities may vary as well. Given the Russian inclination to play geopolitical games, this could lead to a widening gap in the approaches the EU member states take toward Russia, with detrimental consequences for the cohesion of CFSP and the European project as a whole. For this reason, it is wise to have a common framework that informs both EU policies and national policies of member states toward Russia.[14]

The EU's legal and institutional framework for threat reduction activities has evolved slowly. It started in 1994 with the Political Cooperation Agreement between the EU and Russia and became more specific through the Common Strategy of the EU on Russia in June 1999. Only the December 1999 Joint Action Establishing a European Union Cooperation Programme for Non-proliferation and Disarmament in the Russian Federation gave the EU as a whole a clear guidance in the specific field of threat reduction. Together, these three elements provide the normative setting within which CTR projects are designed.

### Political Cooperation Agreement

The Partnership and Cooperation Agreement (PCA) was signed in 1994 but took more than three years to come into force. In the view of the EU, it has strengthened mutual understanding and a perception of common interests,[15] even though the priorities differed slightly among the partners. For the EU, the political aspects of the agreement were deemed most important, while Russia put stronger emphasis on the economic ones.[16]

The agreement contains several provisions related to threat reduction through the rules guiding political dialogue and the creation of new institutions. These

14. The authors wish to thank Quentin Michel of Liège, Belgium, for his comments and explanations on the EU's structure, history, and processes.

15. For an overview, see European Union, "EU's Relations with Russia: Overview, the Institutional Framework, 2002," <http://europa.eu.int/comm/external_relations/russia/intro/index.htm> (accessed August 2, 2002).

16. Christian Meier, "EU-Rubland: Von pragmatischer Zusammenarbiet zu strategischer Partnerschaft?" [EU-Russia: From pragmatic cooperation to strategic partnership?] in *Die Europäische Union als Akteur der Weltpolitik* [The European Union as an actor in world politics], ed. Klaus Schubert (Opladen: Leske and Budrich, 2000), p. 106.

fields are closely interrelated, since the new institutions are designed to foster and intensify dialogue.[17] The advantage of this concept is the firm institutionalization of continuous dialogue on various levels:[18]

- At the EU-Russia summit, the presidents of Russia, the EU-Council, and the commission meet twice a year.
- In the Cooperation Council, members of the Russian government, members of the EU Council, the commission, and if needed the present and future presidencies meet at the ministerial level once a year, additionally if necessary.
- Members of the European Parliament and the Russian Duma meet once a year in the Parliamentary Cooperation Committee.
- Senior officials of the Russian government work regularly with representatives of the European Troika.

Both sides have expressed their willingness to intensify and optimize diplomatic interactions in general and to facilitate cooperation between experts wherever useful.

The PCA is thus not just an expression of good intentions, but it has spurred creation of tangible structures to ensure that good intentions are actually pursued. The multilayer institutional network means that issues can be delegated to the appropriate body as they arise. This enables the highest levels to focus on the most important decisions rather than having to grapple with unnecessary detail.

This approach has succeeded in enhancing cooperation on security policy, as documented in the Joint Declaration on Strengthening Dialogue and Cooperation.[19] Foreign and security policy, including nonproliferation, disarmament, and arms control, has become a regular agenda item for meetings up to the highest level.[20] Although it is difficult to measure the impact of the PCA's institutional setting and its security dialogue on specific CTR projects, one can assume that it has facilitated agreements.

## Common Strategy

Common strategies serve as linkages between the two pillars (commission and council). Their purpose is, on the one hand, to provide a legal framework for areas not covered by community law and the authority of the commission, namely security and defense and, on the other, to coordinate the policies of both pillars in order to produce synergy and enhance efficiency.[21] Adopted by the EU-Council on June 4,

17. European Union, "Partnership Cooperation Agreement between EU and Russia," December 1, 1997, <http://europa.eu.int/comm/external_relations/ceeca/pca/pca_russia.pdf> (accessed February, 2, 2002).

18. Ibid., Arts. 6, 7, 8, 90, 95.

19. European Union, "Joint Declaration on Strengthening Dialogue and Cooperation on Political and Security Matters in Europe," October 30, 2001, <http://europa.eu.int/comm/external_relations/russia/summit_30_10_00/stat_secu_en.htm> (accessed April 4, 2002).

20. European Union, "EU-Russia Joint Statement," May 17, 2001, <http://europa.eu.int/comm/external_relations/russia/summit17_05_01/statement.htm> (accessed August 2, 2002), Arts. 9, 12.

1999, the Common Strategy on Russia was the first since the Amsterdam Treaty entered into force. Its specific purpose was to implement the PCA.

The common strategy is essential for the purpose of threat reduction, because it creates binding obligations and prevents abstention or deviation. This was exactly the reason why member states initially disagreed as to the way the common strategy should be framed. France and the United Kingdom would have liked the draft to be more specific, while Belgium preferred to keep it more open and flexible. Facing the need to find a common denominator between member states and to satisfy Russia's interests as well, it was unsurprising that the outcome was a rather vague and general document, which "lacks agreement on the most important issue areas and lacks a definition of clear priorities within those areas that are singled out as being important."[22]

This points to a more general problem related to CFSP. Since member states still tend to give priority to their own national interests vis-à-vis those of the EU as a whole, they "will almost certainly continue to try to keep the formulation of the common strategy as broad as possible, so as not to see their hands tied subsequently in a decision."[23]

The need to take into account the interest of an external partner is another complicating factor. Given these general weaknesses, it will be essential to evaluate the practical implementation of the EU's common strategies thoroughly. A fundamental review is currently being prepared, "so that the Council can make appropriate recommendations to the European Council before the first of the present common strategies expires (Russia, June 2003)."[24]

## Joint Action

The joint action establishing a European Union Cooperative Programme for Nonproliferation and Disarmament in the Russian Federation, was adopted by the EU-Council on December 17, 1999, on the basis of the common strategy. It declares the

---

21. Marc Gottschald, *Die GASP von Maastricht bis Nizza: Die Ergebnisse und Beschlusse der Gemeinsamen Aussen-und Sicherheitspolitik der EU seit ihrer Entstehung bis zum Vertrag von Nizza* [CFSP from Maastricht to Nice: Results and decisions of CFSP from its beginning to the Treaty of Nice] (Baden-Baden: Nomos, 2001), p. 119.

22. Hiski Haukkala, "The Making of the European Union's Common Strategy on Russia," in *The EU Common Strategy on Russia: Learning the Grammar of the CFSP*, ed. Hiski Haukkala and Sergie Medvedev (Helsinki: Finnish Institute of International Affairs, 2001), p. 50. Haukkala describes the negotiation process as the "Christmas Tree Method." "Once the general principles, the bulk of the tree, were in place the member states were allowed to add their own decorations to the strategy. . . . The . . . method has, however, proven unsatisfactory in reality."

23. Stephan De Spiegeleire, "The Implementation of the EU's Common Strategy on Russia," in Haukkala, ed., *The EU Common Strategy on Russia*, p. 106.

24. This review will be based on the SG/HR's report of December 21, 2000, on the General Affairs Council conclusions of January 26, 2001, the Joint Report by SG/HR and the Commission of January 28, 2002. See European Union, "Annual Review of the Effectiveness of Common Strategies," January 28, 2002, <http://europa.eu.int/comm/external_relations/ceeca/gac.htm#cs280102> (accessed June, 4, 2002). In addition, the experiences of the two other common strategies (on Ukraine and the Mediterranean) will also be taken into account. On these two strategies see Gottschald, *Die GASP von Maastricht bis Nizza*, p. 120.

EU's readiness "to promote cooperative risk reduction activities and the safe and secure dismantlement of WMD-related resources in Russia [and] to provide a legal and operational framework for an enhanced European Union role in cooperative risk reduction activities in the Russian Federation through project-orientated cooperation."[25]

The joint action will last as long as the common strategy, unless the council decides otherwise.[26] It is conditional on Russian cooperation and can be suspended if Russia fails to implement the program as agreed or refuses EU requests for monitoring, external evaluation, or audits.

The joint action is the result of a determination by the member states to give the EU its own profile in this particular field and to link their individual activities to a common framework. Given the limited budgetary resources foreseen for the joint action, the EU's approach is to support existing national projects instead of setting up its own independent projects. This allows the EU to be more than just one minor actor among many and to be closely involved in the most important projects—which increases EU visibility and ensures that the EU is involved in relevant international CTR-related negotiations. Another, very practical advantage is that the EU can operate under the roof of existing bilateral agreements and does not need to conclude extra-legal arrangements with Russia for its projects.

Projects adopted under the joint action complement those undertaken exclusively by the commission or by the member states. The joint action of December 1999 explicitly mentioned two projects to which it would contribute in the first phase: A chemical weapons pilot destruction plant in Gorny and a set of studies on plutonium transport, storage, and disposition.[27] In June 2001, five additional projects were launched when a council decision was passed implementing the joint action of 1999:[28]

- Support to the Russian Nuclear Safety Authority (Gosatomnadzor) for developing the regulatory basis and documents for the disposition of weapons grade plutonium;
- Support for studies and experimental studies for mixed oxides fuel (MOX) demonstration and licensing;
- Cooperative feasibility study for immobilization of Russian waste containing weapons grade plutonium;

---

25. European Union, "Joint Action of December 17, 1999: Establishing a European Cooperation Programme for Non-proliferation and Disarmament in the Russian Federation," <http://www.eur.ru/eng/neweur/user_eng.php?func=rae_disarmament> (accessed April 17, 2002), Preamble (2), and Arts. 1, 2.

26. The common strategy shall endure for an initial period of four years. Published in June 1999, it will end in June 2003 with an option to be prolonged, reviewed, or adapted by the council.

27. European Union, "Joint Action of December 17, 1999."

28. European Union, Council Decision (CFSP 2001/493): Implementing Joint Action 1999/878/CFSP with a View to Contributing to the European Union Cooperation Programme for Non-Proliferation and Disarmament in the Russian Federation," June 25, 2001, <http://www.eur.ru/eng/neweur/rae/attach/council_decision.pdf> (accessed October 18, 2002).

- Support to the Russian Ammunition Agency (RAA) to fulfill the Russian Federation's responsibilities under the Chemical Weapons Convention;
- Support for infrastructure building related to the destruction of nerve gases at the Shchuch'ye site.

For the sake of coherence and simplicity, the technical implementation of the joint action project is delegated to the member state running the project. The financial benefit for the member state is rather limited, but there are other advantages to linking national projects to the joint action. First, the projects gain greater visibility and become part of a broader effort based on commonly defined standards and values. Second, the multilateral framework gives the projects greater stability (something that is of great importance for the partner state, Russia). And third, smaller EU member states can participate in projects that would otherwise be too big and costly.

The biggest advantage, however, is the possible link between projects of the first and second pillar. The Gorny case illustrates this linkage: Because of its military connotations, the construction of a chemical weapons (CW) demolition plant would not be permissible as a first pillar activity; it is thus realized as a second pillar work. The project is managed under a bilateral German-Russian agreement and implemented by a German governmental agency.[29] The EU supports the bilateral project by financing certain elements—such as the installation of German-delivered equipment—from the CFSP chapter of the community budget. A first pillar project, TACIS ENVRUS 9705, complements this work. However, it is focused on nonmilitary aspects of the project, such as construction of a monitoring system and disseminating public information. Together, these activities render important assistance for empowering Russia to implement its undertakings under the CWC.[30]

It is true that the combination of Pillar I and Pillar II instruments in Gorny is more coincidence than the result of a strategic decision. However, since Gorny is supposed to become a model for other projects, the cross-pillar approach could—and should—become systematic for future EU activities. This would create a synergy of bilateral and multilateral cooperation that serves not only Russia's interests, but also those of Russia's neighbors and the EU member states.

## The Decisionmaking Environment

"The EC is the first organization which rests on fully integrated, powerful and sovereign nation-states and yet has acquired an increasingly cohesive, flexible and corporate structure of its own."[31]

---

29. Bundesamt für Wehrtechnik und Beschaffung (BWB) [Federal Office of Defense, Technology, and Procurement], <http://www.bwb.org> (accessed February 23, 2002).

30. For the exact conditions in the treaty see Article IV, and Annex IV of the CWC treaty. The Chemical Weapons Convention, January 1993, <http://www.cwc.gov/treaty/> (accessed May 16, 2002).

31. Jakob Rösel, *The European Union: A Short Introduction to Its Background, Legislation and Policies* (Freiburg: Arnold-Bergstraesser-Institute, 1999), p. 53.

The budgetary procedures relating to CTR programs of the EU vary, depending on whether the activities to be funded belong to the first or second pillar. Although the commission is involved, the council is the most important actor in the decision-making process as regards the projects and their budgets. Since this body works behind closed doors, external influence on its decisions is relatively limited.[32] All the more important is the role of member states. The new troika (the present and succeeding presidency together with the high representative for CFSP and a commissioner, normally the one in charge of external relations) pursues a regular dialogue with Russia,[33] which provides the opportunity to discuss current and potential CTR projects and to incorporate Russia's view in the EU's internal decisionmaking bodies. The exception is the ISTC, where the authority for decisionmaking rests with the ISTC Governing Board.

## First Pillar

Within the realm of the first pillar, the program relevant to CTR is TACIS, which is under the purview of the Directorate General[34] (DG) for External Relations. TACIS programs and projects are designed and financial and personal resources are allocated in the framework of this DG. Implementation, however, is the mission of the EuropeAid Cooperation Office, created in 2000 to improve project management, accelerate project completion, guarantee optimal conformity with international standards, and enhance the EU's influence in the area of development.[35]

The office is responsible for the realization of the projects in all their phases, as well as their evaluation. It divides its managerial tasks according to regional and issue-related principles; the TACIS project ENVRUS 9705 discussed below belongs to Division A4 (Energy, Transport, Infrastructure) within the relevant regional department (Europe, Caucasus, Central Asia).[36] This division holds authority over the project throughout the time of its realization and for the subsequent evaluation.

For each fiscal year, available funds are divided under different headings to cover operative costs.[37] An extra budget is provided for administrative positions. The planning for a given fiscal year is completed within the preceding year; the commission prepares the draft budget and conveys it during the first half of the year

32. Ibid., p. 58.

33. European Union, "Council of the European Union: Order of the Presidencies," <http://europa.eu.int/en/summ.htm> (accessed May 17, 2002); see also, European Union, "External Relations: The EU's Relations with Russia," <http://europa.eu.int/comm/external_relations/russia/intro/>(accessed May 17, 2002).

34. European Commission, "Commission's Directorates-General and Services," <http://europa.eu.int/comm/dgs_en.htm> (accessed May 7, 2002).

35. European Commission, "Improving External Aid Management—A Key Component of the Commission Reform," <http://europa.eu.int/comm/europeaid/general/mission_amel_en.htm> (accessed May 14, 2002).

36. European Commission, "EuropeAid Organigramme," <http://europa.eu.int/comm/europeaid/general/struct_en.htm> (accessed May 22, 2002).

37. As a guideline for budget distribution, a framework for the period 2000 to 2006 has been set with ceilings that shall not be exceeded. See "EU-Haushalt und Mittelfristige Finanzplanung," July 11, 2001, <http://www.bundesfinanzministerium.de/Europa-und-internationale-Beziehungen/Haushalt-und-Finanzen-der-EU-.554.htm> (accessed May 15, 2002).

to both the parliament and the council. The decisionmaking procedure consumes usually the second half and is completed by mid-December.[38] For the current year (2002), administrative costs of all EU institutions amount to 5.2 percent of the total budget, while the remaining 94.8 percent is invested in operative expenditures.[39]

These funds are then distributed among eight different headings and numerous subheadings.[40] Under the heading External Action, the EU has set a maximum ceiling for 2002 of €8.3 billion, 8.4 percent of the total EU budget. The relevant subheading for TACIS is Cooperation with Partner Countries in Eastern Europe and Central Asia, which received €473.9 million in 2002. [41] For 2000–2006, the EU has agreed to pay €3.138 billion for TACIS in general.[42]

TACIS projects can be proposed either by the commission or by delegates of the member states. The council decides in coordination with the parliament; council sessions for this purpose are scheduled as needed. In preparing the decision, the opinions, comments, and suggestions of the recipients of the funds are solicited and taken into account; in this regard, the EU budgetary process is interactive and has broad participation. The TACIS management committee makes the final decision.

Ideally, the council accepts all supplements and amendments suggested for the proposal.[43] Once a project is adopted, a call for tender, issued by the commission or a contracting authority of the recipient country follows to solicit proposals from persons or organizations from the EU member states or from the recipient countries on how to implement the project. From the tenders, the final project partner is selected by the commission or by the contracting authority of the recipient country.[44]

---

38. For the schedule of the budget process see, Carl-Gustav Siuts, *Die öffentlichen Finanzen der Europäischen Union: Status, Frunktionen und Perspektiven* (Berlin: Lang, Frankfurt am Main, 2001), p. 45.

39. European Union, "General Budget of the European Union for the Financial Year 2002," <http://europa.eu.int/comm/budget/pdf/budget/syntchif2002/en.pdf> (accessed May 15, 2002).

40. The different headings are: EAGGF Guarantee Section (agriculture); Structural Operations; Training/social dimension/employment; Energy/EURATOM Nuclear Safeguards/environment; Consumer Protection; Research; External Action; and CFSP. A very small part of the budget (0.2 percent) is kept as a reserve. Ibid.

41. The general budget makes a distinction between commitments and payments. The average value for this subheading is about €1.3 billion. For further explanations of commitments and payments see, European Union, "Financial Framework of the European Union," <http://europa.eu.int/comm/budget/financialfrwk/index_en.htm> (accessed April 30, 2002).

42. This budget will be divided up for all TACIS partner countries (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Mongolia, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan) in the framework of the national programs. It will also provide the funding for the multicountry programs (Cross-border and Regional Cooperation, Nuclear Safety, Small Projects, and Tempus Programme), which is divided by topic, not by country. See European Union, "TACIS in Russia," March 2000, <http://www.tacisinfo.ru/en/newslet/ticp/ticp01/> (accessed June 12, 2002); European Union, "TACIS Programme Overview," <http://europa.eu.int/comm/external_relations/tacis/intro/> (accessed June 12, 2002).

43. For the adoption and rejection processes of a proposal, see European Union, "The Co-decision Procedure," <http://europa.eu.int/prelex/aide.cfm?CL=en&page=codec> (accessed April 16, 2002).

ISTC programs are a special case within TACIS. They are administered and funded by the EU, but neither drafted nor designed by it. ISTC covers research projects only. Individual scientists, working groups, research institutes, or governmental institutions or nongovernmental organizations are entitled to propose projects. The ISTC Governing Board in Moscow determines the feasibility and relevance of these proposals and their conformity with the principles of ISTC.[45] If their assessment is positive, the proposals are forwarded to the funding partners; aside from the EU, this group includes the United States, Japan, the Republic of Korea, and individual member states of the EU.

In other words, the ISTC Governing Board decides about the worthiness of a project, and the funding partners decide about their own participation. The EU as such has set a budget ceiling for ISTC within the framework of the TACIS budget; this ceiling cannot be breached. It is the board's responsibility to distribute the project proposals in a reasonable way among potential funders. The board is the central decisionmaking body; the EU takes the position of partner.

## Second Pillar

Activities under the second pillar that are relevant to CTR in Russia are embedded in the joint action of December 17, 1999, for nonproliferation and disarmament in Russia.[46] Joint action projects are funded from the CFSP budget line of the community budget. Some operational expenditures are directly covered by the member states.[47] In any case, the funding modalities must be clarified at the outset and are specified within the text of the joint action. The payments will endure as long as the joint action does.

Joint action projects can be proposed either by a member state or the commission. The latter is in charge of preparing the project, whereas the decision to adopt it lies with CONOP, the council's working group for nonproliferation. The commission is then entrusted with implementation and supervision; it makes a budget commitment and finalizes a financial agreement with the member state to which the technical implementation of the project is delegated. The latter designates an implementing agency that ensures coherence between the joint action project and the national project and organizes a call for tender (if there is one). Transferring the

---

44. European Union, "Contract Procedures: Manual of instructions," <http://europa.eu.int/comm/europeaid/tender/gestion/index_en.htm> (accessed June 3, 2002), p. 8. For example, the TACIS projects involved in the CW disarmament process, explained in quantitative assessment, are supported by SOFRECO (France), <http://www.sofreco.com> (accessed May 16, 2002).

45. For the proposal evaluation criteria, see European Union, "Instruction for Proposal Preparation," 2002, <http://www.istc.ru/istc/website.nsf/fm/z03InstructPPE> (accessed May 16, 2002).

46. Joint actions, in turn, may reside within the broader frame of common strategies or common positions and be adopted on this basis, which is by recognizing and detailing values, principles, and goals that have already been agreed by the member states.

47. The distinction between administrative and operative budget has not always been a sharp one because of a lack of a clear definition. See European Union, "Special Report No. 13/2001 on the Management of the CFSP (2001/ C 338/01)," 2002, <http://europa.eu.int/eur-lex/en/archive/2001/c_33820011130en.html> (accessed May 15, 2002), § 62–64.

money through successive installments, the commission can supervise the implementation process of the joint action project.

The commission reports on its activities to the council, which will conduct an annual review. Independent audits might also take place. The commission and the council are both charged with providing coordination of the various projects, as well as projects outside the joint action and by non-EU actors, in order to avoid duplication. As a special administrative feature, a unit of experts including a task force in Moscow acts as a liaison office. Among other duties, the office assists member states in identifying suitable projects and monitors the orderly dispersal of assistance funds.

## Quantitative Assessment

The EU is the largest provider of economic and technical assistance to Russia: Between 1991 and 2000, Russia received €2.281 billion in EU assistance. The bulk of this comes from the TACIS program: Between 1991 and 2001, €1.489 billion were allocated to Russia within the framework of the TACIS National Action Programmes (€90 million for 2002 and 2003).[48] To that must be added approximately €890 million Russia has received from TACIS regional programs.[49] For nuclear safety alone, TACIS committed almost €800 million between 1991 and 2001.[50] In addition, the EU contributes to coordinated measures supported by other donors: The ISTC in particular receives more than €20 million each year from the EU (approximately €130 million since the beginning), which represents about a third of the total funding.[51] On top of that, the EU granted to its joint action programs a total sum of €8.9 million for 1999 and 2000, and in 2001, €6.08 million. These considerable fundings go to large variety of projects.

## Nuclear Weapons

EU projects on nuclear nonproliferation in the former Soviet Union (FSU) concentrate mainly on the disposition of excess weapons plutonium (category "Warheads—pits"); safeguards and material protection, control, and accountancy (MPC&A) of nuclear materials (category "Facilities—production reactors"); and civilian projects for former nuclear weapons production staff (category "People—technical specialists"). In the latter category, this review lists only those projects relevant for nuclear disarmament and nonproliferation. There are several additional

48. European Union, "EU assistance to Russia," 2002, <http://europa.eu.int/comm/external_relations/russia/intro/ass.htm> (accessed June 12, 2002).

49. Ibid.

50. European Union, "Nuclear Safety Strategy Paper 2002–2006," 2002, <http://europa.eu.int/comm/external_relations/nuclear_safety/rsp/index.htm> (accessed October 17, 2002).

51. European Union, "TACIS Regional Cooperation," 2002, <http://europa.eu.int/comm/external_relations/ceeca/rsp/index.htm> (accessed October 17, 2002).

projects with various civilian purposes that serve the goals of the ISTC and one project that specifically deals with the destruction of submarines.

## List of EU Projects

- TACIS R5.01/94: Establishing Russian methodology and training center, Phase 1
- TACIS R5.01/94: Equipment for safeguards training center, Phase 2
- TACIS R5.01/96: Obninsk: Nuclear materials accountancy and control training center[52]
- TACIS R5.02/96 and R5.02/96B: Design and setup of three laboratories at VNI-INM-Bochvar Institute[53]
- TACIS R5.03/96: Development of Russian instrumentation for state safeguards and NMAC system in the Russian Federation[54]
- TACIS R5.04/96: Methodological and training center for the Ural-Siberian region (Snezhinsk) feasibility study[55]
- TACIS R5.01/98: Enhancing safeguard system on a pilot plant; development of analytical and metrological capabilities, instrumentation and training[56]
- ISTC Project 1410: Plutonium oxide microspheres[57]
- ISTC Project 0371-2: Pu-utilization in light-water reactor (LWR) experiments
- ISTC Project 2267: Creation of subcritical assembly driven by proton accelerator (SAD)
- ISTC Project 1606: Molten salt loop for waste and plutonium disposition
- ISTC Project 1731: Water-jet cutting for submarine dismantlement
- ISTC Project 1058: Optimum strategy for nuclear fuel cycle development in Russia
- ISTC Project 1341: Infrasound method for nuclear tests detection
- ISTC Project 1823: Software for CTBT inspectors training

---

52. European Union, "TACIS R5 01/96," <http://sic-www.jrc.nl/tp/nrtp/details.html?projects_nr=291> (accessed June 6, 2002).

53. European Union, "TACIS R5 02/96 and R5 02/96b,"<http://sic-www.jrc.nl/tp/nrtp/details.html?projects_nr=292> (accessed June 12, 2002).

54. European Union, "TACIS R5 03/96," <http://sic-www.jrc.nl/tp/nrtp/details.html?projects_nr=293> (accessed June 12, 2002).

55. European Union, "TACIS R5 04/96," <http://sic-www.jrc.nl/tp/nrtp/details.html?projects_nr=767> (accessed June 12, 2002).

56. European Union, "TACIS R5 01/98," <http://sic-www.jrc.nl/tp/nrtp/details.html?projects_nr=836> (accessed June 12, 2002).

57. All ISTC projects are requestable by number at <http://www.tech-db.ru/istc/db/projects.nsf/> (accessed June 12, 2002).

- EUJA (EU joint action):[58] EU-Russia nuclear weapons-related action—studies and experiments in the field of ex-weapons plutonium disposition
- EUJA: Support to the Russian Nuclear Safety Authority (Gosatomnadzor) for developing the regulatory basis and documents for the disposition of weapons grade plutonium
- EUJA: Support for studies and experimental studies for mixed oxides fuel (MOX) demonstrating and licensing
- EUJA: Cooperative feasibility study for immobilization of Russian waste containing weapons grade plutonium
- EURATOM Safeguards Office: Technicus exchanges on safeguards.

## Exemplary Discussion

### Collaboration on Safeguards

Since 1993, the EU has actively cooperated with the Russian Federation on topics related to safeguards. A major actor is the Joint Research Center (JRC), charged with conducting and promoting scientific research efforts. One-third of the JRC's budget is devoted to nuclear research, much of which is dedicated to serving the technical needs of EURATOM and to cooperation with international organizations like the IAEA, NEA and CERN, as well as individual countries outside the community.

Cooperation started under the auspices of the EURATOM Safeguards Office. The general objective in the safeguards field is to improve accountancy and control systems in CIS and other East European states such that they comply with IAEA safeguards requirements, and more specifically, to develop materials accountancy and safeguards for Russian needs and to organize exchanges to train Russian personnel as inspectors.

A remarkable aspect of this project is that it has made use of Russian technology and input as much as possible from its very beginning in February 1994. Thus, it avoided the bitter lessons of early U.S.-Russian cooperative efforts that initially imposed U.S. technologies on Russia in what was, from the Russian point of view, an unacceptably intrusive way.[59] Interaction always took place at the working level and consequently avoided bureaucratic overload. A major result of the collaboration has been the implementation of the safeguards training center at Obninsk. Since 1993, the project has been funded by a total of €11 million (partly through TACIS, partly through other sources).

58. For descriptions of the projects under the joint action framework, see European Union, Council Decision, June 25, 2001. See also, European Union, Council Joint Action, December 17, 1999.

59. European Commission, *Communications from the Commission to the Parliament and the Council: Illicit Trafficking in Nuclear Materials and Radioactive Substances—Implementation of the Guidelines Laid Down in the Communication from the Commission,* September 7, 1994 (Brussels: European Commission, 1994). See also, European Commission, *Conclusion of the Essen European Council* (Brussels: European Commission, 1996).

## Disposition of Excess Weapons Plutonium

Since the early 1990s, European countries have considered the management of Russian excess weapons plutonium to be a critical nonproliferation issue.[60] Initially, there were two national projects, one French-Russian and one German-Russian;[61] these were combined in 1998. The resulting trilateral program aimed to develop practical industrial solutions for the disposition of Russian excess weapons plutonium, taking advantage both of the European MOX experience and the available Russian reactor infrastructure.

Integrated French/German/Russian project teams produced several feasibility and basic design studies. These findings enabled another trilateral team to perform, in close contact with the corresponding body established under the 1998 U.S.-Russian cooperative agreement, a cost assessment of the Russian plutonium disposition program. Two technical scenarios for the disposition of 34 tons of Russian weapons-grade plutonium were assessed, including one corresponding to the AIDA-MOX project, which relies on the operating experience of European MOX-fueled power reactors and would ensure an annual disposition rate of 2.2 tons of plutonium.

The trilateral program gave important direction to the work of the G-8 Plutonium Disposition Planning Group established at the 2000 Okinawa summit. However, it ended formally in June 2002, and its future is still unclear. Germany has decided not to engage in further cooperation on plutonium disposition beyond the work completed so far. France intends to continue its cooperation with Russia on a bilateral basis if necessary (but in coordination with U.S.-Russian efforts). A final organizational and financial solution will hopefully be found as part of the multilateral agreement that (potential) donor countries and Russia are currently negotiating within the framework of the G-8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction.[62]

Several French-Russian activities in this field benefit from financial support of the nuclear part of the EU's joint action.

---

60. Marc Deffrennes, "European Union Programs in the Field of Non-Proliferation and Disarmament: Summary Period 1992–2001," March 1, 2001. Document can be requested via Mr. Marc Deffrennes, head of sector nonproliferation and disarmament, European Commission, by emailing <marc.deffrennes@cec.eu.int>.

61. Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) mbH, Siemens Aktiengesellschaft und Ministerium für Atomenergie der Russischen Föderation (MINATOM): "Basisauslegung für eine Pilotanlage zur Produktion von Uran-Plutonium-Brennstoff aus waffengrädigem Plutonium und zum Einsatz dieses Brennstoffs in Kernreaktoren" [Basic design of a pilot production plant for the transformation of weapon-grade plutonium to uranium-plutonium fuel and its use in civil reactors], Abschlussbericht, February 28, 2002. Yegorov et al., "The Aida-Mox 1 Program: Results of the French-Russian Study on Peaceful Use of Plutonium from Dismantled Russian Nuclear Weapons," in IAEA, *Nuclear Fuel Cycle and Reactor Strategies: Adjusting to New Realities,* Proceedings of an international symposium held in Vienna, June 3–6, 1997, p. 93.

62. G8 Information Center, "Statement by G8 Leaders: The G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction," 2002, <http://www.g8.utoronto.ca/g7/summit/2002kananaskis/arms.html> (accessed August 23, 2002).

- Support for the Russian Safety Authority (GAN) in developing the regulatory basis and documents related to the production, handling, and use of MOX fuels made of weapons-grade plutonium. These activities are being performed in close cooperation with the United States, with each party financing one-third of the 39 regulatory documents to be developed by GAN to cover fuel cycle facilities, the use of MOX fuel in research reactors and in the VVER 1000 and BN 600 reactors, as well as the transportation and storage of MOX fuel.
- The so-called MOX-demonstration program, whose scope is to irradiate in a Russian VVER 1000 reactor lead test assemblies fabricated in Russia from Russian W-Pu. In this project, the EU supports two studies and experiments for MOX demonstration and licensing, one involving reactor aspects, the other the testing of three LTAs in the Balakovo reactor.
- A study of the ways and means for transport and intermediate storage of the weapons-grade plutonium in existing and/or new installations. The objective is to make recommendations for the most effective and safest ways to transport and store the plutonium on an interim basis.
- A study on the medium-term perspective for plutonium disposition, focusing on the Gas Turbine Modular Helium Temperature Reactor (GT MHR), which is an advanced development based on proven technology. Its ability to work without uranium (only plutonium) makes it highly efficient as a plutonium burner. The objective is to define priorities for further projects and to support decisions on larger investments for future development.[63]

All joint action projects in the field of nuclear disarmament are performed under a financing agreement with the French Ministry of Foreign Affairs, signed in December 2000. The implementing agency is the Commissariat à l'énergie atomique (CEA). There is an ongoing consultation process between the EU joint action team and French authorities about the implementation of the project.

## Biological Agents

The EU's efforts in disarmament of biological agents (BA) are focusing on the work of the ISTC. The EU is subsidizing certain projects, like the British program for BA safety in Shchuch'ye and other sites, but there are few prospects for a EU joint action in this field.[64]

63. For details see the various annexes of the joint action and the council decision.

64. European Commission, "Commission Services: Report on the Implementation of the Council Joint Action (CFSP 1999/878)," December 17, 2001. Document can be requested via Mr. Marc Deffrennes, head of sector nonproliferation and disarmament, European Commission, by e-mailing <marc.deffrennes@cec.eu.int>.

# Chemical Weapons

## List of EU Projects

- TACIS ENVRUS 9705:[65] The development of an environmental monitoring system (EMS) in connection with the destruction of the chemical weapons in the Saratov oblast
- EUJA:[66] EU-Russia chemical weapons destruction project in Gorny
- EUJA: Support to the Russian Ammunition Agency to fulfill the Russian Federation's responsibilities under the CWC
- EUJA: Support for infrastructure building related to the destruction of nerve gases at the Shchuch'ye site.

## Exemplary Discussion: ENVRUS 9705

This project aims at developing a system of environmental monitoring for controlling environmental effects of CW destruction in the Saratov oblast. It is explicitly related to the Chemical Weapons Convention and stems from a Russian initiative.[67] Whereas the construction of the site is realized as a joint action project under German leadership (with some financial assistance from the commission's budget), TACIS ENVRUS 9705 is a first pillar project. The project started in January 2000 and was planned for a period of two years, but unforeseen delays have forced an extension until May 2002. The monitoring system has been developed by TACIS staff and by regional and Russian government institutions.

Gorny is located in the Saratov oblast, a rural area where wheat is the most important regional product. The potential environmental damage chemical weapons destruction could cause has provoked considerable public concern. Confidence building through information is therefore one of the overriding objectives of the project: The objective is to provide the Gorny citizens and the general public with reliable, transparent, trustworthy, and independent state of the environment information. This information has to be seen as the major output of the system. Moreover, the Saratov Oblast Committee of Natural Resources' capacity in environmental monitoring is strengthened by provision of the newly created environmental monitoring system and the relevant equipment. This in turn allows for stronger enforcement of the relevant Russian Federation legislation on state ecological control also applicable to the chemical weapon destruction plant.[68]

---

65. European Commission, "TACIS project," 2002, <http://www.sar-ecoinst.org/sem_goal_eng.htm> (accessed August 28, 2002).

66. For descriptions of the projects under the joint action framework see European Union, Council Decision, June 25, 2001; see also, European Union, Council Joint Action, December 17, 1999.

67. "Develop an environmental monitoring system for the region surrounding the Gorny CWD facility, Saratov Oblast, in the overall framework of assistance to the implementation of the Convention on Prohibition of Production, Stockpiling and Use of CW and Its Destruction." European Union, "TACIS project," <http://www.sar-ecoinst.org/new_page_3_eng.htm> (accessed April 4, 2002).

For this purpose, two information centers have been built, one in Gorny and one in Saratov. Gorny will be the main site for collecting and disseminating information; Saratov will focus on data processing. For all three steps—data collection, data processing, and information dissemination—material and equipment must be provided, staff must be trained, and know-how transferred. To coordinate these complex steps, the commission contracted a company experienced in the management of this type of project, SOFRECO SA (France).[69]

The environmental monitoring system, or EMS, will rely on cooperation with the Russian government and is built on the Russian legal system. It also meets Russian standards, which the government adapted to the CWC. In planning and implementation, the system is future-oriented to keep the system flexible for enlargement and to open the possibility for transfer to other sites and projects.

The elements of the information process are manifold. Alongside construction of the EMS, active efforts to involve the public have been made. At a youth camp, young people worked on regional ecological projects. Teachers were trained, the media informed, and seminars offered to interested citizens.[70] In this way, the EMS project began to fulfill its mission even before construction was completed. Before it could be implemented practically, however, the commission had to analyze the legal basis of such a monitoring system and build a strategy that would allow the system to continue operating after the TACIS funding is phased out. For this purpose, material and equipment were procured, methods of analysis selected or developed, and personnel trained for the system's staff to ensure continuity.

TACIS also did crucial work on mediation and coordination between the Russian government and nongovernmental organizations.[71]

The Russian government participates in the development of the project on the basis of its own interests—fulfilling the undertakings under the CWC. The independence of the EMS from governmental inference, however, must be guaranteed; otherwise, credibility with the population will be compromised and an important objective of the project thwarted. This key goal is accomplished by having the system privately managed; the government is a recipient of the information but has no influence on the quality and reliability of the information. The TACIS project is constructed in such a way as to maintain this independence even after the project is completed.[72] A well-informed citizenry is part and parcel of the monitoring process, as is the EMS; the project takes the building of civil society consciously into account, thereby serving the overriding objectives for which TACIS was brought into life in the first place.

---

68. European Union, "TACIS ENVRUS: Environmental Monitoring system," 2002, <http://www.sar-ecoinst.org/new_page_1_eng.htm> (accessed April 10, 2002).

69. European Union, "TACIS Project," <http://www.sar-ecoinst.org/new_page_3_eng.htm> (April 10, 2002); SOFRECO, <http://www.sofreco.com> (accessed April 11, 2002).

70. European Commission, "TACIS Program: Project ENVRUS 9705, Results and Outlook." The document can be requested via the project's address: <http://sofreco_tacis@renet.ru>.

71. Ibid. Partners in cooperation are Russian Federation Munitions Agency, Saratov CNR, Gos NIIENP, NIIX SGU, Russian Federation Ministry of Natural Resources, Saratov oblast government, Krasnopartisansky Rayon Adm.

72. See project results in ibid.

The collaborators in the Saratov Committee of Natural Resources (Saratov CNR) will be trained to assume CWC monitoring functions throughout Russia. TACIS supports enabling Russia to fulfill its commitments under the CWC independently. The role of Saratov CNR as an independent institute of experts is emphasized, and it is given a place not only in national society but also in the international civil community concerned with both the environment and disarmament. In this way, the project provides genuine support for democracy in Russia.

So far, basic data on the Gorny environment have been collected; the chemicals that are to be dealt with have been defined; the construction of a laboratory has begun; equipment has been ordered; existing probes and analytic records have been requested; and the Gorny information center completed. A system for data analysis and processing is under development.[73] Future practical work will comprise the installation of laboratory facilities and the operation of a test phase for the laboratory. A certificate ("toxic agent") for Saratov CNR and the application of a GOST-certified analytical record are also envisaged.[74] These titles refer to standards given by the Russian government to fix safety norms and provide a legislative basis from which to work.

In sum, TACIS ENVRUS 9705 is a well-considered and designed project that fulfills some important auxiliary tasks for the construction and operating of a CW demolition facility. The focus on technical assistance for TACIS has been maintained, and the working concept does not affect the construction of the plant per se. The conduct of the project in collaboration with the government, civil society, and private organizations helps strengthen Russian democracy; governmental objectives are performed by private persons; and the observation of international commitments is supervised by nonstate institutions. A wise investment in public education and information has been made.

TACIS practices, through this project, particularly its bottom-up and dialogue-focused approach, meet the most important objective of organizations involved in assistance: to make themselves dispensable. This is all the more important because the construction of the facility in Gorny is one of the first joint action projects in Russia and will serve as model for further CW demolition projects within the Russian Federation; similar projects are already under consideration for Shchuch'ye and Kambarka.

## Joint Action

- EU-Russia chemical weapons destruction project in Gorny: Activities in Gorny are focused on the provision of equipment like air filter boxes or a system to empty transport containers after their arrival from storage at the destruction site. The supply of equipment helps to ensure the smooth continuation of the project according to schedule.

---

73. Ibid.

74. For more information about GOST, see <http://www.sgs.co.uk/globaltrading/gost/> (accessed April 17, 2002).

- Support to the Russian Ammunition Agency to fulfill the Russian Federation's responsibilities under the Chemical Weapons Convention: The purpose of this project is to coordinate the different parties involved in the planning to fulfill the obligations of the CWC. The EU is focused on coordination, information, and communication to open up new financial sources. The project is concentrated on information of external contributors and local actors.
- Support for infrastructure building related to the destruction of nerve gases at the Shchuch'ye site: The activities in Shchuch'ye are focused on building the necessary infrastructure. In particular, the EU supports financially a facility for the supply of electricity to the destruction facility.

# Export Controls

## List of EU Projects

- ISTC-Project 1292:[75] Chemical Tagging of Explosives

## Exemplary Discussion: ISTC 1292

This project was taken up by ISTC under the area of analytical chemistry. The researchers work on a subject that is directly related to the spread of conventional munitions—that is, to nonproliferation in a broader sense—and which has gained additional urgency through the recent focus on preventing acts of terrorism. Tagging explosives enables the authority to identify their origin and might provide valuable clues to find perpetrators of bombings or to deter would-be assailants.

Within the framework of this project, a comparative analysis and a test of the various possibilities for tagging explosives will be conducted. Researchers also calculate the costs of different taggants against their qualitative value with regard to sensitivity, selectivity, and information capacity.

The scientists and engineers employed by the project, interestingly enough, have been working previously not only in the chemical but in the nuclear weapons sector.[76] One major project goal is to integrate the participating scientists into the international scientific community. For this purpose, the Fraunhofer Institute of Chemical Technology (Karlsruhe, Germany) supports the three Russian institutes involved. The research may open up opportunities for the institutes, as well as allowing Russia to create security-enhancing marketing possibilities for a part of the military industrial complex.

The project strives for a balance between scientific saliency, relevance to the market, and the origins and expertise of the collaborators. This balance appears to have been achieved: In the year 2000, the EU invested €660 000 into the project, by far the largest sum in the chemistry area. The project is still running.

---

75. All ISTC projects are requestable by number via <http://www.tech-db.ru/istc/db/projects.nsf/> (accessed June 12, 2002).

76. See project 1292, <www.tech-db.ru/istc/db/projects.nsf/htm/index.htm> (accessed March 14, 2002).

## Lessons Learned

TACIS is categorized under the European Commission's "multilateral programs," which means the commission retains authority over planning and operation. Initially, the predominant criteria under which the projects were selected and shaped were (1) the needs of the recipient countries and (2) the interests of the European Union (as seen by the commission). Over time, however, priorities have been reformulated, decisionmaking processes optimized, and structures improved. These changes are the result of a systematic evaluation process that involves the commission, the council, and the parliament. The changes have been explicitly formulated and are now part of the standard operating procedures by which new projects are negotiated, formulated, and conducted.

As far as the common strategy and the joint action are concerned, the commission reports regularly to the council, but there has been no overall evaluation yet. It is evident that CTR agreements will have to be evaluated carefully and thoroughly if the broadest, most detailed lessons possible are to be both learned and taught. CFSP is still in its infancy, however, and the institutions concerned are too young to have any depth of experience in medium- and long-term projects. According to EU officials, the implementation of the joint action projects has been satisfying so far, with all schedules respected. The approach of contributing to national projects rather than setting up independent EU projects is generally considered successful by both the member states (who can share their financial burden) and the EU (which gains a relatively high degree of influence and visibility at relatively low cost). It has allowed the EU in particular to be on the "right track" and to become a recognized player in the CTR arena.

Because an in-depth review of the second pillar's CTR activities is still missing, the following section focuses on TACIS, with brief reference to its two special cases—TACIS in connection with joint action projects and ISTC.

### TACIS Activities with a Bearing on CTR

TACIS was tailored to help the transformation process in the successor states of the former Soviet Union. Its objective has been to help establish a market economy, improve public institutions, and strengthen civil society.[77] This may seem beyond the scope of the much narrower aims of threat reduction, but it contributes to economic and political stabilization and therefore to the security of Russia (and the other successor states).

Although nonproliferation and disarmament are not the original or primary objective of the TACIS program, certain projects are aimed at enhancing the physical safety and security of nuclear reactors and fall, therefore, under the purview of CTR. These projects are fully compatible with the broader security concept that underpins TACIS.

---

77. European Commission, "An Evaluation of the TACIS Country Program in Russia: Final Synthesis Report," 2002, <europa.eu.int/comm/europeaid/evaluation/evinfo/tacis/951500_ev.html> (accessed March 19, 2002), p. 13.

Over time, the commission has come to believe that a bottom-up approach is more likely to yield success with TACIS projects. During the first phase (1991–1994), the basic orientation of the assistance was tailored to the needs of the recipients as defined in a centralized, authoritative way. In addition, the projects were primarily conducted in major cities. During this period, TACIS was focused on emergency assistance, management training, and exchanges.

In the second phase (1995–1998), the focus shifted significantly. Smaller projects and activities in rural areas gained higher priority. Support for civil society became a key concern, and for this purpose, nongovernmental organizations from EU countries were asked for their cooperation.[78] A basic weakness persisted, however: the remoteness of the staff in charge of the program from the reality on the ground. There were illusions as to how quickly the required reforms could be pushed through in the transition country and how speedily the Russian partners could adapt. It was less a lack of general knowledge than a lack of capability to apply this knowledge under specific circumstances. Project engineering, not project design, was the most nagging problem.[79]

It is this experience that motivated the much stronger orientation toward dialogue with the recipients and further attention to their social environment that is now characteristic for TACIS activities. In general, the EU has concluded that technical assistance will not work under a top-down approach in the Russian Federation; the crucial condition for success is a framework that emphasizes the common search for solutions.[80] Dialogue, interaction, and cooperation have therefore become the guiding principles for TACIS, as it works to create a situation in which Russia will no longer have to rely on foreign assistance. The EU deems influence more important than spectacular visibility. Investment is thus preferably directed at projects whose payoff may not be immediately apparent, such as education. This applies for the sector of threat reduction, nonproliferation, and disarmament as well.

The focus of TACIS has been not financial assistance alone but technical aid to foster the development of a market economy and democracy. Meanwhile, however, TACIS has moved from a pure aid program to a strategic instrument in shaping the relationship between the European Union and the successor states of the Soviet Union.[81] This happened partially through the development of European-Russian relations in general (and to a lesser extent relations with the other successor states) and partially through the development of TACIS itself.

The evaluation of TACIS and the ensuing actions taken prove that the commission has the ability to learn from past mistakes. During the course of the 1990s, the link between TACIS and the PCA was strengthened considerably to transform the

78. Ibid., p. 27.

79. Ibid. This shortcoming was very clear from the difficulties TACIS had in realizing the innovations proposed in the PCA of 1994. TACIS succeeded in this objective only partially.

80. Ibid., p. 32.

81. European Commission, "TACIS 2000–2006, TACIS Procedures, TACIS Overview, EU-NIS General Leaflet, Cooperation That Counts, TACIS Cooperation Text: TACIS Overview," 2002, <http://europa.eu.int/comm/external_relations/ceeca/tacis/> (accessed March 21, 2002).

donor-recipient relationship between the EU and Russia into a two-way consultation.[82] Transparency and flexibility have also been improved.

On the other hand, bureaucracy remains a major problem, and the multiplicity of small projects still contributes to a lack of clarity, making effective management and coordination among the various projects difficult. According to the most recent evaluation, "the main problem of any proposal for improving TACIS instruments seems to combine two apparently conflicting needs—strategic clarity and management simplicity vs. ownership by the beneficiaries and decentralization."[83]

The newest projects, and the documents that provide their legal framework, make a serious effort to address the criticism and suggestions from previous evaluations. The readiness to enter a genuine dialogue with the Russian partners as an integral part of the projects demonstrates marked progress and improves the chances that projects will achieve their overall objectives.

As discussed above, TACIS projects can be combined with joint action projects. In so doing, the EU gains valuable experience in coordinating CTR activities between nation states and international organizations. It can also draw conclusions on the weaknesses and strengths of different models of assistance.

More leeway for the commission in what it is permitted to support would be desirable, as it is relatively flexible (if slow) in directing its funds. The reluctance of member states, however, makes it unlikely that the commission will gain greater authority over security issues. Furthermore, budget ceilings enforce limits, as the commission is not authorized to obtain credits or to issue bonds like a nation state. (On the positive side, this encourages very precise economizing of existing funds.)

TACIS combines broad political principles (fostering democratic and market structures) with specific objectives of the various projects. At the same time, TACIS programs work as instruments of linkage between the EU and political institutions as well as private organizations, nongovernmental organizations, and the general public. This comprehensive approach seems well suited to build structures within which disarmament projects can be carried out.

One important lesson for future projects is that the attitude of the population toward disarmament activities is extremely important. According to an opinion poll organized in December 2001 in the Gorny and Saratov regions, health risks, the employment situation, and mistrust of technology were the main hurdles between the project and public support.[84] TACIS reacted with plans for improved transparency and information. New communication channels with the public have been

---

82. European Press Agency (EuroPA), *Inside Russia and the FSU* 9, no. 11–22 (November 2000): 15.

83. European Commission, "An Evaluation of the TACIS Country Program in Russia," 2002, <http://europa.eu.int/comm/europeaid/evaluation/evinfo/tacis/951500_ev.html> (accessed April 17, 2002), p. 58.

84. The main concerns were: public health situation and service; social economic conditions; infrastructure development; benefits for changing residence; employment at the CWDP; citizens safety provisions; experimental/ pilot technology; CW import from other regions and countries; absence of conducted expertise results; protest mood. See Saratov CWD Environmental Monitoring System (EMS) in European Commission, "TACIS Program: Project ENVRUS 9705, Results and Outlook," p. 12.

established, and public opinion polls will be organized regularly to obtain feedback from the people immediately affected by the programs.

These insights have induced TACIS staff to focus more on developing a close relationship with civil society. In this context, experience in public relations and the transfer of knowledge collected in previous projects have proved useful. For example, TACIS is running a program for development of educational and professional links. One of the projects, DELPHI, aims to establish a link between schools, universities, and vocational training programs in order to improve education and business management.[85] These resources are being used to improve the opinion environment for ENVRUS 9705; in cooperation with Russian institutions, information is being transferred and teachers and other surrogates are being trained to answer questions and help create an awareness of the problem that ENVRUS 9705 aims to solve.[86]

In addition, the Gorny Information Center serves as a focal point for all questions and suggestions from the population. By making the process of CW demolition visible and understandable to a broad public, the center will gain importance beyond the regions of Gorny and Saratov, since the plant and the monitoring system are designed to serve as models for other projects in this field.

The feedback circle between experience gained from established projects and the planning of new ones draws not only from the commission's own work but also from the member states.

ISTC projects are, as we have seen, a special case within the TACIS program. They are administered and funded by the EU, but drafted elsewhere. ISTC is devoted to a bottom-up approach: Research projects are developed by the scientists themselves; their application then goes to an independent body of scientists (the ISTC governing board),which in turn gives an assessment of feasibility and worthiness.[87] If the scientific body's assessment is positive and the EU agrees to fund the project, the necessary budget requirements will be found. The Russian scientists involved in the project are the direct recipients of the money coming from the EU. They administer the funds themselves and can therefore decide how best to use them for their work. Bureaucracy, a real drag on efficiency in Russia, is bypassed. The scientists only need to present their ID card or passport at the bank to draw from their ISTC account. This bottom-up approach makes sure that nobody else can divert the money.

A weakness of the ISTC may be the spread of tasks over a multiplicity of increasingly complex research fields, such as biological science. The scientific community is characterized by rising specialization in increasingly complex areas. Whether the distribution of the money according to the preferences of the applying scientists leads in all cases to support a level of specialization that corresponds with current international standards is an open question; but, then again, that is not the primary objective of the program.

85. For DELPHI, see European Community, *TACIS—Cooperation That Counts: A Look at Support from the European Union's TACIS Programme in Russia* (Brussels: European Union, 2001), p. 9.

86. See Saratov CWD EMS, p. 8.

87. ISTC, "Instruction for Proposal Preparation," 2002, <http://www.istc.ru/istc/website.nsf/fm/z03InstructPPE> (accessed June 18, 2002).

## Comparative Advantage

The European Union is a unique phenomenon in world politics. The combination of intergovernmental cooperation and coordination with supranational elements creates decisionmaking processes that can, at times, be difficult and frustrating. Complex negotiations can result in agreements founded on the lowest common denominator, a preponderance of red tape, and general overregulation. That said, the process also can yield a series of distinct advantages in addressing problems such as those related to threat reduction.

In describing these advantages, one has to make the distinction between those that derive from the EU as a whole and those that stem from the commission as a supranational, functional body.

### Advantages of the EU as a Whole

- **Mobilization**. The EU can (in theory) mobilize the assets of 15 member states for a single political purpose. All the member states are relatively rich, well developed, and full of scientific and technical expertise. The EU can combine these assets with those of the European Commission, a flexible functional body with no singular constraining "national interest" to interfere with the task at hand. Given the urgency of the situation in the former Soviet Union, this ability to channel funds and assistance in kind toward a single purpose is extremely valuable; it is doubtful whether all member states would independently have decided to devote resources to this task without the EU as a coordinating force. It is, however, deplorable that it took so long to use the most effective instrument available, the joint action, to bring about a strong and focused common effort.
- **Coordination**. By embedding the activities of 16 actors (15 member states and the commission) in a single program, the investments made will have greater positive effects than could be expected from uncoordinated parallel efforts by the actors individually. Coordination and the avoidance of unnecessary, costly duplication is one of the explicit objectives of the joint action. Well-established and frequently used review and evaluation processes should ensure that this objective is achieved. Installing critical scrutiny processes instead of ad hoc international bodies is a much more cumbersome and delicate endeavor, as states are often wary of submitting their activities to the criticism of their peers, not least because of possible domestic repercussions. In the EU, these procedures are matter of fact and routine and do not arouse exaggerated concerns. Given that threat reduction is a completely new field and, to make matters worse, is taking place in a rapidly changing social, political, legal, and economic environment, the opportunity for a serious and unimpeded learning process is likely to be a necessary condition for success.
- **Variation**. European integration has not eliminated the specific national style of the member states, but has created a new, tailored way of doing things by the commission. This means that the task at hand is approached from a large vari-

ety of perspectives. This may be of considerable advantage over national approaches, which lack the competitive comparison with other modes or ways of doing business. Because, as discussed above, joint action involves continuous evaluation, Europeans can learn from each other and adapt their approaches accordingly.

## Advantages of the European Commission as a CTR Actor

- **Absence of geostrategic interest.** The European Commission was created, and still operates, as a functional organization with a mandate to fulfill a panoply of legislative, executive, and implementing tasks. It is not a national government and represents no classic territorial nation-state. This is not to say that the commission has no distinct power interests, but these interests relate to battles for influence among the different bodies of the EU and between the commission and member states. They also take place (as in all bureaucracies) between different parts of the commission, but they do not extend—at least not as of now—into traditional geostrategic interests typically associated with nation-states. As a consequence, partners are less suspicious that the commission might use assistance to pursue a hidden and sinister agenda, or to induce a power struggle. Partners are also more open to cooperation than they are in traditional interstate relations. This is particularly helpful with regard to threat reduction, an area that directly relates to security policy and involves the most sensitive parts of the defense sector.
- **Project expertise from different fields.** The commission can draw on a broad range of technical and administrative expertise. Despite intra-bureaucratic turf wars, the interagency committee system (which the commission has cultivated over 40 years) is a useful tool to derive coherence from the diverse expertise. Since threat reduction involves rather complex projects extending over several fields of science and technology and requiring considerable project planning and management skill, the commission is in an excellent position to meet this challenge.
- **Experience in development and transition assistance.** The commission has, over the years, gained particular experience in assistance for economic and democratic development. Development assistance has, from the beginning, been one of the main fields of commission work, in part due to the special relationship between the European Community and the former colonies of European countries. Extensive assistance funds, for which the commission is responsible, have long been available. One of the basic aims of integration is to help underdeveloped regions in the EU. The management of the structural and regional funds has been an exercise in development assistance to industrialized countries, an experience that bears some resemblance to what has to be done in Russia. Also, the accession of Greece, Portugal, and Spain, all very young democracies recovering from dictatorships and with less well-developed economies, provided the commission with first-hand experience in the difficult mission of assisting with stabilizing democracy while developing a thriving market economy. Finally, German unification integrated a society in transition

squarely into the EU; again, the commission was able to gain some useful experience of the difficulties involved (even though the major part of this burden was borne, naturally, by Germany itself).

The specific features of the EU's threat reduction activities, as analyzed in general and demonstrated through the examples of some individual projects, reflect these advantages. In particular, three features stand out: (1) the attempt to establish dialogue from project conception to project completion with all relevant actors as well as the broader public, to design and conduct projects that meet the needs of the recipients and also have a good chance of being accepted; (2) embedding projects in the broader process of economic and democratic development to make them an integral part of the transformation process rather than isolated, ad hoc steps for a specific purpose; and (3) the inclusion of civil society as a key actor and the intention to strengthen and empower civil society through the course of the project.

These features should ensure that threat reduction, as understood by the EU, goes beyond narrowly defined national security interests to support a broader concept of societal and political security—and does so in a cooperative fashion that regards the development of a stable and democratic Russia as being in the security interest of all.

## Future Priorities

Future EU efforts to support CTR in Russia will evolve within the framework of existing agreements. It is conceivable that the area of CTR will receive stronger emphasis in the coming years, particularly if the current joint action programs are successful. However, what will certainly not happen is member states' transference to the commission of competencies that clearly belong to the realm of security and defense. Although common positions develop continuously under the second pillar and interests are increasingly formulated on a joint basis, ultimate authority and decisionmaking about budgetary questions will rest with the states. This puts limits on the efficiency and speed of preparation, adoption, realization, and completion of new and bold CTR initiatives, because decisionmaking involving many, partly competing, actors, is by necessity complex and cumbersome.

With regard to the total volume of resources allocated to CTR, the enlargement of the EU will be a major challenge. Adding a group of new members whose gross domestic product is significantly below the EU average will claim considerable financial resources. The EU will have to set priorities, for which perceived needs and institutionalized partnerships will be prevalent criteria. This favors Russia, where diplomatic and organizational relations are well entrenched. Time-honored links, forged through TACIS, are a factor that clearly favors EU-Russian projects. The geopolitical and strategic importance of the Russian Federation, as well as the urgency regarding the WMD sector in Russia for European security, will help to maintain CTR as a priority. Facing important enlargement costs, it is doubtful, however, whether the EU or its member states will significantly increase spending on CTR.

## First Pillar

First pillar CTR projects will remain within the framework of the PCA, which was designed to help develop an intensified dialogue between Europe and Russia, and to explore and create common positions related to security and stability.[88] In this sense, the core mission of CTR is also at the heart of the PCA and opens the door to expanded CTR activities. On the other hand, given that PCA encompasses the authority of both the member states and the commission, security and defense issues are not addressed operationally, and CTR is not a point of emphasis. Although ISTC is mentioned, in passing, in one article,[89] the focus is generally on strengthening political dialogue and assisting both market and democratic development. CTR is only an indirect concern, although work on CTR is not excluded in the text of the PCA, and indeed promoters of stronger CTR activities could argue that the general objectives of the PCA are well served by fostering CTR projects.

TACIS programs will remain an important element for EU assistance to Russia. The orientation of the programs toward a dialogue with the partner has been shown and is to be further strengthened and expanded. Russia's interests as a partner have been retained as a priority by stating this intention, and Russia accepts and welcomes this orientation as well.[90] This opens up a chance for the Russian side to propose more activities in the CTR sector if it so wishes.

Concerning CTR, TACIS is increasingly seen as the link between national assistance and multilateral activities. The experiences gained through projects like ENVRUS 9705 will be used for further joint action projects. In this context—as a supporting measure with a focus on technical assistance—TACIS will remain a significant part of the EU's CTR program.

Cooperation through the ISTC will be continued as well. However, as previously mentioned, EU decisionmaking hinges on the willingness to provide funding, while substantive decisions on the merits of the proposed projects rest with the ISTC staff. The budget line of the ISTC will remain fixed within the TACIS budget and under the authority of the DG responsible for TACIS. In other words, expanded support for ISTC activities will come at the cost of other TACIS projects unless the total TACIS budget is nudged higher.

Generally, TACIS was targeted toward a long-term partnership; cooperation between the EU and Russia will thus retain the institutionalized format that has developed, including a regular budget line. This helps continue EU support for CTR. Whether the support function of TACIS for clearly focused CTR activities continues, however, depends on the willingness of the member states to develop further projects to which TACIS can provide flanking support and/or on future joint actions, in which case this willingness is legally fixed within an EU context.

---

88. European Union, "Partnership Cooperation Agreement," 2002, <europa.eu.int/comm/external_relations/ceeca/pca/pca_russia.pdf> (accessed February, 2, 2002), Article 6.

89. Ibid., Art. 62:2.

90. European Union, "Medium-term Strategy for Development of Relations between the Russian Federation and the European Union (2000–2010)," 2000, <http://europa.eu.int/comm/external_relations/russia/russian_medium_term_strategy/index.htm> (accessed February 11, 2002), 12.6, 2.1.

## Second Pillar

The common strategy adopted by the EU member states in the frame of the CFSP is valid for four years, meaning it expires, or comes up for renewal, in June 2003.[91] Since mid-2002, the evaluation of the strategy has been a priority in order to draw conclusions for future common strategies. CTR nonproliferation activities are evaluated as well, with a particular focus on the dialogue fora, the joint action, and the work of the ISTC.

The council joint action is covered by the common strategy; that is, it will also be continued through June 2003 and also has an option for continuation. The objective of the program—"to support the Russian Federation in its efforts regarding arms control and disarmament"—remains dependent on implementation of the specific activities jointly adopted by the member states.[92]

## Nuclear Weapons

One obstacle to forceful EU activities in the nuclear field is the member states' varying nuclear policies. Collaboration so far has concentrated on two fields—safeguards and plutonium disposition. Although the former is undisputed and mostly successful, the latter is slow because of a lack of will and financing shortages. Nevertheless, it should be a priority to enhance efforts in these two fields since they are key elements of nuclear disarmament.

With regard to safeguards, the EU is in a unique position regarding the success of its projects.

First, it has decades of experience on safeguards with EURATOM. It was EURATOM that initially had responsibility for the implementation of safeguards on the territory of its member states, before IAEA verification was established.[93] EURATOM's safeguards are more comprehensive and intrusive than those of the IAEA, and its legal authority extends much further. Many technical tools that are used by the IAEA originated from EURATOM. The Joint Research Center plays a strongly supportive role and has always been innovative in developing new techniques.

Second, in contrast to the IAEA, EURATOM does not discriminate between nuclear weapon and nonnuclear weapon states (NWS and NNWS) with regard to their obligations concerning civilian nuclear fuel cycles. EURATOM applies its safeguards in a similar manner to the civilian nuclear fuel cycles of all members, including France and Britain. Thus, a reprocessing plant that was formerly also used for military production has successfully been subjected to EURATOM safeguards. This is a unique experience that may also be of value as regards the conversion of Russian former production facilities.

---

91. European Union, "Common Strategy of the EU on Russia (CFSP 1999/414)," 1999, <http://europa.eu.int/comm/external_relations/ceeca/com_strat/russia_99.pdf> (February 11, 2002).

92. European Union, Council Joint Action, December 17, 1999.

93. D. A. Howlett, *Commission of the European Communities: Report of the Operation of Euratom Safeguards, 1991–1992* (Brussels: European Commission, 1994); W. Gmelin, "The Role of Euratom in International Safeguards," Proceedings of the International Safeguards Symposium, Vienna, March 14–18, 1994; S. Thorstensen and K. Chitumbo, "Safeguards in the European Union: The New Partnership Approach," *IAEA Bulletin* (January 1995).

Also because of this approach, the safeguards culture in the EU is different from that in the United States. As an NWS, the United States—like Russia—does not perceive itself as obligated to pursue international transparency. If, in the longer term, more nuclear disarmament is to become a common objective, this kind of self-perception must change. A different tradition exists in Europe, despite the fact that two members are also NWS. With these practical experiences and this different culture, the EU is well suited to engage in pragmatic collaboration with Russia on safeguards and international standards on MPC&A.

Third, the objectives of EURATOM safeguards are twofold: regional control of nondiversion and the function of the SSAC. In NNWS, nonproliferation and security of fissile materials and installations are controlled through several steps: the first involves national physical protection measures; the second uses technical MPC&A measures at the individual facilities; the third is the SSAC, run by the state (or in case of the EU by EURATOM); and the fourth is additional verification by the IAEA.[94] In NWS like the United States and Russia, facilities can be placed on voluntary lists, but they must be capable of meeting IAEA safeguards criteria. Their operators must therefore follow IAEA accounting rules and procedures, and it would be beneficial for Russia to adapt its national authorities to similar standards. Safeguards cooperation with the EU provides a wealth of experience in this field. Consequently, it is clear that the EU should continue to place a high priority on safeguards-related cooperation.

With regard to plutonium disposition, Europe also offers advantages relative to other states collaborating with Russia. The major advantage is the experience of using MOX technology.[95] In several countries, MOX fuel has been produced and used in light-water reactors, or LWRs, including Germany, which is now engaged in a nuclear phaseout. German LWRs are still running on MOX. Notably, the technology of the facility in Hanau (that was never used) was offered by its owners for the disposition of plutonium.

For several years, plutonium disposition has been emphasized as a key element of nuclear disarmament, ensuring that technical irreversibility is part of the disarmament process. It is also a key element in thwarting the danger of nuclear proliferation. The EU and its members should therefore strengthen their efforts and afford a much higher priority to disposition, especially regarding the high level of funding that is needed. It would also give the EU more influence generally in the nuclear disarmament field. The EU members should therefore be encouraged to separate these endeavors from their domestic nuclear energy policies.

## Chemical Weapons

There is significant movement in the chemical weapons field. The basic project model is in place and experience is available; together these elements map out a

94. Often the terms SSAC and MPC&A are used synonymously; more precisely, however, the SSAC is a legal body and an instrument that defines the technical and practical MC&A measures.

95. Annette Schaper, "Using Existing European MOX Fabrication Plants for the Disposition of Plutonium from Dismantled Warheads," in *Selected Papers from Global '95 Concerning Plutonium*, ed. William G. Sutcliffe (Livermore, Calif.: Lawrence Livermore National Laboratory, 1996), p. 197.

clear route for action. In planning additional projects for dismantling chemical weapons, the EU has to respect the decisions taken by the Russian government. Moscow adopted a program for Chemical Weapons Stockpiles Destruction in the Russian Federation in July 2001. Through this decision, the government has renounced the prior objective of constructing seven CW demolition plants—one facility per storage area to destroy stockpiles on-site—in favor of two large, central demolition plants.[96]

The EU echoed this approach through its concentration on the three plants at Gorny, Kambarka, and Shchuch'ye. The facility at Gorny is expected to open in early 2003; the two other plants supported by the EU are still in the planning stage.[97] The Gorny experience, however, will inform the future course of these projects. The coordination between multilateral and bilateral approaches is significant: in Shchuch'ye, the supporting states even include nonmembers of the EU. There is a considerable risk of duplication of efforts and loss of efficiency; hence the project could truly profit by learning from the EU experience at Gorny.

## Biological Weapons and Export Controls

In the short term, the prospects of developing a joint action for biological weapons (BW) disarmament are poor. There are few conceptual ideas, and it appears that relations with Russia in this sector might not be mature enough to push forward. However, a feasibility study is under discussion, and some preliminary consideration has been given to EU participation in such a study.[98] The EU should be encouraged by its record in regard to chemical weapons to move boldly into the BW field. It may be in a better position to acquire Russian trust and cooperation than the United States, as U.S.-Russian relations in the BW sector have been tense. The BW field, given its increasing saliency for international security, may be where seizing the initiative is most advisable.

In the sector of nuclear and chemical nonproliferation, it is essential to conduct an evaluation to identify the type of project that the EU could undertake and to look into the compatibility of such activities with those of the IAEA and OPCW. It is also conceivable that cooperation with the Russian government in the area of export control could be undertaken. Practical expertise in export control is mainly available at the level of member states; however, one EU asset is its experience in devising a common system among states that have a free trade zone with no custom boundaries. If Russia develops closer trade relations with some of its fellow CIS countries, this experience could prove valuable.

---

96. Stockholm International Peace Research Institute, "Russian CW Destruction Programme (revised 2001), Introduction," 2001 <http://www.projects.sipri.se/cbw/research/cw-destruction.html> (accessed May 22, 2002).

97. "Bundesminister Fischer traf russischen Komitee-Vorsitzenden für Chemiewaffenabrüstung" [Foreign Minister Fischer meets chairman of Russian committee of chemical disarmament], <http://www.auswaertiges-amt.de/www/de/aussenpolitik/ausgabe_archiv?suche=1&archiv_id=2694&bereich_id=15&type_id=2> (accessed May 22, 2002).

98. "Report on the Implementation of the Council Joint Action 1999/878/CFSP of 17 December 1999 establishing a European Union cooperation program on nonproliferation and disarmament in the Russian Federation," October 2001.

## Final Thoughts

It appears that the main improvement needed for EU CTR assistance to Russia is, bluntly, more money. The framework is there, the organization has proven its ability to do useful work, and the division of labor between the commission and the member states, despite all the difficulties, has developed a positive synergy. Given the importance of the field for security, enhanced efforts—and that inevitably means enhanced funds—would be advisable.

So far, EU funding has focused largely on nuclear safety with a small amount provided for disarmament efforts through the joint action projects. Therefore, an expansion of funding for Cooperative Threat Reduction under the CFSP would be particularly desirable. However, a substantial increase will only be possible in 2006 (the community budget is already set until that date), and even then, only if the EU recognizes CTR as an important priority for its CFSP. To achieve that objective requires ensuring, until 2006, at least a minimum of continuity and visibility in this field by renewing the 1999 joint action, maintaining a certain level of funding, and launching some new projects.

CHAPTER 3

# Finland

*Jenifer Mackby*
Center for Strategic and International Studies

Nonproliferation is one of the major objectives of Finnish assistance to neighboring countries, and Russia holds a special position in this cooperation. Finland shares a common land border with the Russian Federation of almost 1,300 kilometers (about 800 miles), with six official crossing points. In addition, the Leningrad and Kola nuclear power plants, which have had ample problems, are located fewer than 100 kilometers from the border with Finland, and a contaminated former naval base lies near the Barents Sea. The Scandinavian countries have been troubled for many years about Soviet dumping of nuclear waste in the Barents and Kara Seas and about many decommissioned submarines containing nuclear reactors. Finland therefore has a special interest in preventing the proliferation of weapons of mass destruction, reducing the danger of theft of these materials, stopping smuggling across borders, and addressing safety concerns related to nuclear and radiation accidents. Given the historical relationship between the two countries, all of these issues became more urgent after the dissolution of the Soviet Union. This has prompted Finland to cooperate over the past 10 years in the fields of nuclear and radiation safety with neighboring areas.

## Program Assessment

### Nuclear

Since 1992, the Finnish Support Program for nuclear safety has aimed to prevent nuclear accidents at Eastern European nuclear facilities, including the nearby Leningrad and Kola nuclear power plants. Finland also supports the Russian Nuclear Safety Authority (Gosatomnadzor or GAN), by participating in reviews of the safety assessments of the Leningrad and Kola nuclear power plants and through a regular exchange of reports on the operation of the Russian and Finnish plants. The program includes projects to improve nuclear waste management and reduce environmental risks of processing radioactive substances. It also deals with threats posed by illegal transport of radioactive material and supports radiation monitoring and measurement networks to improve early warning to neighboring countries in case of a serious accident.

In 1992, Finland's Radiation and Nuclear Safety Authority (STUK) and GAN assessed the operational safety of the Leningrad plant and, in 1996, the Kola plant. The assessments covered management procedures, training of personnel, testing of equipment, and emergency preparedness—and described the work procedures at the plants and the way in which Finland could improve them. The assessments revealed that the units of the Kola plant did not have adequate safety systems and the equipment was of uneven quality. In 1999 Finland evaluated a safety assessment analysis that showed that the risks of an accident at the Leningrad plant were extremely high.[1] Since then it has also been found that the welded points of the pipe work need to be monitored. STUK has conducted studies on the combined effects of fires, floods, and natural phenomena on the Leningrad nuclear power plant, and Finland has provided improvements in both perimeter and plant area surveillance. Following a joint study with Russia in 1996–1997 on the safety of storage at the Leningrad nuclear power plant, Finland repaired the metal liner of the spent fuel handling pools. Finland has spent €1.0 million–€1.7 million annually for bilateral cooperation in improving the Leningrad and Kola nuclear power plants. As of May 1996, Finland had contributed ECU 4.2 million to the European Bank for Reconstruction and Development (EBRD) Nuclear Safety Account.[2]

The Nordic countries have cooperated on a number of projects dealing with threat reduction. In one such effort, Norway, Sweden, and Finland supplied the diesel generators, pumps, valves and instrumentation for an emergency feed-water system to improve the safety of the Kola nuclear power plant. They also plan to improve the plant's fire safety in 2002. Finland contributed €0.5 million of the €3 million spent by Nordic countries on the emergency feed-water supply system that became operational at the Kola unit 3 in September 2001.[3] The feed-water supply system assists in cooling the reactor. Unit 4 is to be added to the system during 2002, and units 1 and 2 will be added to the system in the future. Joint projects with Norway and Sweden are expected to expand over the next few years—with Norway on the waste management of the Kola nuclear power plant and Murmansk and with Sweden on nuclear power plants.

Since 1992, Finland and Russia have cooperated on improving nondestructive testing (NDT) activities. Finland has supplied new NDT equipment, inspection techniques, and training at the Leningrad power plant, which have reduced the radiation doses for personnel dealing with the systems and improved the inspection of welded joints. Finland supplied modern ultrasonic inspection measurement and analysis equipment to assist in the inspection of the heat exchange tubes of the condensers of steam turbines. This equipment enables the assessment of the condition of the pipe work and the chemistry of the water, as well as the reliability of the primary coolant circuit. Many Finnish experts have been sent to visit the Leningrad plant, and numerous workers from the plant have been sent to Finland for training.

1. Radiation and Nuclear Safety Authority, "Radiation Safety across Borders: STUK's Support for Neighboring Countries 1992–2002," Finland, 2002.

2. Scientific and Technological Options Assessment Program, Directorate General for Research, European Parliament, "Nuclear Safeguards and Nuclear Safety in the East: Final Report," Luxembourg, November 1996, p. 41.

3. Radiation and Nuclear Safety Authority, "Radiation Safety across Borders."

The Finnish companies VTT Technical Research Centre and Polartest Oy in particular assisted in these efforts.

A five-year agreement between STUK and GAN was signed in June 1998 to cooperate in the area of regulatory activity in nuclear materials and radioactive waste management and in the oversight of nuclear material control, accounting, and physical protection.

## Training

Since 1992, Finland has provided training to the personnel of Russian power plants on operating and maintenance procedures, emergency procedures, fire fighting, modernization of nuclear power plants, and information systems. It has also assisted in sending Russian personnel to International Atomic Energy Association (IAEA) training sessions. In addition, STUK has organized training for the Leningrad nuclear power plant NDT inspectors regarding manual and mechanical ultrasonic inspection, X-ray inspection, examination of liquid penetration, magnetic particle examination, and measurement methods. To this end Finland has provided equipment, supplies, and inspection instructions.

Finland installed an advanced training simulator that assists operators in controlling plant disturbances and containing accidents at the Kola power plant units 1 and 2. This simulation environment is equipped with workstations for the operators and instructors and displays the equipment in the control desks and panels of the plant's control room, including measurements, electrical systems, and alarms. Regular training of operators on the simulator began in 1999. The simulator has been upgraded and updated since then with a new reactor power control system and electrical system to correspond to the changes that have been implemented at the plant.

Finland has also provided training and equipment to the Estonian Radiation Production Centre since its establishment in 1997.

## Borders

Finland aims to bring the large quantities of radioactive substances under the supervision of the authorities and prevent illegal trafficking. Finland has helped Russia, Ukraine, and the Baltic countries to establish and maintain national accounting and monitoring systems for nuclear materials and to monitor the export and import of nuclear and other radioactive materials. It assisted in the development of regulations, instructions, and inspection methods and procured radiation-monitoring equipment. To help prevent smuggling, for example, Finland donated a system to monitor the radiation of passengers and luggage to the Tallinn Airport. Seven automatic radiation monitors were installed in 1999–2000 at various points in the terminal to register an alarm at those locations, in the central command room, and at the customs office. Finland also donated portable radiometers to Russian border stations and has trained customs authorities.

## Emergency Preparedness

In 1987, Finland and Russia signed the Agreement on the Reporting of Accidents and Exchange of Information on Nuclear Power Plants. This agreement stipulates provisions regarding alarm links, notification thresholds, exchanges of notification of nuclear accidents, and information on nuclear plants. Both countries cooperate in exercises for emergency preparedness and the exchange of information on events pertaining to nuclear safety. Finland has provided a telephone exchange system and air samplers for mobile measurements and laboratory activities at MINATOM's regional emergency response center in St. Petersburg. This center monitors northwest Russia and assists the authorities in tracking radiation, protecting the population, and producing information. Finland maintains modern communications and a state of readiness through the services of experts continually on duty. It also uses modern radiation-monitoring techniques under the Comprehensive Nuclear Test Ban Treaty and for covering its own nuclear power plants. Each Nordic country has a bilateral agreement with Russia concerning accident notification and information exchange. Finland has provided experts to the European Commission body (Directorate General of the Environment) that deals with emergency preparedness in Russia.

In 1994, a bilateral project was launched to build a monitoring network to cover the vicinity of the Leningrad nuclear power plant. A system was created that made the monitoring data available in real time to the plant and to Finland (STUK), if necessary. The data are transferred from the local communications systems to Finland through the independent INMARSAT satellite system. In 2001 the two countries also agreed to a redundant data transfer through the emergency response centers in Moscow. This has enabled the timely clarification of small increases in the normal level of radiation. A similar monitoring network was created for the Kola nuclear power plant in 2000. Should an unusual event occur, this system transfers monitoring data to STUK through the MINATOM emergency response center in Moscow. In 1992 a Finnish company designed and installed in the GAN on-site inspection units an alarm and notification system that ensures independence from external disturbance. These systems have been updated, and a satellite connection would immediately notify STUK of radioactive emissions. A similar notification system has been installed in the harbor area of Murmansk for civil nuclear vessels. This equipment provides rapid notification to Russian, Finnish, Swedish, Norwegian, and Danish authorities of abnormal events at nuclear installations.

## Nuclear Waste Cooperation

Finland has studied the amount of radioactive materials and waste as well as waste disposal in Russia. The two countries have exchanged information on regulatory activities, and Finland has supported a number of projects, either directly or through the International Science and Technology Center (ISTC) and the Technical Assistance to the Commonwealth of Independent States (TACIS) Program. As a party to the ISTC, Finland financed €1 million of projects in 1994–1995. It also provided €3 million for the IAEA Safeguards Support Program.[4] Finnish equipment has been used to clean up liquid radioactive wastes at Paldisk in Estonia and at the

Atomflot shipyard in Murmansk, Russia. In May 1996 the Foreign Ministry provided $700,000 to the Finnish company IVO Power Engineering to use a Finnish mobile waste-processing facility, Nures, to treat liquid radioactive waste from nuclear-powered icebreakers at Atomflot.[5] Within a year Nures had processed 300 cubic meters of waste. According to STUK, this was the only Western project where radioactive waste in Russia has been successfully treated.[6]

Also in 1996 Finland assisted Estonia in dismantling a nuclear submarine training base established under the Soviet regime in Paldisk. Finnish Nures equipment purified 760 cubic meters of liquid radioactive waste there, and since 1997 STUK has provided equipment to the Estonian Radiation Protection Centre. STUK participated in a project to build a storage and transport cask in Murmansk to store spent fuel in vessels and to transport it to Mayak. It has also promoted the ISTC financial support to GAN in developing a code of nuclear waste regulations.

Since 1995 Finnish experts have provided technical assistance to the authorities responsible for the management of radioactive waste in St. Petersburg and northwest Russia. They have reviewed the collection, processing, storage, and final disposal of nuclear waste. Finland has also been active in the Contact Expert Group of the IAEA that promotes the safe management of nuclear waste in Russia. Under the auspices of the Contact Expert Group, Finland will provide expert assistance to help clean up the former naval base at Andreeva Bay, scheduled to begin in 2002. Andreeva Bay is the main nuclear waste storage site of the Russian Northern Fleet, where a radiation leak occurred in 1982. It is located near the Barents Sea, where Norway, Finland, Japan, and Russia send their fishing fleets. The naval base has the largest concentration of nuclear waste in the area and contains about 100 reactor loadings of damaged spent submarine fuel, which has been stored in poor conditions. The area is contaminated, and much of the radiation-monitoring equipment is inoperable.

## Safeguard Support Programs

The safeguard support program for Russia began in 1996 and has focused on preventing the smuggling of radioactive substances, curbing illegal activities relating to nuclear power plants and nuclear materials, and promoting cooperation among authorities in control of nuclear materials. Finland is an active participant in international export control arrangements. In addition to delivering radiation-monitoring equipment at the borders, Finland has trained Russian customs officials at STUK and Finnish nuclear power plants on issues related to radiation monitoring.

Finland has provided seminars and workshops for customs and border guard personnel to help prevent smuggling radioactive substances in the Baltic states as part of a support program for those states to develop national safeguards. The Min-

4. Liisa Maunula, counsellor, Arms Control, Nonproliferation and Disarmament, Ministry for Foreign Affairs, Finland.

5. James Clay Moltz, "Russia: Naval Fuel Cycle Foreign Assistance Overview," Center for Nonproliferation Studies, Monterey Institute of International Studies, April 1998, p. 2.

6. Radiation and Nuclear Safety Authority, "Radiation Safety across Borders."

istry for Foreign Affairs, in coordination with the OSCE Secretariat, organized a border management training seminar for the Central Asian countries in Helsinki in June 2002. The purpose of the seminar was to help Central Asian countries reinforce national export control and border security systems in order to reduce illicit trafficking of small arms, drugs, and strategic goods, with particular emphasis on nuclear and other radioactive material and nuclear-related dual-use goods and technology.

Finland, together with the IAEA, supported Ukraine in creating a national safeguards system when Ukraine gave up its nuclear weapons and placed its nuclear materials under international safeguards. Ukraine needed to create a safeguards system that would meet international requirements, and Finland was the only Western country that had VVER, older water-cooled reactors similar to those in Ukraine, under effective safeguards. The support included control equipment, a database system, national regulatory guidelines, and training.

## Chemical

In 1996 Finland began to consider contributing to the Russian Chemical Weapons Stockpile Destruction Program and presented a proposal in January 1997 for a chemical warfare agent detection network. Russia and Finland decided to install a detection network to improve safety at the Kambarka storage site, as lewisite tanks were considered a significant threat to the local population. The government contributed 6 million markka (€1 million) to the program.[7]

In 1997, Finnish, Swedish, and Dutch experts visited Kambarka to evaluate the proposed monitoring system. Detector testing was also conducted at the Russian Military University of Chemical, Biological, and Radiological Defense. Following delays over customs and taxation modalities, the Ministry for Foreign Affairs of Finland and the Ministry of Defense of the Russian Federation finally signed an agreement in October 2001.

The Finnish contribution toward the implementation of the special federal program, Destruction of Chemical Weapons Stockpiles in the Russian Federation, consists of delivery and installation of an M90 Fixed Chemical Warfare Agent Detection Network. The purpose of the network is to provide an early warning of a possible lewisite leakage in the storage area of Kambarka. The network meets the requirements for the fixed CWA early warning network.

The first phase of Finland's contribution (€0.4 million) was the delivery of the detection network to Kambarka. Environics, the company that delivered the network, also trained local personnel for daily operation and basic maintenance of the system. The equipment was installed in July 2001. Finland has reserved €0.6 million for the second phase of the project and is considering the possibility of using these funds for a destruction site in Gorny that has been proposed by the Russian Federation.[8]

---

7. Pilvi-Sisko Vierros-Villeneuve, director, Arms Control, Nonproliferation and Disarmament, Ministry for Foreign Affairs, Finland.

8. Ibid.

## Future Priorities

Owing to Russia's poor economic situation, foreign support for threat reduction will almost certainly be needed for some years into the future. Joint Nordic projects in the nuclear area, in particular with Norway and Sweden, are expected to broaden in scope over the next few years, as these countries are able to implement and finance larger projects when they pool their expertise and resources. It is further expected that cooperation with the Russian Federation and the Baltic countries will continue in nuclear materials safeguards and other areas.

Following the events of September 11, 2001, nuclear terrorism will be a new focus for Finland, and export controls and other related issues will receive more pronounced attention. More coordination on these issues will be planned within the EU and between the EU and the United States to avoid duplication of work, particularly regarding assistance given to countries such as those in Central Asia.

## Comparative Advantage

Finland has developed an efficient real-time nationwide radiation-monitoring network, sophisticated equipment, and expertise in both the nuclear and chemical fields. It could expand on the projects it has worked on in the past as well as broaden into new areas. Finland's proximity (as the closest EU member) to the Russian Federation and the historical ties between the two countries give Finland a unique ability to relate to the former Soviet countries. Joint Nordic projects are expected to increase in the next years, especially with Norway and Sweden. Norway is interested in cooperating to enhance waste management at the Kola nuclear power plant and Murmansk. Sweden can offer significant experience and knowledge regarding the nuclear industry. The Nordic countries could also use to good advantage their tradition of cooperating with the Baltic countries.

## Decisionmaking Environment

The key decisionmakers on cooperative threat reduction, or CTR, are the parliamentarians and the Ministry for Foreign Affairs. The government presents to Parliament in March a frame for the budget of the upcoming year. The ministries each prepare a plan that is coordinated by the Ministry of Finance and presented to Parliament in the autumn. The final budget is approved by Parliament in December. The ministry then decides how the money will be distributed.

Finland's VTT Technical Research Center is a company of about 3,000 employees that works on technology and applied research, about one-quarter of which is government-related; some of this relates to CTR.

The government provides an opportunity for NGOs to be heard on a variety of issues, including the budget, and efforts are under way to improve transparency in this regard. The Ministry for Foreign Affairs, STUK, and other authorities regularly publish information about their activities regarding assistance to neighboring

countries. This information is available to the media and the public through the Internet, bulletins, and publications. The number of newspaper articles on these questions would indicate that the public is interested. However, despite the existence of an umbrella organization of NGOs, the Citizens' Security Council (KATU),[9] government sources say that there is scarce feedback from the NGOs and the public.[10]

## Lessons Learned

Finland has succeeded in providing equipment (e.g., for radionuclide monitoring and radioactive waste cleanup), training, exchange of information, and expertise in a variety of projects. An independent evaluation of Finnish assistance to nearby areas completed in 1998 found that the financing has been efficiently implemented. Finnish assistance has directly lowered the risk to the populations of both Russia and Finland; indirectly it has helped create, through training and other programs, a "safety culture."

That is not to say that all work has proceeded smoothly. Along with technical questions, there are problems involving logistics, customs, and travel, etc., and the practical work often requires moving around in demanding northern climatic and geographic conditions. Equipment frequently needs to be installed in difficult environments, and the tasks of procuring materials and supplies or making repairs are often complicated. Further, no global or bilateral solution has been found for the nuclear liability question related to measures at Russian nuclear power plants. This problem has caused considerable delays for some of the projects and contracts.

In addition, political problems frequently enter the equation for funding cooperative threat reduction. For example, in 1977 the Ministry for Foreign Affairs withdrew funding from a project to process liquid waste from Russian nuclear submarines at Andreeva Bay because it believed that the money might be used by Russia to strengthen the military capability of the Northern Fleet.[11]

At the end of the day, Finland has found that cooperation involves not only technical development projects and agreements but also multicultural understanding and respect.

9. See <http://www.katu-network.fi>.

10. Liisa Maunula, counsellor, Arms Control, Nonproliferation and Disarmament, Ministry for Foreign Affairs, Finland.

11. "Kola Radwaste Project Suspended," *Nuclear Engineering International*, August 1997, p. 6.

CHAPTER 4

# France

*Isabelle Facon, Cécile Maisonneuve,* and *Bruno Tertrais*
Fondation pour la Recherche Stratégique

## General Framework and Initial Threat Assessment

The political basis for French involvement in cooperative threat reduction, or CTR, includes France's responsibilities as a nuclear-weapon state and a permanent member of the UN Security Council and its willingness to play a meaningful role in European security. In addition, after the fall of the Soviet Union, many French policy experts were concerned that new nuclear countries would appear on the continent—most alarmingly, Ukraine. French political leaders made numerous references to the security risks posed by "oversized" nuclear arsenals on the Eurasian landmass—a not-too-subtle reference to the need for Russia to reduce its nuclear arsenal without delay.

The Gulf War further highlighted the perils of nuclear proliferation and dissemination. France ratified the Nuclear Proliferation Treaty in 1992, reduced its nuclear arsenal unilaterally, and became a major player in the nuclear nonproliferation field, in particular by promoting the creation of new multilateral instruments and the improvement of those that already existed.

The swiftness with which France committed itself to CTR has to be understood in light of this turning point in French disarmament and nonproliferation policy. In the post–Cold War world, awareness of the dangers linked to Soviet nuclear weapons was so vivid that France did not want to miss what was considered a historical opportunity for implementing nuclear disarmament.

Nuclear cooperation is by far the most significant of French CTR-type programs, building on extensive French industrial experience in the nuclear field and on existing relationships between French and Russian laboratories. Underlying principles guiding French CTR programs include the promotion of "irreversibility" (which France claims to have adopted for itself as far as nuclear disarmament is concerned) and the desire to avoid "trading nonproliferation for disarmament" (in other words, actions to help the ex-Soviet countries reduce their arsenals should not lead to a greater risk of proliferation).

# Quantitative Assessment: The AIDA-MOX Program

## The Framework of French-Russian Nuclear Cooperation

In 1992, France formally decided to engage in nuclear cooperative threat reduction with Russia. The AIDA (Aide au démantèlement) program began later that year. The legal basis for AIDA includes, on the political side, the French-Russian security cooperation treaty (February 7, 1992); a French-Russian agreement on nuclear threat reduction (November 12, 1992); a French-Russian agreement on nuclear energy cooperation (April 19, 1996); and a French-German-Russian trilateral agreement on AIDA-MOX 2 (June 2, 1998).

On the industrial side, it includes in particular a MINATOM/COGEMA (Compagnie Générale des Matières) agreement to promote nuclear fuel business (July 31, 1992); and a MINATOM/CEA (Commissariat à l'Energie Atomique) technical agreement (March 10, 1993).

Due to its "interministerial" nature, the AIDA program is run and monitored by the SGDN (Secrétariat Général de la Défense Nationale), a coordinating body under the authority of the prime minister.

The initial phase of the AIDA program ("AIDA Phase 1") covered five areas:

- The free delivery of radiological measurement equipment, both for area detection and personnel surveillance, at a cost of Fr 55 million ($7.85 million).
- The free delivery of 100 large containers to help repatriate weapons from the former Soviet republics. These high-quality containers, delivered in 1994, were specifically designed for the AIDA program, according to Russian specifications. Their cost was Fr 148.5 million ($21 million).
- The free delivery of high-precision metal-cutting tools to help with the dismantlement of weapons, at a cost of Fr 15.1 million ($2.15 million).
- The construction of a dedicated building for the storage of by-products of dismantlement of nuclear weapons (essentially lithium derivatives). "Building 737" is located near Novosibirsk, Russia. The 5,000-square-meter modern structure—built by the French firm Spie-Batignolles and the CEA and delivered in December 1997—can store about 3,000 by-product containers. Built according to French norms adapted to Siberian climate constraints, its cost was Fr 154.7 million ($22.1 million).
- The conduct of feasibility studies for using plutonium as a nuclear fuel through the MOX process (see below), known at the time as "Project TOMOX." The amount spent for these studies was Fr 44.2 million ($6.31 million).

The total French financial commitment to AIDA represented Fr 400 million (1992) between 1992 and 1996 or $ 57.1 million.[1]

1. Basis used throughout the text: 1 U.S. dollar = 7 French francs. In official French documents dated 2001, the cost was estimated to be Fr 417 million (2000), thus about $59.5 million.

## The MOX Concept

The MOX (Mixed plutonium/uranium OXide) process, which involves degrading the isotopic quality of plutonium to make it available for burning in civilian reactors, is well known in France. In the 1970s, the concept of recycling plutonium as a nuclear fuel had been studied and validated by the state-run nuclear energy industry, EDF (Electricité de France). According to EDF plans at that time, no fewer than 16 out of the then-planned 28 900-megawatt reactors were to be capable of burning MOX.

MOX began to be produced in the MELOX plant located in the reprocessing facilities of La Hague, with an annual output of about 100 tons. In 1987, France started burning MOX in its reactors. In 2000, 20 of the 28 MOX-certified 900 megawatt plants were actually using MOX. EDF adjusts the production and exact composition of MOX in a way that ensures that the use of this fuel is not more expensive than traditional fuels.

MOX was *not* designed or intended to recycle weapons-grade plutonium, but rather as a means to limit the stocks of plutonium produced by the civilian industry.

## Adapting MOX for Cooperation with Russia

The MOX process, which rested on extensive industrial experience, soon appeared attractive to the Russians. The process was also promoted by the French as one of the best options from a nonproliferation point of view, as it was the only one that guaranteed irreversibility—a key aspect of French nuclear disarmament and nonproliferation policies.

The AIDA-MOX-1 studies (1993–1996) aimed at ensuring that Russian plants (in particular the VVER-1000 and BN-600) could be adapted to burning MOX. In March 1996, the French government decided to continue the AIDA program, and on June 2, 1998, a two-year, trilateral agreement (AIDA-MOX 2) was signed with Russia and Germany in order to launch more in-depth studies, aimed in particular at adapting Russian reactors to allow them to burn MOX. The agreement, which is automatically renewed unless otherwise agreed by the parties, covers the following:

- *A conversion plant called CHEMOX.* This plant would transform weapons-grade plutonium (W-Pu) into plutonium oxide ($PuO^2$) and then mix it with uranium oxide. MINATOM has chosen the site of Chelyabinsk-65 (Mayak) for the CHEMOX plant.[2] The process will involve two successive conversion steps, one based on a Russian/French (VNIINM/COGEMA) process and then one based on a proven process developed by COGEMA in La Hague. The plant's output capacity would be about 2.5 tons of Pu/year (with a possible extension to 4 tons/year). The construction and licensing is to take place between 2002 and 2005, with a planned start-up date of 2007.
- *A fabrication plant called DEMOX.* This plant would turn the output of the CHEMOX plant into actual pelletized MOX fuel, building on a proven Russian process (COCA) for BN-600 fuels and a proven French process (A-MIMAS) for VVER-1000 fuels. Two sites are under study, including one at Mayak. (The con-

2. Both COGEMA and Siemens have contracts with the existing Mayak reprocessing facilities.

cept originally included the transfer to Russia of equipment used in the MOX plant built by Siemens at Hanau; however, those plans have since fallen through, and studies are now under way to devise replacement solutions.) Like CHEMOX, the output capacity of DEMOX would be about 2.5 tons of Pu/year, with a possible extension to 4 tons/year (a U.S. study has explored the 4 tons/year option).

- *A fuel test and licensing process called MOX Demo.*
- *The modification of one BN-600 fast-breeder.* AIDA studies showed that limited adaptations of a BN-600 reactor could permit a 25 percent fuel core load with MOX.
- *The modification of four to seven VVER-1000 reactors.*[3] AIDA studies showed that limited adaptations of VVER-1000 reactors could permit a 30 percent fuel core load with MOX.

So far, the agreement has generally been considered successful, largely owing to industrial motivation and the use of proven technical processes.

The total French financial commitment to AIDA-MOX 2 between 1998 and 2001 represented Fr 60 million ($8.57 million). This time the choice was made to involve industry (COGEMA, EDF, FRAMATOME); thus the French government's contribution was limited to about 60 percent (Fr 35 million). The total cost of AIDA-MOX-2 studies is about €14 million (about $14 million at current rates), of which about 30 percent are borne by Russia and about 70 percent by France and Germany. The final AIDA-MOX-2 report is to be issued at the end of 2002.

The actual implementation of AIDA-MOX will require a continued financial commitment from member countries. On September 22, 2000, the French government announced that it was ready to spend, for the continuation of AIDA programs, an amount comparable to what had already been spent (thus, about $60 million–$70 million), pending an agreement among Western powers and with Russia. More specifically, according to Prime Minister Lionel Jospin in his annual defense policy speech:

> In 1992, France engaged in a program of cooperation that has led her to invest 460 million francs over six years in these areas. I want to underline in front of you that the French government is willing to commit itself to a comparable effort in the coming years. This renewed commitment implies, of course, that the conditions of the development of the program be met, and in particular that the structure of the multilateral organization envisioned by the declaration of heads of state and government of the G-8 at Okinawa, be defined. The next Genoa summit, in 2001, will be the occasion to take stock on these essential questions.[4]

---

3. The modification of the Russian plants involves adaptation and validation of Russian computer codes and reactor modifications. The AIDA concept involves seven VVER-1000 reactors; the U.S. studies involve only four of them.

4. "Allocution du Premier Ministre, M. Lionel Jospin, lors de l'ouverture de la session annuelle de l'Institut des Hautes Etudes de Defense Nationale," Paris, September 22, 2000.

The overall cost of the operation has been estimated by two separate studies to be between $1.6 billion and $2 billion, evenly distributed between investment and operating costs.[5] The biggest share of that sum would be for the DEMOX plant ($0.9 million). So far, about $600 million has been pledged, primarily by the United States (about $400 million) and France ($60 million–$70 million). Belgium, Canada, Germany, and Italy might also contribute.

### Other French CTR Programs

France participates in European Union (EU) programs, in particular the 1999 Joint Action on nonproliferation in Russia (construction of a pilot plant in Gorny). In addition, the French government announced in September 2000 that it was available to discuss with Russia requests for help with the disposal of chemical weapons, in particular in the EU framework. According to Jospin:

> Our country, as I have told you, is actively engaged in the AIDA program to help dismantling Russian nuclear weapons; it is also willing—through cooperation, in particular, with its European Union partners—to study Russian requests for assistance in the destruction of chemical weapons, a huge stockpile that remains a major problem.

However, French-Russian discussions to that effect have not yet been conclusive. France also participates modestly in the International Scientific and Technical Center (ISTC). A French national, Alain Gérard, is a former director of the center.

## The Russian Perspective: Pluses and Minuses—and Prospects for Future Cooperation

The Russian attitude toward French cooperative threat reduction programs has been positive overall, both because of perceived mutual interests and approaches in the nuclear field, and more general foreign policy ambitions on Russia's part. However, French CTR programs have faced the same problems and hurdles as those funded by other countries.

Russian officials welcome foreign assistance programs aimed at demilitarization or military conversion with cautiousness and reluctance, if not outright hostility. The French AIDA programs, especially in their early stages, encountered the same problems as the equivalent U.S. programs, the most important being the difficulty of gaining access to Russian nuclear sites. In addition, Russian authorities lack the capacity and/or the willingness to boost their financial contribution to the various CTR programs.[6] For instance, the Russian government has made clear it will not be able to pay for CHEMOX and DEMOX investment and operation costs.

---

5. Out of a total of $2 billion, the cost of "saved fuel" is estimated to be about $350 million, thus reducing the actual cost to $1.65 million.

6. Russia's Western partners frequently stress that the relative stabilization of the Russian economic situation over the past three years should lead to an increase in the Russian state's contribution to funding threat reduction programs.

Cooperation with Russian nuclear laboratories or institutes can be efficient at the scientific level (for example, COGEMA-Kurchatov on the adaptation of Russian reactors to MOX use and COGEMA-GSPI), but difficult when it comes to cost-assessment and economic performance. Russian nuclear entities are still not used to Western-style accounting and cost-efficiency practices, reflecting the privileged status they enjoyed in Soviet times, when they received heavy state subsidies and did not have to worry about costs.

According to French experts in charge of negotiating or implementing CTR programs, MINATOM has also proved to be a difficult partner. One reason is MINATOM's relative autonomy from the government, a phenomenon that was particularly salient in the Yeltsin years. As a result, the Russian side's attitude in both preliminary discussions and concrete implementation of the programs has more often than not been rather confused and at times even contradictory. MINATOM's positions are often characterized by its partners as opaque and inflexible, if not incoherent. The perception that the Russian state's failing control over MINATOM is at least potentially a proliferation risk has not helped implementation of threat reduction programs.

Another complicating factor is the freedom of maneuver enjoyed by MINATOM laboratories, firms, and institutes, which has been a major problem in both the negotiation and implementation of a number of threat reduction programs. The VNIINM (Bochvar) and Kurchatov institutes, both engaged in the AIDA-MOX programs, have not been exceptions to this rule; VNIINM has apparently been rather free in expressing its opposition and obstruction to a number of approaches. (In the nuclear sector, as in many other Russian sectors, an institute's attitude toward foreign partners depends largely on its bargaining power in relation to federal authorities or on the personal ties of one of its leaders to officials within MINATOM or the government.)

These difficulties notwithstanding, the AIDA-MOX programs do contain elements that have appealed to Russian authorities and encouraged their cooperation. There is a "demilitarization dimension" to the programs, since they involve conversion of W-Pu, but at the same time, Moscow seems to perceive them as conducive to Russia's national strategy of supporting its nuclear industry's prestige.

MINATOM may feel that such programs can help boost the reputation and health of the national nuclear sector through the engagement of major firms and institutes in international programs. Indeed, MINATOM has worked hard over the past 10 years to maintain both the competence and the prestige of the nuclear industry in spite of the financial trouble the latter has endured since the late 1980s. As part of this strategy, MINATOM has devoted a significant part of its scarce resources to a number of institutes and firms supposed to represent the sector's greatest skill and potential. Among these "happy few" are VNIINM and Kurchatov. Moreover, given the budgetary crunch in the Russian nuclear sector, French and German funding made available for feasibility and other studies, even if relatively limited, could only be welcome[7] (despite criticism on the Russian side in connection with what is viewed as the Europeans' lack of willingness to resort to Russian technologies and processes). In addition, the MOX programs are in keeping with

the "philosophy" of the Russian government, which considers plutonium not as a waste, but as a valuable material and energy source.

These programs have also been viewed as potentially helpful in supporting some foreign policy objectives. Over the 1990s, the Russian political, military, and military-industrial elite grew increasingly resentful of the dominant U.S. role in international threat reduction initiatives—and critical of what they view as the "hidden agenda" behind these programs (allegedly preventing the reemergence of the Russian military-industrial complex, securing access to promising Russian technologies, asserting control over the Russian nuclear sector, etc.).

Russia's positions on these fronts were rather ambivalent over the 1990s, to say the least. Indeed, while complaining that the Europeans were not active enough, Russian officials initially spent much more energy building dialogue and cooperation with the United States than with the Europeans. This reflected Russia's desire to recreate, even in a reduced format, the traditional superpower-to-superpower dialogue on strategic and nuclear issues. As a result of these expectations, part of the Russian political and military elite tended to consider that on such issues, the United States was the only valid interlocutor. At the same time, seeing the former archrival take the lead in demilitarization assistance to Russia was painful to the very same Russian officials.

This frustration periodically led the Russian leadership to turn to the Europeans for a more balanced picture of foreign threat reduction assistance. Before the entry into force of the Treaty on the European Union, the Europeans had no efficient common tools to position themselves on such issues as disarmament and nonproliferation—yet Russia continued to pursue diversification and "Europeanization" of CTR-type initiatives.[8] The fact that European countries, not the United States, have expertise and technologies in dealing with MOX may have played a part in spurring Russia's interest in this option.

Such Europeanization, while marginal when compared with U.S. financial assistance for threat reduction, was perceived by Russia as providing useful political counterweight. For example, the United States favored a "dual-track" approach to do away with its own weapons-grade plutonium, but Russia opposed one of the U.S. options—immobilization—because of its reversibility. Engaging in the AIDA-MOX program on the grounds that it contributed more to international nonproliferation efforts was viewed by Russia as a potential tool both to assert itself as a responsible player on the world stage and to convince the United States to choose the MOX option.[9] However, despite the perceived advantages Russia attached to the AIDA-MOX programs, the picture is still rather complex, mostly for industrial and commercial reasons.

---

7. A number of studies have been conducted by Russian institutes: adaptation of the VVER-1000 and the BN-600, design of the CHEMOX and DEMOX plants, cost estimates for the whole program, etc.

8. As was said, Germany is involved in MOX studies, and several European countries have expressed an interest in taking part. The fact that France traditionally defends positions similar to those of Russia (for instance on the role of the UN Security Council, on sanctions against Iraq, on the need for counterbalances to U.S political, economic, and military world leadership) may also have played a part here.

First, the Russians resent the fact that Western, not Russian, technologies have generally been favored in MOX industrial projects.[10] VNIINM has long argued that it has the required technologies; the French response is that Russian technologies are only at the R&D stage with regard to light-water reactors (VVER-1000) and that only Western and "well-established" technologies will attract international funding for the MOX program.[11] It is not clear whether VNIINM's attitude is shared by MINATOM and the Russian government, but it is certainly widespread among Russian politicians. It therefore has to be taken into account as reflecting a general Russian irritation that most Western conversion and nonproliferation assistance programs benefit primarily U.S. or European consultants, firms, or institutes—not Russian ones. Compounding the "junior partner syndrome" of the post-Soviet Russian political, military, and industrial elite, these conflicts of interests have created additional obstacles in the running of the various programs.

The Russians also argue that adapting their light-water reactors to use MOX fuel is both complex and costly, and they insist that MOX fuel will compete with traditional Russian nuclear fuels on the domestic market. For both reasons, they say, the whole process is only worthwhile if Russia is allowed to sell domestically produced MOX to Western European nuclear power plants. Other Russian officials use the same arguments to say that the revenues from such exports could help Russia shoulder part of the MOX plants' operating costs. Needless to say, France could not support this approach, as it would mean that Russia, thanks to French state and private funds, would be enabled to export fuels (produced with French technologies) that would compete directly with France's own nuclear industry. Moreover, if French authorities qualify Russian MOX fuel for export, they would also qualify regular Russian nuclear fuels, which are even more competitive.[12] Such a prospect is unacceptable, given that the Russians are not prepared to contribute to investment and operational funding for their MOX plants.

The Russian side often retorts that Russia has no economic or technological incentive to start transforming W-Pu into MOX, only political and nonproliferation incentives. (This argument has become more salient since Moscow and Washington signed in September 2000 an agreement committing them each to dispose of 34 metric tons of surplus plutonium.) France's insistence that there be coherence between various MOX-related projects, including those in the framework of U.S.-Russian bilateral cooperation in this field, has led to some tensions between France and Russia.[13]

9. In February 2002, following a review of U.S. nonproliferation programs, the Bush administration finally decided it would use the MOX option to dispose of surplus weapons-grade plutonium.

10. Russian technologies are employed in both CHEMOX and DEMOX projects.

11. Russia has developed technology to use MOX fuels only for fast breeders.

12. It is worth noting that critics question the value of MOX fuel and, doubting the viability of the market for MOX, stress that converting military-grade plutonium into MOX is primarily a political project (with, among other purposes, that of displaying strong commitment to nonproliferation action).

13. These tensions were probably heightened in 1999–2000 by the general degradation of French-Russian relations linked with the Kosovo crisis, France's criticism of Russian military operations in Chechnya, and a number of diplomatic incidents over that period.

Several factors may influence the evolution of the MOX agenda after the current agreement ends this year. First, MINATOM might become easier to deal with. Under Vladimir Putin, the Russian government has started strengthening its control over this institution. The new minister, Aleksandr Rumiantsev, appointed late in March 2001, has proved much less inclined to pursue an independent line. Under this new leadership, MINATOM has started reforming the nuclear sector, as ordered by the government—in particular, separating the civilian and military sectors of the industry. This development is generally described as positive on the French side and as a significant step generating both more coherence and more transparency in the sector, as well as in the negotiation position of Russian counterparts.

It could mean a more favorable climate for negotiating a follow-up to AIDA-MOX programs, especially since both the VNIINM and Kurchatov institutes now have very high-level representatives in MINATOM, which might reduce their ability to pursue independent agendas: Rumiantsev was previously the director of the Kurchatov institute, where he spent most of his career; and the former director of VNIINM, Mikhail Solonin, was appointed the first deputy minister for atomic energy on January 28, 2002. At the same time, both Rumiantsev and Solonin have been fierce defenders of Russia's nuclear competence, skills, and interests on the world stage. Rumiantsev is used to dealing with foreign partners, which could be a bonus in negotiations on the future of MOX programs.[14] On the other hand, he has been very active in trying to reduce the dependence of his institute on foreign assistance.[15] In his new function, Solonin replaces Valentin Ivanov, who used to be rather open in relations with foreign partners (among other things, he often tried to persuade Solonin, when the latter was the director of VNIINM, to display more flexibility in the AIDA-MOX framework). In sum, the recent bureaucratic changes might be both positive and negative as far as future discussions are concerned.

Second, the broader framework of Russian foreign and security policies might affect the overall program. For example, Russian officials, seeking to enhance their country's participation in international decisionmaking, have increasingly stressed their interest in strengthening multinational frameworks with which Russia is associated, such as the G-8. Will the effort to anchor threat reduction initiatives in the G-8 framework help alleviate Russian concerns about the political and economic consequences of the MOX programs? A favorable evolution, from this point of view, is the recognition of Russia as a full member of the G-8 during the June 2002 summit in Kananaskis and the approval of a Global Partnership against the Spread of Weapons and Materials of Mass Destruction, which will devote up to $20 billion over the next decade to threat reduction initiatives.

Russia has tried to strengthen its integration within the European economic space by promoting an energy partnership with the EU. How will the above-mentioned industrial and economic conflicts of interest influence and interact with this

14. Rumiantsev has experience with threat assistance programs. Kurchatov is one of the institutes using U.S. protection and security devices.

15. When he was the director of Kurchatov, A. Rumiantsev favored conversion programs aimed at providing equipment to the domestic oil and gas industries.

strategy? More generally, President Vladimir Putin has stressed his willingness to engage Russia in a political and security partnership with the European Union. Will this willingness, if it proves genuine and long lasting, encourage more active threat reduction initiatives on the part of the EU, which has emphasized its intent to elaborate a more detailed and comprehensive nonproliferation policy?

Russia and the United States are also in the process of redefining their strategic relationship. In many respects, this has proved a difficult process, and this remains true despite some recent positive developments, such as the May 2002 signing of a new treaty on cuts in strategic offensive weapons, which will increase the need for weapons-grade nuclear materials disposition. Russian officials are suspicious of U.S. plans to store rather than destroy warheads, which might result in reduced, not enhanced, transparency on Russia's part in the implementation of threat reduction initiatives.

This problem is all the more acute in that the new strategic arms reduction treaty does not address the Russian arsenal of tactical nuclear weapons—a subject of renewed concern among Western experts in the post–September 11 context. Some European countries at the June 2002 G-8 summit stressed the lack of Russian transparency[16] as a significant roadblock to making further progress in threat reduction.

# Going Forward

## French Interests

**Security.** As suggested above, the initial rationale for the AIDA-MOX program was simple: In the wake of the Soviet Union's collapse, it was necessary to immediately repatriate to Russia and secure all the nuclear weapons disseminated throughout the territory of the FSU. For post–Cold War France, the memory of the massive and deadly threat coming from the Soviet Union was very vivid in 1991–1992; this is why the stakes were then considered in terms of a military threat. There was also widespread concern at the highest policy levels about the possibility of new nuclear powers emerging on the Eurasian landmass. This explains the swiftness with which France committed itself to Russian nuclear disarmament and why it dedicated a significant amount of money to this purpose.

Today, the perception of the threat has evolved. The question is no longer how to neutralize a Russian military threat; instead, the rationale for participating in nuclear disarmament programs rests on the idea that the current stocks of weapons of mass destruction in Russia put European security at risk. Through its cooperation with Russia, considered a major European country and "rational" actor, French policy aims to contain the maneuvers of other actors who violate international rules. Weapons of mass destruction are deemed particularly attractive for some terrorist groups operating in the former Soviet republics. Terrorist scenarios,

16. Another field in which Western countries expect Russia to display greater transparency is its nuclear cooperation with such "sensitive" countries as Iran, North Korea, China, and others.

which were formerly seen as plausible but very improbable, are now considered improbable but very plausible.

It should be added that, from a European point of view, environmental and security threats are linked. In the mind of every European, reducing the threat in Russia is also a matter of environmental security, 15 years after Chernobyl. The shadow of a new nuclear-related accident in Eastern Europe is also a question potentially affecting French energy policy.

Finally, since 2000, French policymakers have insisted, when dealing with their Russian counterparts, on the need for more transparency and faster reductions of short-range or "theater" nuclear weapons, which in Paris are increasingly considered as a subject of European concern. So far, however, this new set of considerations has not translated into a new political impetus for increased threat reduction efforts.

**Industrial.** The challenge that Russian weapons of mass destruction represent for European security explains why, in principle, France decided to intervene in disarmament in Russia. Concrete implementation was made easier, however, because other interests came into play. A good example is the cooperation between European companies and Russian scientists in the ballistic field, where a small part of the research program led by EADS–Launch Vehicles is conducted by Russian scientists through the ISTC. This way of working, which is common to all the countries that finance the ISTC, enables private companies to benefit from both Russian technical and scientific excellence and European funding, to establish very fruitful contacts with scientists whose know-how is nourished by decades of research and test programs, and to benefit from a very positive return on investment. Similarly, the convergence between a superior interest and secondary motivations—economic, industrial, and scientific—is one of the keys to the success of the AIDA-MOX program.

**Political.** As stated above, the rationale for French efforts must also be viewed in the context of France's global responsibilities as a permanent member of the UN Security Council and a nuclear power. In this respect, cooperative programs with Russia are seen as a way of anchoring Russia more solidly in the community of law-abiding nations and of making it a responsible partner in the network of multilateral agreements and regimes that help to prevent proliferation.

## Policy Priorities

With 10 years of CTR experience under their belt, some French leaders and experts have begun to point out preferences for the future. At present, their state of mind could be described as, "Yes, let's cooperate—but not at any price or under any conditions." In other words, the initial hope that characterized French nonproliferation policies seems to be in need of a "boost": The idealism of some French actors may have been blunted by the constant struggle against the numerous obstacles encountered in day-to-day cooperation with Russia.

**Increased Coherence.** There is agreement in France that inappropriate cooperation in CTR programs could play against France's security interests and even be counterproductive. This is why verification and transparency are deemed

so important: Any diversion of assistance to Russia could result in a net decrease in European security.

Along the same lines, the increasing diversity of threats—with chemical and biological concerns now on the same level as the nuclear threat—raises the issue of coherence for participants who have chosen to limit their action to specific areas of disarmament, as France did by focusing nearly exclusively on nuclear matters. The biological threat in particular raises many questions in France today: Can and should France increase its commitment to CTR when strong doubts persist over Russia's attitude toward biological weapons (BW).

The fact is, today, there are few comprehensive analyses of the former Soviet biological threats and risks to France, not only because of Russian opacity but also because France showed little interest in this issue for many years. Until lingering doubts are eliminated, the two expert camps will keep fighting—on the one hand, the alarmists (who rely on data such as Ken Alibek's testimony), and on the other, the skeptics. This helps explain why French actions in BW disarmament have been confined to the funding of former biologists from Biopreparat within the framework of the ISTC, which is judged to be the most efficient and transparent framework. Some French experts also suggest that this field is considered "U.S. hunting grounds," including for commercial reasons, and see little reason for more French investment.

France has indicated its willingness to do more in the area of chemical weapons, but preferably within the EU, possibly with Germany taking the lead.

In sum, generally speaking, there does not seem to be any appetite at the policy-making level for a dramatic reorientation of the current national focus on nuclear threat reduction.

However, French experts also wonder what a reduction of the nuclear threat means for France in terms of security if, while France helps reprocess Russian plutonium, Russia continues with or resumes its chemical or biological programs? And would the French or German populations understand and accept that European countries make important efforts to reduce the chemical and nuclear threats in Russia, while learning at the same time that other dangers remain, or are developing, regarding biological weapons? Thus, *in fine,* the coherence of the policy of European countries is closely linked to that of Russia itself.

The coherence of U.S. policy figures as well, especially now that the G-8 is discussing the nature and modalities of an increase in the financial effort devoted to CTR. French experts believe it is necessary for all partners to commit themselves firmly in the long run. From this point of view, the "10+10 over 10" initiative represents a positive step.

Today, French experts and observers insist on the following:

- Guarantee that Russia is not continuing to produce weapons-grade plutonium.[17] Stopping and dismantling Russian reactors that still produce plutonium must be an urgent priority.

17. According to a September 24, 1998, Russian-American agreement, the three plants located at Tomsk and Krasnoyarsk were supposed to end plutonium separation by December 31, 2000. Plutonium production continues, however, because of civilian needs (heating of Tomsk-7).

- Ensure that Russian research reactors do not produce materials usable for weapons purposes.
- Give top priority to the securing of fissile materials and spent fuels.
- Be cautious about the concept of using Russian weapons-grade plutonium in foreign reactors (as suggested by the United States). The French plant at La Hague cannot easily accept more plutonium storage; increasing MOX burning capacity in French reactors would be costly; it should be the responsibility of the countries that have accumulated excess plutonium to manage the consequences; and burning Russian plutonium elsewhere might have unwanted effects on the nuclear energy market ("unfair competition").

**Europe as a Full Partner.** For historical reasons, CTR programs have a major and prominent Russian-U.S. dimension that takes precedence over links between Russia and the other countries involved in those programs. The U.S.-Russian disarmament agreement signed on May 24, 2002, testifies to this unique and special relationship and reminds us that the Russians and Americans continue to set the agenda as far as disarmament is concerned. Yet, however positive this latest agreement may be, it raises the question of both the role and the position of other countries involved. To put it bluntly, continuing CTR "business as usual," in which outside partners seem sometimes to be considered as mere auxiliaries, may not be compatible with the spirit of the G-8 work.

The Moscow arms reduction agreement may have an indirect impact on CTR-type programs, because the freedom left to the signatories in the way retired weapons should be handled may not be perceived by all players as perfectly fitting with the global objective of improved security for all parties. A recurrent difficulty met in CTR programs regarding nuclear weapons concerns the management and accountability of the weapons already stored. What will happen with the further scheduled reductions if Russia is free to choose either to dismantle its weapons or to store them undismantled or to cannibalize them, without having to account for its choices?

What must be done to shift the European perception of participation in CTR programs toward the notion of burden sharing, so often put forward by the United States? How can Europeans be elevated from "bit players," who are asked to take part in the funding but not fully in the decisionmaking process, to "full partners" implementing a shared political initiative?

Reinforcing the security relationships between Europeans and Russians will help avoid this unsatisfactory divide between "decisionmakers" and "silent partners." And there are areas not well covered by disarmament and CTR where such a stronger partnership could be applied, such as tactical nuclear weapons. (Future joint actions in this area could include accounting, consolidation and protection of storage sites, and so on.)

Yet, given the breadth and scope of existing challenges, there is no place in the debate for idealism or naïveté. Building such a relationship will require much time and political will—but the threats we face are immediate, especially after September 11. This reinforced strategic dialogue is therefore a goal, not a preliminary condition to enhanced European participation in threat reduction programs. It does not

mean that all the issues have to be linked, but rather that the ongoing programs offer a great opportunity to lay the foundations for the nascent European-Russian security dialogue. CTR-type programs could thus be used as a means to consolidate European security interests from the bottom up.

**Genuine Cooperation with Russia.** In spite of labels—*cooperative* threat reduction—international help for Russia still has more in common with one-way assistance than with genuine cooperation. Even the sense of urgency stemming from September 11 should not obviate the need to set up a real "contract relationship" with Russia. The determination to fight the terrorist threat should not lead to softening or abandoning the idea of "conditionality" when and where necessary. Over the past decade, France has demanded nothing from Russia, whether linked to nonproliferation or issues such as human rights, in exchange for its involvement in the reprocessing of Russian plutonium. The "state of emergency" that led to the first AIDA-MOX program mainly accounts for this situation. It is not clear that this will always be the case.

Strategic and industrial "cultures" also come into play. The AIDA-MOX program is judged successful because France and Russia have converging views regarding the best way to deal with excess plutonium (reprocessing). Mutual respect between French and Russian scientists was another reason for success: The excellence of Russian scientists, as well as Russian national pride, should never be overlooked.

**More Transparency on the Russian Side.** As noted earlier, transparency is a leitmotiv put forward by all the partners involved in disarmament programs in Russia. Without insisting on this well-known theme, it is necessary to repeat that, 10 years after the end of the Cold War, at a time when a "new strategic framework" is taking shape, it is time to close the book on reciprocal defiance. The interests at stake are simply too important for the United States, Europe, Japan, or Russia to let outmoded Cold War reflexes persist.

## Enhancing French and European Engagement

### Preserving National Programs

Should European CTR cooperation programs from now on be led exclusively within the EU framework, or should we keep on with the existing framework, which mixes national, bilateral, and multinational programs, some of them EU-funded? Most French experts agree that the EU framework must remain optional at this point. They point out that many of the debated issues are too complex and/or politically sensitive to be managed only by the EU and that "national" interests still exist in this area. They also suggest that the most rational use of existing national competences is often, in this particular area, through national programs. This includes the idea of "pilot nations"—programs launched and headed by countries that have a specific competence in one area and later joined by other countries.

### Creating More Synergies

It could be useful to integrate the problem of securing civilian nuclear infrastructures in Russia (a longstanding EU field of action) within the G-8 initiative, which means enhancing the role of the IAEA. Promoting a culture of nonproliferation in Russia goes far beyond an exclusively military approach, especially as terrorist groups will undoubtedly try to exploit all the failures of the existing systems. Indeed, European public opinion suggests that the civilian dimension of the threat remains very salient to those who remember Chernobyl. France, as a major civilian nuclear power and one of the world leaders in the nuclear industry, has a first-rank interest in integrating this dimension with its efforts in the former Soviet Union.

### Identifying Niches and Gaps

All the people who were or are involved in threat reduction programs insist on the importance of concentrating on a few major actions, not multiplying the areas of intervention. In their view, the best approach would be to foster very accurate micro-programs in specific areas. Concentrating on specific areas is justified by the existence of national competencies and "*filières d'excellence*"—but it requires finding the appropriate framework within the institutional system to identify Russian needs and expectations on the one hand and national abilities and capacities on the other.

### Improving National Coordination and Decisionmaking

Some French experts point out the need for better coordination and integration of political and industrial efforts at the national level. Ideally, the French CTR policy should reflect both "top-down" and "bottom-up" approaches. In addition, this will help France in dealing with Russian partners who often have an exclusively financial approach to cooperation programs.

Also, while government coordination of the programs is judiciously placed under the authority of the SGDN, some actors note that the current arrangements are not sufficient to devise appropriate program assessment, industrial policy, and public diplomacy.

Finally, beyond France's overall budgetary commitment, there is a question of how to divide the CTR burden among the institutional participants. As disarmament programs in Russia are not designed to address a military threat, but broader security interests, there is no reason why the Ministry of Defense should be a main provider of funds for CTR programs.

## Concluding Thoughts

France's commitment to the programs aiming at reducing the WMD threat suffers from a lack of visibility, even within French security policy circles. Very few French decisionmakers have any knowledge of these programs, which remain confined to the narrow cadre of experts directly in charge of their implementation, as well as the

few researchers who work on these issues. Consequently, the public receives little information about France's role regarding Russian WMD.

No poll-based, scientific study has been conducted to assess the French public's level of awareness and interest in this subject, but the lack of media coverage of CTR issues is revealing. The publication in December 2000 of a thorough report—the first of its kind—by the Defense Committee of the National Assembly went virtually unnoticed. Even on the Russian side—that is to say even among those who directly benefit from these cooperation programs—the French involvement in threat reduction is little recognized, if known at all.

It is true that, because of its very nature, Franco-Russian CTR cooperation is hard to render accessible to the public. The issues at stake are complex and often linked to confidential matters. Moreover, since September 11, French authorities have had to manage the frail balance between objective information and appeasement of a concerned public; the image of a Russia filled with enormous and inadequately protected arsenals of deadly weapons and materials does not help to alleviate such concerns.

However, considering what is at stake, is it possible to go on maintaining the confidentiality surrounding cooperative disarmament programs with Russia? At a time when international negotiation is occurring between the members of the G-8 on the "10+10 over 10" initiative, the lack of visibility of these programs, especially within decisionmaking circles, seems neither wise nor sustainable.

Does France's involvement in the reduction of the Russian WMD risk need to evolve, and if yes, how? A decade after the first French initiatives, in a context marked by September 11 and a renewed G-8 effort, this question needs to be tackled urgently by the new French authorities. The time may have come for an overall national strategy as far as threat reduction in Russia is concerned.

CHAPTER 5

# Germany

*Klaus Arnhold*
Stiftung Wissenschaft und Politik

## Risk Assessment and Risk Perception

From a German expert's viewpoint, Russia remains the world's greatest risk for the proliferation of weapons of mass destruction (WMD), precursors, and related technology. That said, former Soviet republics such as Belarus, Ukraine, Kazakhstan, and Uzbekistan also pose a proliferation threat. Although none of those countries possesses nuclear or chemical weapons any more, former Soviet WMD facilities are still located on their territories, and weapons scientists who worked for the Soviet military are still there. Thus, the risk of theft, smuggling, and the export of dangerous technical know-how to countries and nonstate actors attempting to acquire WMD exists not only for Russia, but to a lower degree, for some newly independent states (NIS) as well.

The worldwide focus on international terrorism in the wake of September 11, 2001, may have marginally reduced these risks. According to some reports, the Russian government took some additional safety measures to prevent theft, although the extent to which those measures are maintained remains to be seen. Furthermore, it is an open question as to whether the current Russian government's awareness of the dangerous potential on its soil will change either Russian priorities or the character of its cooperation with the West in this domain. If there is not a significant shift in Russian attitudes as experienced over the course of the past decade, the proliferation risks described above will persist for years to come.

From a German perspective, the greatest dangers concern nuclear material and biological weapons. Nuclear material includes radiological material that terrorists (or other malevolent actors) could use for dirty bombs and tactical nuclear weapons that could be stolen or illegally obtained by state or nonstate actors. Biological weapons (which are considered by some to be the terrorists' weapon of choice, as they offer the best cost-benefit ratio) are, according to unconfirmed reports, still available in Russia, along with scientists who know how to handle them. The information available suggests that, 10 years after Western threat reduction assistance began, Russian safety and security measures for nuclear and biological weapons still fail to meet Western standards.

Germany has provided counterproliferation assistance to Russia since 1993. Known as "disarmament assistance," it involves only a small group of governmental and nongovernmental experts—in the Auswärtiges Amt, the Federal Ministries of Defense, of Economics and Technology, and for the Environment, Nature Conservation and Nuclear Safety, as well as in a few of their subordinate agencies. Only a limited number of members of the German Bundestag who participate in relevant parliamentary committees, such as the Foreign Affairs Committee, the Defense Committee, and the Subcommittee on Arms Control and Disarmament,[1] are aware of the risks, dangers, and the German assistance programs.

Given that fears that the breakup of the Soviet Union could result in dramatic WMD proliferation have failed to materialize, dealing with the remnants of Soviet WMD research and production has become a routine matter for the German Bundestag, government, and media. Media coverage of these issues, as well as interest and involvement from senior government officials, has been rare at best.

September 11, 2001, has not significantly altered this state of affairs. As in other democracies, an issue's public prominence in Germany tends to be tied to the direct impact it is seen to have on people's lives. Terrorism, generically, is a German concern, but WMD terrorism is not (yet), whether speaking of politicians, the man in the street, or the German media.[2]

## German Disarmament Assistance Projects

German disarmament assistance activities were carried out in Russia and Ukraine based on government-to-government frameworks agreed to in 1992 and 1993.[3] From 1993 through 2002, €72 million were spent, of which some €10 million were used for projects in Ukraine. Annually, the overall amount varied between some €4.5 million (1994) and €8.5 million (1998), depending not only on authorization but also on Russian readiness to place orders. Projects not linked to the purpose of disarmament, such as environmental safety in the context of WMD facilities, are not included in these figures; nor are projects funded by the European Union (of which Germany's regular financial share is 25 percent).

Key assistance projects include the following:

- The delivery of nuclear safety equipment to Russia, including measuring instruments, tools, radiation protection equipment, and robots designed for safe transport and dismantling of nuclear weapons, as well as a heavy, remotely controlled vehicle to be used for recovering a nuclear warhead. This equipment was

1. Federal elections on September 22, 2002, in connection with the unavoidable shake-up of committee membership, will significantly (but hopefully only temporarily) reduce the Bundestag's threat reduction expertise.

2. That said, a lack of public interest or press attention would not prevent the relevant German agencies from stepping up their threat reduction activities after additional resources were provided. In the course of the June 2002 G-8 summit, in response to the U.S. "10+10 over 10" initiative, the German government pledged €1.5 billion for the next 10 years. Such a commitment, however, requires approval by the new German Bundestag to be elected on September 22, 2002.

3. All figures mentioned in this section are cleared with the Auswärtiges Amt.

provided, based on Russian orders, between 1993 and 2000 at a cost of €12.5 million.

- Several bilateral and trilateral (France, Russia, Germany) studies since 1995 concerning the development and implementation of a MOX (Mixed plutonium/uranium OXide) process in Russia, which involves converting pits to oxide suitable for MOX-fuel rods to be burnt in civilian reactors; and also the construction of a MOX production facility in Russia. The latest study was concluded in June 2002. The cost of this project to date has been €6.5 million.
- Enhancements of safety measures at a military nuclear power plant in Mayak, which cost Germany €1.55 million in 1999–2000. Beginning in 2002, another plant will receive similar safety improvements, at a projected cost of €0.75 million for this year.
- Since 1993, the design, engineering, and delivery of hardware (as ordered by Russia) to establish a chemical weapons destruction facility in Gorny, where 1,200 tons of blister agents are stored. This facility will also be used as a pilot plant to determine the appropriate technology for destroying 6,800 tons of blister agents in Kambarka. The facility is to be tested in 2002 and operational in 2003. So far, Germany has spent €40 million on this project. In addition, the EU has devoted €5.95 million, and the Netherlands €0.5 million.
- The planned delivery of special communications equipment to the chemical weapons (CW) destruction facility at Shchuch'ye (Russia) in 2002, at a cost of €1.5 million.
- The destruction of 18 SS-19 and 9 SS-24 silos (Ukraine) located in the vicinity of urban areas (where blowing up the silos was not appropriate) using a special technology involving high-pressure jets of water. The program ran from 1994 to 2001 and cost €10 million.

## Lessons Learned

### General Remarks

The events of September 11, 2001, revitalized Western desires to keep nonstate actors and certain nations from acquiring WMD or WMD-related knowledge and technology from Russia. September 11 also increased Western readiness to fund counterproliferation activities.

Yet, even after a decade of threat reduction assistance to Russia, donor governments still lack a clear overview of deficiencies, of needs—and of Russia's own contributions to improve the safety and security of its weapons and facilities and to fulfill its disarmament obligations.

In the past, the task seemed almost insurmountable. This was due not only to the enormous number of WMD and WMD facilities in Russia, but also to the fact that Russian authorities were, to a large extent, not supportive and even at times obstructive of the process. Furthermore, the more money the West was prepared to provide, the less Russia was willing to contribute. The safety, security, and ultimate

destruction of Russian WMD was increasingly perceived as a Western interest and obligation. Whenever possible, Russian authorities inflated demands from WMD destruction to peripheral areas, such as compensation for local authorities. This unbalanced approach was aggravated by lingering Soviet-style habits of secrecy and bureaucratic obfuscation. A new era of assistance to Russia must be linked to a new spirit of cooperation between Western donor countries and Russia.

At first blush, it may seem appropriate to insist on Western standards regarding safety and security measures. However, one should recall that safety and security was not an issue during the Cold War: the repression and control imposed by the Soviet regime guaranteed an adequate standard. With the breakdown of the Soviet Union, internal controls eroded, and the situation was aggravated by the state's inability to pay wages, as well as a rise in unemployment and organized crime. Therefore, current requirements for safety and security are to a large extent related to social problems and development in Russia. An assessment of assistance needs in this area should come, first and foremost, from the relevant Russian authorities.

It should not be assumed that the only acceptable solutions in this area are the most expensive (Western) ones. Should contemporary Western equipment be replaced with modern Western equipment in 10 years time, at Western expense? To some extent, Western threat perception in this field reflects a certain distrust of Russian authorities' competence and responsiveness. Is there any way to change that?

In the nuclear area, the nuclear fuel cycle remains as much a concern as nuclear weapons and their destruction. It is not known to what extent 10 years of Western assistance have rendered weapons-usable fissile material safe and accounted for. Information on the subject is available only from nongovernmental sources such as RANSAC or the Monterey Center for Nonproliferation Studies, and it is neither authoritative nor complete. If, for instance, such information says that out of the estimated 603 tons of such material, 190 tons have received a quick-fix security upgrade and 90 tons a comprehensive security upgrade, does this mean that the remaining 323 tons could be stolen easily? At the same time, if no substantive unauthorized transfer of such material has occurred within the last decade, which seems to be the case, does the security of such material really depend on Western assistance programs? Answers to such questions are relevant not only to a threat assessment but also to any future Western assistance.

Meanwhile, non-weapons-grade material, which could serve as a precursor for dirty bombs, is not covered by any program. Neither quantities available nor the type of security measures for such material are known in the West. Although this is primarily a Russian responsibility, it is also an international problem.

The lack of information is even worse for nuclear weapons, despite a decade of U.S. CTR activities. Although it is acknowledged that a single nuclear weapon in the hands of a nonstate actor would constitute a serious threat and the transfer of a nuclear weapon to any nonnuclear state would be highly undesirable, facts and figures to assess the security situation are not available. The fact that General E. E. Habiger (USAF ret.) found the security at the several strategic weapons sites he visited in 1996–1997 to be comparable to their U.S. equivalents should not lead us to assume the situation is under control.

There are many open questions—for example, what results has U.S. assistance in this field genuinely achieved so far? What is the overall level of security of Russian nuclear weapons storage sites? If secondary information says that out of 123 storage sites, only 50 have received quick-fix programs so far, does that mean that nuclear weapons could be stolen easily from the 73 others? Secondary information says 6,000 out of 13,300 nuclear warheads have been dismantled. The assumption here is that these figures refer to strategic nuclear warheads only. What about warheads from substrategic systems? How many substrategic nuclear weapons have permissive action links (PALs)? Are there specific security measures for storage sites for weapons without PALs? What is known about secure storage of weapons pits? What is the security status of weapons-usable plutonium not yet secured at Mayak?

Is it possible, after 10 years of U.S. engagement in this field, to obtain a balance sheet of achievements and still-existing deficiencies? What are the results of the United States pressing Russia for more transparency? Which aspects of improving the security of Russian nuclear weapons offer opportunities for nonnuclear weapon states, taking into account that security encompasses not only the weapons but also their storage sites?

The situation is clearer for chemical weapons and former CW production facilities. As a result of Chemical Weapons Convention (CWC) reporting, it is quite clear what Russia has and where. Based on personal knowledge of one CW storage site (Gorny), however, this author would conclude that security measures are easily surmountable, if so desired. The threat of theft might be even greater at other storage sites, as the agents and CW weapons they house might be more attractive to would-be proliferants. Given the time frame for CW destruction, the issue of safe storage will remain relevant for many years to come. The question of whether additional safety measures are required for Russian CW storage sites must be addressed.

Biological weapons (BW) activities are the least well-understood component of the Russian WMD complex. The size and number of former-Soviet BW facilities, their present status, and their still-existing capabilities are unknown. To what extent have Russian and U.S. conversion activities been successful? How much weaponized and "loose" BW agent still exists? Is there any destruction program in this regard? How many BW scientists still work in former BW research facilities?

As for the "brain drain" issue, although the ISTC's activities are generally viewed positively, statistics of their activities give only a portion of the overall picture. It is well known that certain scientists possessing WMD knowledge are unemployed, underemployed, or underfunded, yet the ISTC's contribution to keep those people from selling their knowledge outside Russia seems very limited. Part-time jobs, as regularly provided by ISTC, could hardly prevent anyone from selling his or her knowledge to Iran or Iraq. Indeed, at a recent ISTC presentation in Germany, the impression was given that the ISTC's activities have become a special kind of technology cooperation program whereby Western companies, subsidized by Western taxpayers, profit from cheap Russian labor and Russia profits from access to Western technology. Is the brain drain still a security concern deserving of Western funding? At least a review of the ISTC's activities seems in order.

## Lessons from German Activities

Since 1993, Germany has selected limited projects for which the specific information base required was developed, step-by-step, between Russian /Ukrainian and German experts. The German program for disarmament assistance did not follow a priority list of possible threats and risks; new projects were initiated based on what the Russian/Ukrainian side expected and wished, where Germany could offer expertise, and which projects were affordable.

Construction of the Russian CW destruction facility in Gorny is the major achievement of German disarmament assistance so far. There have been, however, numerous delays on the road from design to an operational facility.

First, the Russians initially appeared reluctant to destroy CW at all, despite their legal commitment to do so. Former CW researchers and managers from the Russian Ministry of Defense who were involved in the activities obviously faced a difficult conflict of interest and conviction.

Second, Russian bureaucracy presented a permanent delaying factor. During the early years, the Russians formed one commission after the other without moving the issue forward any further. Even technical details had to be "negotiated" in large gatherings and finalized in official protocols. Customs problems were a constant irritant; Russian bureaucrats repeatedly demanded customs dues, even for hardware deliveries donated by German taxpayers.

Third, successful negotiations at the ministerial level were no guarantee for further progress. Russian promises made in bilateral negotiations were rendered meaningless by lack of funds or political will. Subordinate structures and local authorities could throw up roadblocks; for example, in exchange for permission to run the CW destruction facility, they requested a water plant, a sewage-disposal plant, a power station, and housing. Repeated haggling over who should fund what, and Germany's insistence on paying for disarmament-related work and material only, eventually forced the Russians to find their own funding for infrastructure and compensation.

Fourth, Russia's desire—stemming from national pride—to plan and construct the CW facility using Russian technology to the largest extent possible, encumbered the undertaking. There were long discussions about appropriate technologies and concepts. The Russian side opposed a German contractor having overall responsibility at the beginning of the process, while asking the Germans to look after the proper functioning of the facility once it was about to become operational.

After years of bilateral dealings on this issue, however, with the same experts involved from both countries, a foundation of mutual confidence has been secured. This, combined with a new level of Russian government commitment, has enabled work today to proceed more smoothly and speedily than in the past.

The German government also repeatedly tried to promote a greater exchange of experiences and cooperation among Western donor countries, but without much success. For a long time, and in part still today, Western countries have preferred bilateral negotiations with Russia. Quite naturally, this situation was exploited by the Russian side. For example, while some Western countries attempted to spend their money for projects linked to WMD only, others also funded infrastructure or

environmental projects. In view of the huge amount of work still to be done in the WMD field in Russia, this situation is less than satisfactory.

In 2000, after lengthy debate, the EU Council established the EU Co-operation Programme on Non-Proliferation and Disarmament with the Russian Federation, and, inter alia, appropriated €5.95 million for the construction of the CW destruction facility in Gorny. While the money is being spent through Germany as the Western lead country for the project, additional EU organization and overhead costs can be avoided. The EU Council Joint Action is an encouraging first step toward further involvement of EU countries in WMD assistance projects in Russia.

Germany relied on very lean organizational backup in the Auswärtiges Amt, the Ministry of Defense (MOD), and an MOD agency for its disarmament activities. A close and direct dialogue was established between private contractors and German government agencies, as well as Russian authorities. No permanent representation in Moscow or anywhere in Russia was deemed necessary. As a result, overhead costs—which, for private contractors, were controlled by the German government—were very low. Administrative costs for German government agencies are not counted as part of the disarmament assistance program. German companies are not allowed to make more profit in this business than in any other business with the German government. In sum, taxpayers' money has been transformed—to the largest extent possible—into hardware and necessary engineering for disarmament assistance in the recipient country.

## Future Priorities

Germany's current priority is to finalize the CW destruction facility at Gorny and to make it work. As this will be the very first operational CW destruction facility in Russia, its importance cannot be overestimated. Finally, after considerable delay, Russia will start to destroy CW in accordance with its legal obligations under the Chemical Weapons Convention. Gorny is supposed to be the pilot plant for the type of technology to be used for another CW destruction facility in Kambarka, where an additional 6,800 tons of blister agent are stored. A successful operation in Gorny will constitute a breakthrough in Russia's overall destruction program for chemical weapons.

It would be logical and appropriate for Germany to build on its experiences in Gorny and in destroying old chemical weapons in Germany with continued assistance for CW destruction in Russia. Therefore, the CW destruction plant in Kambarka should be the next task for future German activities in this field.

As Germany successfully provided safety features to a military nuclear power plant at Mayak in 2001 and similar activities are currently being undertaken at another plant in Mayak, this seems to be a possible field for future German activities.

In view of a possibly much larger financial contribution by Germany in the future, additional appropriate projects will have to be discussed with Russia and among Western donors.

## Assistance to Russia after the June 2002 G-8 Summit

The G-8 summit in Kananaskis approached the problem of WMD in Russia (and in other countries) with the goal of preventing the world's deadliest weapons from falling into dangerous hands. Three means were proposed to that end:

- A significant increase of money allocated by G 8 countries—up to $20 billion within the next 10 years;
- A set of principles to be applied by all countries worldwide; and
- A set of guidelines for cooperative projects to be applied by donor and recipient countries.

Although the scope of these decisions goes beyond Russia, it is assumed Russia remains—for the time being—the primary focus. If successfully implemented, the Kananaskis project should, for a number of reasons, launch a new era in assisting Russia with its WMD challenges:

- Russia is now an equal partner in a multilateral process. Russia has accepted responsibility for the funding and implementation of projects on its soil. It is assumed that Russia's financial contribution is a portion of the suggested $20 billion and as such part of the annual review process. Altogether, it should be easier to motivate Russia and to address certain problems.
- The G-8 has accepted responsibility as a group, which can help reduce duplication and friction among competing unilateral approaches.
- G-8 countries will cooperate on all "new or expanded cooperation projects" (i.e., all projects decided upon after Kananaskis). This should be the start of overall multilateral cooperation and coordination in this field, which have been lacking until now.
- Reviewing progress of the G-8 program requires all participating countries to report on achievements and failures in all three areas above (i.e., financial contributions, adhering to principles, and following the guidelines). This might increase project effectiveness. Obstacles to cooperative projects, if not overcome, would necessarily have to be discussed. This could help to avoid some past problems—lack of transparency, bureaucratic delays, and diverging standards of different donor countries for accepting or rejecting certain requests, such as assistance in housing or other infrastructure.
- Other donor countries are invited to subscribe to the G-8 guidelines—and, it is assumed, also to join respective consultations. This may increase the number of countries involved in this effort worldwide.
- National contributions to this program will have to be counted according to comparable standards. The non-U.S. portion of nearly 50 percent of $20 billion will never become a reality if accounting rules continue to differ. For example, the current German approach—considering as part of German counterproliferation assistance only the expenditures for disarmament hardware and necessary

engineering and not other related expenditures, such as governmental overhead costs, or other assistance programs, such as environmental or nuclear safety or EU programs—will have to be adapted. Furthermore, it should make a difference whether a high or a low percentage of a national contribution is spent in the recipient country in direct support for a project or in the donor country for overhead costs. Currently, policies in this regard still differ considerably among donor countries.

## Giving the G-8 Initiative a Proper Start

What should be done in order to give the G-8 initiative a proper start?

- Russia should be asked to give its own perspectives in regard to achieving results on the priority concerns: destruction of chemical weapons, dismantlement of decommissioned nuclear submarines, disposition of fissile materials, and employment of former scientists. Russia should also be asked to give a status report on areas where G-8 countries might have their own concerns, such as safety and security measures for radioactive material and substrategic nuclear weapons, BW facilities, and CW storage sites.
- G-7 countries should develop procedures for how donor activities could be coordinated among themselves, with non-G-8 donor countries and with the European Union.
- G-8 countries should give their planning for 2003 in terms of projects and financial contributions and conditions linked to it, such as approval in the parliamentary budget process. They should share experiences from the past, priorities for the foreseeable future, and ideas for how to strengthen the recipient country's responsibility.
- The G-8 countries should also consider turning the G-8 principles into an appropriate UN instrument, such as a General Assembly or Security Council resolution, and asking for worldwide adherence to it. With or without a UN instrument, G-8 countries, in asking other countries to abide by the principles, must lead by example.

The Kananaskis G-8 summit declarations offer a unique opportunity—to reduce significantly, if not end, the proliferation threat originating from Russia (and a few other countries) within the next 10 years. But this objective will only be achieved if current and future donor countries comply with their pledges and commitments, if a new spirit of cooperation between donor countries and Russia becomes the basis for future activities, and if Russia acts according to the understanding that its own contribution is the most important prerequisite to success.

CHAPTER 6

# Green Cross

*Jenifer Mackby*
Center for Strategic and International Studies

## Background

Green Cross International (GCI) was founded in 1993 by former Soviet president Mikhail Gorbachev and other leaders from the United States, Russia, Japan, Switzerland, and the Netherlands. It has grown to 22 national affiliates (plus four preparatory committees) on five continents and is implementing a wide variety of programs. Green Cross concentrates in particular on five program areas: the Earth Charter, the legacy of wars, water conflict prevention, energy and resource efficiency, and environmental education and communication.

The program on the environmental consequences of wars and conflicts (otherwise known as the Legacy Program) promotes: the implementation of arms control agreements; the safe and environmentally sound destruction of Cold War weapons arsenals; the conversion and cleanup of military facilities; the reduction of the environmental impact of military activities; improvements in the areas of public health, education, and social infrastructure in regions affected by military legacies; and public awareness of military-environmental issues.

This program is implemented in the frame of three operational units: the Legacy of Wars Program, formed in 1994 to address technical, scientific and political issues; the Socmed Program, which focuses on social and medical problems; and the Legacy of Conflicts Program, which focuses on recent conflicts (e.g., Kuwait). In addition, a Chemical Weapons Campaign seeks to contribute toward ridding the world of weapons of mass destruction by creating the political and public will needed to support the practical implementation of the 1993 Chemical Weapons Convention (CWC), with the objective of destroying chemical weapons stockpiles by 2015.

## Quantitative Assessment

The strategy of the Green Cross organization in its Legacy Program is to create and increase public awareness through a "bottom-up" information and education campaign, and within political circles using "top-down" networking and appeals to

influential figures. The activities of Green Cross focus on public outreach in chemical weapons (in the United States and Russian Federation) and strategic missile destruction (Russian Federation), assessing new technologies for the chemical weapons destruction process (United States), as well as more broadly on military base management and military environmental training.

Green Cross believes it is necessary to strengthen the political resolve to enforce the CWC and to generate financial backing needed—in particular, for Russia. In the field of chemical weapons, the Legacy's ChemTrust Project ("chemical weapons: trust building for their destruction")[1] seeks practical local solutions regarding destruction concerns. It has worked in both the Russian Federation and the United States on building public participation in decisionmaking regarding the safe and timely destruction of chemical weapons. Project components include public forums at chemical weapons sites in the United States and Russia; policy workshops in both countries to address issues regarding destruction technology, regulatory and legal problems, public health and safety; and active participation in the national dialogue of the United States on the policy and technology of munitions destruction.

Green Cross's public outreach model includes the following:

- Information dissemination through seven public outreach offices in five Russian chemical stockpile regions (Shchuch'ye, Kurgan, Chelyabinsk, Kizner, Kirov, Pochep, and Penza); publication of brochures; regular information meetings with legislators and administrators in Russia, the United States, and European countries;
- Public hearings on chemical weapons disarmament (Gorny, Kambarka, Washington, Indianapolis, Shchuch'ye, Kizner); the introduction in Russia of Citizens' Advisory Commissions (CACs) to facilitate discussions between the communities holding stockpiles and regional and national authorities (including the Russian military services and the Russian Munitions Agency); training for outreach personnel and others in the United States; and a national dialogue in the United States on alternatives to incineration for destroying chemical weapons;
- Training doctors and public health officials to address environmental health issues related to weapons stockpiles such as from chemical weapons (Shchuch'ye, Kizner, Kambarka, Briansk, Penza, and elsewhere); donating medical equipment to local hospitals and assistance to local Russian emergency response forces near chemical weapon facilities; conducting epidemiological and medical investigations in chemical weapons stockpile areas (Gorny, Shchuch'ye); and establishing U.S.-Russian partnerships with peer groups such as the American Public Health Association and Vanderbilt University;

---

1. See <http://www.greencrossinternational.net/GreenCrossPrograms/legacy/lessdanger.html>. Three key affiliates of Green Cross International (<http://www.gci.ch>) manage the Legacy Program—Global Green USA (<http://www.globalgreen.org>), Green Cross Russia (<http://www.greencross.org.ru>), and Green Cross Switzerland (<http://www.greencross.ch>).

- Risk assessment of chemical weapons destruction facilities (Kambarka, Kizner, Shchuch'ye) and nuclear missile bases; investigation of abandoned chemical weapons destruction sites (Penza, Moscow); and assessment of the environmental impact of open burn/open detonation sites.

This work has been funded through public charitable contributions, foundation grants, and British, Swiss, Swedish, Dutch, U.S., and other government contracts. Total expenditures of the Legacy Program from 1994 to 1997 were $3.08 million.

Within the framework of a joint program with Sweden initiated in 1993, for example, a risk assessment has been made of the chemical weapons storage facility in the settlement of Kambarka in the Republic of Udmurtia; a public outreach center has been established; and medical equipment has been supplied to the local hospital. The total amount of assistance provided under this program is SEK 4.4 million.

The Green Cross Social and Medical Care (Socmed) Program assists in health education and training for the local population, particularly for children and mothers affected by military-related activities. Socmed is coordinated by Green Cross Switzerland in a number of locations: in Belarus, working in the areas contaminated by the Chernobyl accident; in Russia, in areas with chemical weapons stockpiles; in Ukraine, which focuses on radioactively contaminated areas in the north; and in Vietnam. The program turnover in 2000 was $2.25 million and in 2001 $2.65 million. The Green Cross Legacy and Socmed Programs have been supported for the last few years by Switzerland, Sweden, the United Kingdom, the Netherlands, and the U.S. Cooperative Threat Reduction Program, as well as American and Swiss foundations and private donors.

Green Cross Switzerland has assisted in the implementation of public outreach projects in areas in which chemical weapons destruction facilities are to be located. Approximately $300,000 has been spent over the last three years. Those funds have been used to conduct public hearings in chemical weapons storage areas, to establish information centers, to publish brochures for the local population on chemical weapons destruction facilities to be built near the chemical weapons facilities, and to conduct research to assess the state of health of the local population and the environment in the chemical weapons storage areas.

Another program, Radleg, focuses on collecting and compiling data on the location, size, and scale of nuclear contamination of the environment as a result of the military use of nuclear materials. It also advocates cleanup priorities. Projects have included the following:

- Radleg-0 (1994–1995): Assessment of the impact of nuclear tests in Semipalatinsk on the environment and on the population of the Altay region. Data on distribution of fallout, nuclide content in plants, soils, and water, general health state, and hydrogeology were integrated into a geographical information system and a database.
- Radleg-1 (1995–1996): Assessment of the impact of the plutonium breeding facility in Krasnoyarsk-26 on environment and public health, discussion of the

safety of the underground repository, and measurement of the nuclear contamination of the Jenissei River.

- Radleg-2 (1995–1996): The northwest region of Russia is home to the nuclear Northern Fleet, the nuclear test site in Novaya Zemlya, and different wharves for nuclear vessels. Green Cross conducted an investigation of the health and environmental impact in the area as well as a risk assessment of possible nuclear accidents.
- Radleg-3 (1996–1997): Investigation of the impact of the operation of the nuclear Pacific Fleet on environment and health in the Vladivostok area. A section is dedicated to the submarine accident in Bolshoi Kamen.
- Radleg-4 (1996–1997): Assessment of the impact on environment and public health of the plutonium breeding facility in Tomsk, its underground repository, and an accident in April 1993.

A technical report was published in Russian and English on each of the above projects, and data from each were integrated into a geographical information system and a database. A Radleg book summarizes the results of Radleg-0 to Radleg-4. It also includes sections on Novaya Zemlya (bomb tests); Northwest Russia (nuclear fleet); Moscow (R&D); Chelyabinsk, Tomsk, and Krasnoyarsk (plutonium breeding); Altay (bomb tests); and Vladivostok (nuclear fleet).

Radleg and ChemTrust have been supported by the Swiss Department of Foreign Affairs, the U.S. Department of Defense, the United Kingdom, Sweden, a number of foundations, and private contributions.

Within the Legacy of the Cold War Program, the Conventional Weapons Project (Conweap) promotes military base cleanup and conversion as well as the environmentally sound destruction of weapon inventories. Also under Conweap, Green Cross compiled an inventory of the military legacy in Estonia (unexploded ammunition, spills, toxic waste) and conducted a cleanup of unexploded ammunition on the shores of Estonia. The Pskov Oblast authorities and the Environmental Department of the Russian Army requested Green Cross and the Strategic Rocket Forces to help clean up a kerosene spill at a military airport. This project began in August 2000 with funding from the Swedish Ministry of Foreign Affairs.

## Future Priorities

Green Cross expects to appeal to parliamentarians—both in Switzerland and internationally—as a means of simultaneously informing the public and politicians of the environmental, human, and security risks of chemical weapons. The Chemical Weapons Campaign of Green Cross will continue to alert the general public to the dangers posed by chemical weapons. The campaign, developed in Switzerland, will extend throughout Europe.

Most of the local communities that have been affected by large chemical weapons arsenals are in need of considerable infrastructure development. In Russia many towns and villages still lack basic necessities, such as adequate housing, cen-

tral utilities, sewage and potable water supply systems, schools, emergency and public health services, and roads and bridges. In many cases it is impossible to construct and operate a destruction facility without first upgrading the infrastructure. Green Cross believes that Russia, with Western support, should commit itself to providing an adequate infrastructure that will bring the communities living near destruction facilities into the twenty-first century. Such developments should also be well planned, perhaps through the international community, in order to build a sustainable economy in these regions.

Most experts recognize that it is expensive to destroy chemical weapons in secure, automated facilities and that it is also very complicated. Extensive R&D is required to devise new technologies that are individually appropriate for each weapons type and stockpile site. Leaks of nerve agent from the smokestacks at Tooele, Utah and Johnston Atoll, and ongoing difficulties in safely destroying dunnage (related non-agent waste such as wood and plastics) illustrate that further technology development is necessary to carry out full and safe destruction.

## Comparative Advantage

Green Cross and its affiliates undertake their efforts as third-party, neutral facilitators and mediators, an approach that the organization believes affords it access to, and legitimacy among, all stakeholders, including local, regional, and national officials, citizens, academics, and public interest groups. Although these efforts have not totally overcome local concerns and opposition, Green Cross believes it has helped empower the public, raise critical issues, and improve the stockpile destruction programs in Russia and the United States.

Because they do not have either the legal authority or the quantity of financing of governments, nongovernmental organizations (NGOs) such as Green Cross cannot substitute for the state. NGOs are, however, often very well informed about most aspects of the issue and can be innovative in the design of new solutions.

The Organization for the Prohibition of Chemical Weapons (OPCW) as well as states that are parties to other treaties can benefit from NGOs. Green Cross believes that NGOs often have a more complete network with all stakeholders, information that is more up-to-date, and sometimes a larger view of the issues involved. Also, Green Cross believes that its NGO status sometimes makes it the recipient of information that would not be given to states. Green Cross sometimes serves as an informal communication channel or is asked to articulate ideas that a government itself could not.

NGOs have access to sources of funding that may not be available to governments, such as charitable foundations and private donors. In many cases, such funding can help to address issues that might otherwise be neglected. Governments are often not able to react flexibly on these issues, as they are usually restricted by their parliamentary mandates.

## Decisionmaking Environment

One role Green Cross sees for itself is to help to make chemical weapons a public issue. Green Cross believes that such weapons are usually dealt with by just three or four officials in each country, and it therefore remains difficult to obtain the finances necessary for their destruction, for ongoing industry verification, as well as for generating public pressure in support of demilitarization programs. Green Cross believes it acts as a neutral and independent third party in controversial questions and that it provides open and credible information. The extent of public involvement may vary from site to site, but a proactive outreach effort by a neutral third party may assist in implementing the demilitarization process. Green Cross has found that the ongoing involvement of the public, including regulatory officials, in the planning, monitoring, and execution of demilitarization programs is essential to ensure success in the long term. For example, staff from Green Cross Russia's public outreach offices in Shchuch'ye, Kurgan, Penza, Pochep, and Kizner attend community meetings, visit remote settlements, brief the mass media, and organize quarterly lecture tours bringing decisionmakers to the stockpile communities.

Over the years Green Cross (known as Global Green USA in the United States) has organized several roundtables in the United States on chemical weapons destruction, defense environmental cleanup, and base conversion. Participants have included representatives from the Department of Defense, Army, Air Force, Navy, Environmental Protection Agency, and community groups. Global Green USA has participated since 1998 as one of the three national environmental and arms control organizations in the national Dialogue on Assembled Chemical Weapons Assessment (DACWA) for the AltTech II Program of the U.S. Army. It served as a member of the Citizens' Advisory Technical Team that was engaged in the procurement process for chemical weapons destruction technologies.

In February 1997, Global Green USA coordinated a coalition of environmental groups in support of the Chemical Weapons Convention. A National Security Council meeting with environmental groups was held to review specific conditions for the Resolution of Ratification for the Chemical Weapons Convention. Similar events were organized both by Green Cross Russia and Green Cross Switzerland prior to Russian ratification in November 1997. Green Cross Russia served as an adviser to the Duma commission preparing the Russian chemical weapons destruction law in 1996.

Most recently, Global Green USA has organized a new coalition of arms control and environmental groups in support of the U.S. Cooperative Threat Reduction ("Nunn-Lugar") Program that has helped Russia destroy its weapons of mass destruction over the past decade. The international Legacy Program also organizes an annual national dialogue/forum on chemical weapons destruction in both Moscow and Washington around the Russian and U.S. anniversaries of the CWC ratification in 1997. This is an ongoing effort to establish a network in both countries to build consensus on timely, safe, and environmentally sound destruction of the 70,000 tons of chemical weapons remaining in both countries' CW stockpiles.

Green Cross lists as its main network partners the Swiss government (Ministry of Foreign Affairs); the U.S. Cooperative Threat Reduction Program; the Organization for the Prohibition of Chemical Weapons; the NC Defense Center Spiez (Switzerland); the National Defence Research Agency (FOI, Umea, Sweden); the Institute of Social and Preventive Medicine of Bern and Basel (Switzerland); the New Technologies Foundation Minsk (Belarus); Russian Troops of Radiological, Chemical, and Biological Protection; Russian Ministry of Atomic Energy; nongovernmental organizations; academic institutions; and embassies in the Russian Federation, the United States, Switzerland, and Estonia.

## Lessons Learned

Over the last six years Global Green USA, Green Cross Russia, and Green Cross Switzerland have combined efforts to facilitate consensus at the local, regional, national, and global levels in order to spur progress on weapons demilitarization programs.

Green Cross's stated philosophy is that cooperation rather than confrontation with all stakeholders is the most productive approach to resolving problems. For example, the Shchuch'ye facility, one of the seven major chemical weapons arsenals in Russia, had been chosen by Russia and the United States as the site for U.S. support through its Cooperative Threat Reduction Program. In this town, local and regional concern and mistrust about the weapons destruction programs presented a challenge for successful implementation. In 1995, Green Cross organized a public meeting in Shchuch'ye to discuss plans for the destruction of the Shchuch'ye chemical weapons stockpile. It established a public outreach office there as well. Green Cross believes it demonstrated the need to be involved in decisionmaking at all levels.

In the view of Green Cross, the time frame for the abolition of CW arsenals under the Chemical Weapons Convention, a maximum of 10 to 15 years, has placed pressure on the implementing agencies in both the United States and Russia. The time required for planning, obtaining permits, overcoming technological and financial problems, constructing and putting into operation a chemical weapons destruction facility in some cases could be as much as 12 years or more, so that all of the Russian and at least two U.S. sites might not be able to meet the 2012 deadline. This "deadline versus reality" issue often leads to conflicting approaches and confrontations in program implementation. Further, Green Cross has found that there is a lack of consistency in the application of international assistance funds.

The experience of Green Cross has shown that a key to success is to achieve communication among the four levels involved in international disarmament projects: the local communities, the regional administrations, national authorities, and the international community.

Over the past five years of the Legacy Program, Green Cross has learned that NGOs can play a large role in the implementation of programs such as the elimination of chemical weapons. Green Cross therefore urges member states of the OPCW to include NGOs in organizational proceedings, and government agencies and con-

tractors to include public facilitation in their projects. Green Cross has stated its commitment to help facilitate the implementation of the Chemical Weapons Convention, not only because of its goal to eliminate all such weapons, but also for the long-term precedent it sets for global disarmament and verification in general.

CHAPTER 7

# International Atomic Energy Agency

*Jenifer Mackby*
Center for Strategic and International Studies

## Threat Assessment

The International Atomic Energy Agency (IAEA) is the only international organization devoted to controlling access to weapons-usable material on a worldwide scale. Under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the agency carries out inspections at facilities containing radioactive materials to verify that states parties comply with their treaty obligations. The IAEA currently monitors the more than 900 facilities around the world that store and use radioactive materials to ensure that these materials are not diverted to military purposes. The amount of nuclear material in peaceful programs in the world has increased six times since 1970: in addition to the estimated 450 tons of military and civilian separated plutonium and more than 1,799 tons of highly enriched uranium (HEU)—mostly in the five nuclear-weapon states—there are more than 2,770 kilograms of civilian HEU in research reactors in 43 countries.[1]

Since 1993, there have been175 cases of illicit trafficking in nuclear material and 201 cases of trafficking in other radioactive sources (medical, industrial), according to the IAEA. "Because radiation knows no frontiers, States need to recognize that safety and security of nuclear material is a legitimate concern of all States," said Mohamed El Baradei, director general of the IAEA. "Security is as good as its weakest link and loose nuclear material in any country is a potential threat to the entire world."[2]

The activities of the agency, including those covered by cooperative threat reduction (CTR), are based on the agency's mandate and requests received from member states. Consequently, it is the threat assessment of member states that

1. David Albright and Mark Gorwitz, "Tracking Civil Plutonium Inventories: End of 1999," *ISIS Plutonium Watch* (Washington: Institute for Science and International Security, October 2000); and International Atomic Energy Association (IAEA), *Nuclear Research Reactors in the World*, IAEA-RDS-3 (Vienna: IAEA, September 2000).

2. Mohammed El Baradei, "Calculating the New Global Nuclear Terrorism Threat," Special Session on Combating Nuclear Terrorism, IAEA, Vienna, November 2, 2001.

directs the agency's programs in this field. Even if states honor their nonproliferation obligations under the NPT, the fact that nuclear material, nuclear facilities, and other radioactive materials can be subject to theft, illicit trafficking, and sabotage is regarded as a national security concern. A threat from criminal or terrorist subnational groups is considered a matter for each state to address.

The exception to this is the international transfer of nuclear material. Recognition of the threat first emerged in the negotiations and agreement to the Convention on the Physical Protection of Nuclear Material, which entered into force in 1987. The obligations of the convention only cover nuclear material in international nuclear transport. They do not cover nuclear material in domestic use, storage, or transport. There is no treaty that requires countries using weapons material to protect it from being stolen or that requires nuclear facilities to be protected. The IAEA Board of Governors welcomed the decision in September 2001 by the director general to convene a group of experts to draft an amendment to the convention that would, *inter alia*, broaden coverage to civilian nuclear material in domestic use, storage, and transport; and add a requirement to protect against sabotage of nuclear facilities and theft of nuclear material. For many years, IAEA programs did not include physical protection or other security-related activities. In the beginning of the 1990s, however, a disturbing number of instances of illicit trafficking and smuggling of nuclear materials as well as other radioactive materials occurred, sometimes in the form of strong radioactive sources. Growing international concern led the IAEA General Conference in 1994 to ask the director general to strengthen the agency's activities against illicit trafficking in nuclear and other radioactive materials. The Board of Governors approved the first of such activities in March 1995, and a program dedicated to the "security of material" was established for 1997–1998. The program has evolved since then and continues to be revised.

In recent years, states have confirmed to the agency some 189 cases of illicit trafficking involving nuclear materials. Trafficking in nuclear material and other radioactive sources is a global concern, with confirmed cases recorded in more than 40 countries on all continents. But the majority of confirmed incidents involving nuclear material have occurred in Europe. Although only a few of these cases involved significant amounts of nuclear material, they demonstrate that security is still inadequate at certain locations and that there is an urgent need for improved protection and control.[3]

In response to a request from the General Conference, the IAEA Secretariat recently prepared a report on four threats related to nuclear terrorism: theft of a nuclear weapon; the acquisition of nuclear material to construct a nuclear weapon or to cause a radiological hazard; the acquisition of other radioactive materials to cause a radiological hazard; and violent acts against a nuclear facility to cause a radiological hazard. Most of the agency's ongoing and planned activities in these fields address the last three of these perceived threats.

---

3. Anita Nilsson, "Security of Material: The Changing Context of the IAEA's Programme," *IAEA Bulletin* 43, no. 4 (2001).

The IAEA plans to increase the number of International Physical Protection Advisory Service missions and workshops designed to help states assess possible threats to nuclear activities. It also plans to expand its program to increase the capabilities of member states to detect and respond to theft, illicit trafficking, and other illegal use of nuclear and other radioactive materials. As there are no comprehensive binding international standards for the physical protection of nuclear material, the IAEA is seeking to broaden the scope of the Convention on the Physical Protection of Nuclear Material to cover the security of additional activities. Lax security of radioactive sources in some states has resulted in an undetermined number of sources becoming "orphaned" from regulatory control. The IAEA has proposed a number of measures to strengthen regulatory control and to update its standards to increase the protection of radiation sources.

The robustness of nuclear power plants and other nuclear facilities (fuel fabrication, enrichment, reprocessing and waste-management plants, and research reactors) against acts of sabotage and of extreme violence varies among countries and among facilities. The agency believes that assessments of facility design and operational measures could contribute to preventing and/or mitigating the impact of malicious acts. At the same time, the agency is revising safety standards related to the safe construction and operation of nuclear facilities.

# Quantitative Assessment

## Security of Material

One of the IAEA's major programs, Nuclear Verification and Security of Material, comprises two programs: Safeguards and Security of Material. The Safeguards Program helps prevent nuclear proliferation by states and offers them incentives to establish proper accounting and control of nuclear material. Verification carried out under this program aims to deter diversion of nuclear material by states and provides for the early detection of theft of nuclear material.

The IAEA uses "nuclear material accountancy" for safeguarding material declared by a state pursuant to its safeguards agreement. The system establishes the quantities of nuclear material present in a nuclear facility and the changes in these quantities that take place over time. IAEA instruments and surveillance equipment confirm physical inventories of nuclear material. Each year, IAEA computers process and store about 1 million data entries, and the agency reviews about 1,000 optical surveillance films, 5,000 videotapes, and 27,000 seals on nuclear material and on agency-installed equipment.[4]

Since the early 1990s, the IAEA and member states have been working on a strengthened inspection and verification system. Some new measures were implemented within the authority of existing safeguard agreements, and a Model Protocol Additional to States' Safeguards Agreements was approved by the Board of Governors in May 1997. The supplementary measures include the provision of

4. International Atomic Energy Agency, Fact Sheet, "Safeguards, Nonproliferation and the Peaceful Uses of Nuclear Energy," 2000 (99-02834/FS-04/Rev.1), p. 4.

increased information on a state's nuclear and nuclear-related activities, complementary access to locations, and the use of new verification techniques.

The Safeguards Program reflects the legal commitments of states party to the NPT, while the Security of Material Program addresses subnational, criminal, or terrorist threats to nonproliferation, as well as illegal activities such as trafficking involving nuclear and other radioactive materials. This program aims to generate information exchange, develop and improve internationally accepted standards, and provide guidance, expert advice, and other assistance to member states in their application of these standards.

The agency continues to strengthen the physical protection regime by actively supporting the work related to the Convention on the Physical Protection of Nuclear Material, the implementation of security measures in all states, and the Recommendations for the Physical Protection of Nuclear Material and Nuclear Facilities.[5] New initiatives have included assisting states to develop physical protection systems and training. The evaluation service provided in the International Physical Protection Advisory Service (IPPAS) is offered to all states upon request. To date, about 1,000 staff in member states have undergone IAEA training, increasing awareness of the need to protect nuclear material and facilities and promoting higher standards for physical protection systems.

## Newly Independent States

In safeguards agreements pursuant to the NPT, each state is required to establish and maintain a State System of Accounting and Control (SSAC) of nuclear material within its territory, jurisdiction, or control. SSACs are responsible for physical protection, import/export control, and regulatory matters.

Many of the Newly Independent States (NIS) of the former Soviet Union had nuclear programs that included uranium mining and refining, as well as other types of nuclear activities. States in this category include Armenia, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Russia, Tajikistan, Ukraine and Uzbekistan. To support NIS nonnuclear weapon states in meeting national and international obligations in the field of nuclear nonproliferation, the IAEA began a number of activities in 1992 to help them establish or further develop their SSACs. Support from IAEA member states became essential in this effort.

Since 1992, fact-finding missions have been carried out in numerous NIS, beginning with Belarus, Kazakhstan, and Ukraine. The missions aimed to inquire about the timing of likely accession to the NPT and acceptance of preparatory technical visits; to identify relevant contact people and organizations; and to identify technical support plans for each individual NIS.

In 1993 and 1994, technical visits were conducted to most major facilities in Armenia, Belarus, Ukraine, Kazakhstan, and Uzbekistan. The objective was to obtain information about the operator's nuclear material flows, quantities, categories, and measurement system; further define lists of needs relative to nonproliferation for coordinated technical support; identify safeguards equipment requirements; and demonstrate the verification of nuclear material equipment

5. INFCIRC/225/Rev. 4.

used. These visits helped enable the IAEA Department of Safeguards to initiate preparations for the implementation of safeguards in the respective countries and familiarized officials of those countries with IAEA procedures and requirements.

On the basis of these visits, safeguard-equipment needs were identified and budgeted, and initial purchases were made. Estimates of the requirements for inspection resources were made for all major NIS facilities. The visits also helped identify hardware and training needs for the SSAC infrastructure, including software for nuclear materials accounting, communication systems, and instrumentation used by state inspectors. The IAEA worked in close cooperation with member states on the funding and expertise for these activities. It also provided coordinated technical support with donor states to the NIS for the SSACs, including physical protection and export/import. Support was also provided in concluding and implementing safeguards agreements, as well as legislative assistance to the NIS to cover areas of nuclear activity. The IAEA and the Nuclear Energy Agency of the OECD cosponsored training seminars for lawyers and regulators.

Based on the 2002–2003 program, the agency is strengthening the work related to nuclear material control systems in member states. It will provide new, updated norms and guides as well as technical advice, training, and guidance to states to establish the necessary systems at both the state and facility levels.[6]

## Other Programs: Waste Management, Emergency Response, Detection of Radioactive Materials, Illicit Trafficking Database

The IAEA spends $2 million per year to help establish safety standards and improve waste disposal—for example, to recover lost sealed sources that were used by the former Soviet military to generate electricity. The agency brings these sources to safe storage and has helped individuals who have been injured by them. The IAEA also carries out training courses in assessing the safety of waste repositories.

The project on strengthening emergency response is in its fifth year. Some 22 countries, including former Soviet and Eastern European countries, attend IAEA workshops and training courses. The agency produces technical manuals on assessment response, emergency monitoring procedures, medical procedures, and public information management. In a survey of member states regarding their response to a nuclear accident, the agency found different criteria among most Western countries regarding the notification of accidents and emergency response. The IAEA plans to develop internationally accepted and "harmonized" criteria for emergency response.

The agency also offers training to customs officers, border guards, police forces, and security services on the detection of radioactive materials, and it expects to establish soon a network of laboratories capable of performing sophisticated analysis of material seized in trafficking. Most seizures of illicit nuclear material occur not at borders but rather within states, as a result of police and intelligence actions.

In addition to offering training in detection of radioactive materials, the IAEA also has helped to test detection equipment and recommend minimum perfor-

6. Nilsson, "Security of Material."

mance characteristics, and it has initiated a Coordinated Research Program to develop improved equipment.

In 1993, the IAEA established an Illicit Trafficking Database Program in which 70 states participate. The program aims to assist states by alerting them to incidents, facilitating exchange of reliable information, and identifying common trends that might help states combat illicit trafficking. Reported information is treated confidentially, but states can designate specific information that may be shared with other states and/or publicly.

Between January 1, 1993, and June 1, 2002, the database recorded more than 650 incidents of illicit trafficking, of which about two-thirds have been confirmed by states. Of these confirmed incidents, 43 percent involved nuclear materials. The number of cases per year in 1999 and 2000 was about twice the number in 1996, with most of this increase connected to incidents involving radioactive sources.

Of the confirmed incidents with nuclear material, one-third involved low-enriched uranium and 18 cases (10 percent), involved highly enriched uranium (HEU) or plutonium. In most cases, the quantity of HEU and plutonium encountered was small compared with the amount required for a nuclear explosive, although it should be noted that even small quantities of material may be samples of larger quantities available for purchase or at risk. Although there were no incidents of HEU or plutonium during the period 1996 to 1998, eight incidents were confirmed from 1999 to 2001, including the seizure in April 2000 of nearly a kilogram of HEU in the form of fast-reactor fuel pellets.

For incidents with radioactive sources where the source strength has been reported, about one in six involved sources of one curie (37 giga-becquerel) or more. In 14 cases the reported source strength exceeded 1000 giga-becquerel, and 11 of those 14 cases occurred during the last four years. Some of these incidents with high-intensity sources involved people who did not know what they were dealing with.

In order to define and target weaknesses in the prevention of nuclear terrorism and identify improvements in the relevant systems, the agency needs an increased understanding of the threats to nuclear security, including cases of theft, sabotage, and illicit trafficking. It also needs additional resources to increase the collection, dissemination, evaluation, and exchange of information on specific incidents and background facts. The analytical output will help in planning the detection and response strategies. The agency expects to improve mechanisms for consultation with member states and other international organizations regarding the collection and analysis of information.

## Trilateral Initiative

In September 1996, the Russian Federation, the United States, and the IAEA set in motion a trilateral initiative in the context of Article VI of the NPT, designed to investigate technical, legal, and financial issues associated with IAEA verification of weapons-origin and other fissile material released from defense programs in the two countries. The initiative would allow the IAEA to verify the weapons material from dismantled U.S. and Russian nuclear warheads and ensure that the material is properly controlled and protected. A joint working group was established to carry

out investigations and to develop appropriate equipment for verification. Over the past five years, much of the technical work under the Trilateral Initiative has been devoted to developing a verification technique that could allow nuclear-weapon states to submit for inspection fissile material with classified characteristics, including intact components from dismantled nuclear warheads. After considering every known measurement method (starting with those used by the IAEA in nonnuclear-weapon states to safeguard plutonium and highly enriched uranium), the trilateral parties concluded that each of these methods could reveal weapons secrets if inspectors were allowed access to the raw measurement data. Direct, quantitative measurements used in normal IAEA safeguards procedures were thus excluded from consideration. Instead, measurements would be required to block quantitative information from view. The actual measured results of a suite of tests are to be compared with unclassified reference points, with outcomes showing that the actual results are either greater than or less than the reference values, thus verifying a defined "attribute."[7]

This technique—"attribute verification with information barriers"—allows the IAEA to make credible, independent verification measurements while precluding the retrieval of secret information. Contracts are being concluded for the production of the first attribute verification system for plutonium with classified characteristics to be built for use in a facility.

Most of the technical work on the initiative has been conducted at U.S. and Russian laboratories and at workshops to investigate which advanced tools are available or under development for the verification and the safe containment of classified nuclear materials. The most recent of these technical workshops, in December 2001, was held at the Joint Research Center of the European Commission in Ispra, Italy. It considered:

- neutron and gamma devices designed for the assay of the plutonium mass but having an "information barrier" built in to assure the protection of classified parameters;
- advanced surveillance devices (e.g., 2-3D laser surveillance scanners);
- identification and authentication procedures; and
- vulnerability assessment, ensuring that the responses of the instruments could not be altered.[8]

Work is continuing on inventory monitoring systems for dedicated storage facilities for weapons-origin fissile material that will track material within the facilities and ensure that its identity, integrity, and location are verified at all times. A model verification agreement is in its ninth draft, with few points of contention remaining. However, aside from the challenging technical questions, the cost of ver-

7. Thomas Shea, "Report on the Trilateral Initiative: IAEA Verification of Weapon-origin Fissile Material," *IAEA Bulletin* 43, no. 4 (2001).

8. Information provided by Andre Poucet, Non-Proliferation and Nuclear Safeguards, European Commission Joint Research Center.

ification for the Trilateral Initiative has not yet been determined, nor has it been decided when verification will begin and how long it will be required.

Nevertheless, the Trilateral Initiative has an established process. Each year the U.S. secretary of energy, the minister of the Russian Federation on Atomic Energy, and the director general of the IAEA meet to review the current situation and to guide future activities of the joint working group. The pace of work depends on the relations between the states and the changes in administration of the two countries. When the annual meeting took place on September 17, 2001, U.S. secretary of energy Spencer Abraham stated that in light of the September 11 terrorist attacks, the initiative was more important than ever. The final document of the 2000 NPT conference, in its review of Article VI of the Treaty, states that the Trilateral Initiative should be completed and implemented.

## Lessons Learned and Future Priorities

The IAEA's technical cooperation projects and assessment services have been generally successful. The IAEA has received widespread support for its activities—particularly in General Conference resolutions as well as in the context of the NPT review process.

The prime constraint to the agency's ability to expand its CTR-related activities is a lack of resources. The global safeguards budget for preventing one of the most serious threats in the world is not even U.S.$100 million—less than 10 percent of the price tag for building a new nuclear power plant.[9] The agency's safeguards budget has had zero real growth for 15 years. Yet during that time the number of facilities and the amount of plutonium and HEU requiring safeguards have substantially increased. Given the important role the IAEA plays in preventing the diversion of nuclear materials to terrorists who could develop nuclear or radiological weapons, the budget is nowhere near adequate for the needs. The political will of states to fund such a security measure must be galvanized to meet the potential dangers. The Nuclear Threat Initiative contributed $1.2 million to the agency in October 2001 to strengthen its activities in reviewing and identifying security needs for nuclear facilities worldwide as well as to promote contributions from member states to implement these needs.[10] The zero real-growth environment and an increasing reliance on extra-budgetary resources are matters for states to solve.

The budget and personnel of the IAEA physical protection programs should be at least doubled in order to meet the task of assisting states to improve security measures. The IAEA could increase assistance to states in assessing and upgrading the security arrangements of their nuclear facilities. It could also assist in registering information on the material protection, control, and accounting (MPC&A) efforts in countries, focusing on securing nuclear material and preventing sabotage. It could develop a confidential database on the status of physical protection for each

9. Charles B. Curtis, "Reducing the Nuclear Threat in the 21st Century," Symposium on International Safeguards: Verification and Nuclear Material Security, IAEA, Vienna, October 29, 2001.

10. NTI press release, October 29, 2001.

country's nuclear materials and nuclear facilities. The IAEA's physical protection advisory service could assist countries in developing and implementing programs to test nuclear facility security systems designed to thwart terrorism.

The IAEA Board of Governors recently approved in principle the Secretariat's plan for strengthening activities to counter the threat of nuclear terrorism. The plan proposes expansion of agency programs in (1) physical protection of nuclear material and nuclear facilities; (2) detection of malicious activities involving nuclear and other radioactive materials; (3) state systems for nuclear material accountancy and control; (4) security of radioactive material other than nuclear material; (5) assessment of safety/security-related vulnerability of nuclear facilities; (6) response to malicious acts, or threats thereof; (7) adherence to and implementation of international agreements, guidelines, and recommendations; and (8) nuclear security coordination and information management. The plan also includes a proposal that would enable the agency to respond expeditiously to requests for assistance in the provision of equipment for physical protection upgrades at facilities and for detection equipment, for example, at border crossings (upgrades and procurement). As long as funding for these activities remains voluntary and insufficient to cover the entire plan, priority is given to the following activities:

- increasing the number and scope of International Physical Protection Advisory Service missions and other assessment services (e.g., regarding the safety/security vulnerability of nuclear installations);
- locating and securing highly radioactive orphan sources;
- assisting member states in implementing recommended improvements of state regulatory systems and security arrangements for nuclear material and nuclear installations;
- promoting adherence to international instruments; and
- increasing training, and the development and conduct of new training, with respect to improved security of nuclear and other radioactive material and nuclear facilities.

Broad international cooperation will be required to upgrade security measures, to improve capabilities for intercepting and responding to illicit trafficking, and to improve the protection of facilities against terrorism and sabotage. It will be a challenge for the agency and states to consolidate all these measures into an integrated, efficient system in order to ensure the security of nuclear and other radioactive material. Some believe a major new international initiative is needed to secure and account for weapons-usable nuclear material and nuclear facilities, with a transparency that will gain the confidence of the international community.[11]

11. Matthew Bunn and George Bunn, "Reducing the Threat of Nuclear Theft and Sabotage," Symposium on International Safeguards: Verification and Nuclear Material Safety, IAEA, Vienna, October 30, 2001, p. 15.

## Comparative Advantage

Given the IAEA's 134-state membership, its priorities—including CTR-related programs and activities—reflect those of the wider international community. The IAEA has the only international response system in place that would be able to react immediately to help countries in the event of a radiological emergency caused by a nuclear terrorist threat. The agency has proposed upgrading its Emergency Response Center to improve the speed of response. It has also proposed international response standby teams that could be promptly dispatched to states in need of urgent assistance.

The IAEA can be of service to a state that is seeking to upgrade its security measures for nuclear and radioactive material—through the transfer of technology, exchange of information, assistance and training in the implementation of internationally accepted standards, and assistance with regional cooperation. A comparative advantage of the agency's programs may be the sense of national ownership by states receiving assistance and advice, owing to the fact that projects are embedded in request-driven technical cooperation and other programs. The agency is able to work in close association with responsible national and international authorities, including customs and law enforcement organizations, to share best practices and conduct assistance visits.

## Decisionmaking Environment

As mentioned above, the activities of the IAEA, including those covered by cooperative threat reduction, are based on the agency's mandate and requests received from member states. The agency's activities are funded from three sources: mandatory assessed contributions to the agency's regular budget and safeguards budget; voluntary assessed contributions and assessed program costs (contributions from recipient states) to the Technical Cooperation Fund; and extra-budgetary, voluntary contributions for specific activities and projects. The agency is in the process of creating a special fund for activities in support of the agency's program to counter the threat of terrorism. Contributions to this fund will initially be exclusively voluntary. A review will be undertaken in a few years to see whether assessed contributions may be a viable option.

The government offices responsible for IAEA affairs are generally departments dealing with energy and environment, science and technology, or foreign affairs. In some cases donor states cover technical cooperation through international development assistance agencies.

CHAPTER 8

# Italy

*Paolo Cotta-Ramusino, Antonino Lantieri,* and *Maurizio Martellini*
Landau Network–Centro Volta/Union Scienziati Per Il Disarmo

## Background and Threat Assessment

During the Cold War, Italian foreign policy was characterized both by a strong commitment to NATO and to the building of the European Community and, later, the European Union. When dealing with military and especially nuclear issues, consecutive Italian governments paid close heed to the opinion of NATO allies and, chief among them, the United States.

During the 1960s, Italy briefly debated whether to acquire an independent nuclear capability but decided to forgo this option and acceded very early to the Nuclear Non-Proliferation Treaty (NPT). That does not mean that Italy was or is a nuclear weapons free country; in various times it hosted as many as 600 U.S. tactical nuclear weapons. Nevertheless, during the Cold War, most decisions pertaining to nuclear weapons were only marginally debated by the Italian public or political parties. Even the movement against nuclear weapons was never extremely active, with the notable exception of the debate over cruise missile deployment in the 1980s.

Thus, Italy has long seen itself as rather marginal in decisions concerning nuclear weapons. As a result, even after the end of the Cold War and the demise of the Soviet Union, Italy has been inclined to continue delegating nuclear weapons issues to others, and to the United States in particular, and has not felt prepared to assume a leadership role in combating the dramatic new risks of nuclear proliferation.

One could legitimately argue that no European country was well equipped for such a task. Nuclear weapons have been the topic of U.S.-Russian debates and negotiations for decades, while other NATO countries have been relegated to a marginal role; many could see no apparent reason why this suddenly ought to change.

Moreover, public perceptions of the proliferation risks arising after the demise of the Soviet Union have been shaped by the media's initial tendency toward hysteria—which contributed to a sense among the public that the inevitable had happened and nothing more could be done—and then by the sense that the media was "crying wolf."

At first, any seizure of radioactive material—no matter how minute—was presented by the media as having thwarted an effort to build a bomb. The larger-than-life image of the Russian mafia contributed to the false impression that all fissile material available for smuggling had been effectively smuggled and that fissile material and possibly bombs were already being sold on the black market to every crook on the planet.

Over time, however, the fact that no nuclear terrorist acts occurred and no new nuclear country appeared on the world scene as a result of illicit traffic of nuclear material strengthened the perception that the illegal sale of nuclear materials was not a source of serious risks after all and that nuclear proliferation from the former Soviet Union was not something that one should worry too much about. Threat perceptions were minimized, and the sense of urgency was lost.

As a result, the primary motivation for cooperating with Russia in strengthening control over nuclear materials, improving the environment of Russian nuclear military-related infrastructure, and facilitating the conversion of nuclear weapons structures was—and still is—seen by most Italians in economic terms as opposed to broader European and global security terms.

Economic cooperation has its own rules. To start with, it must be mutually advantageous and foster business in the richer partner as well. Furthermore, in the case of Russian economic cooperation, it is expected to benefit Russian society, help build a true market economy, and bolster the foundations of democracy. By these standards, initiatives that have to do with preventing nuclear proliferation in Russia are certainly not of paramount interest, with the possible exception of initiatives that stress "restructuring and conversion." Certainly, nuclear infrastructure does not fit in the mainstream of Russian-European economic cooperation, which includes the sale of Russian gas (40 percent of total EU imports) and the opening of the Russian market to European commodities.

In conclusion, preventing nuclear proliferation from Russia is seen in Italy, and possibly in Europe, mainly through the lens of economic cooperation, and even within that framework, it is not considered the top priority. This explains the modest results of European initiatives developed up to now, and particularly of Italian initiatives. The total amount of Italian money involved per year in cooperative threat reduction activities is roughly equivalent to a fraction of the annual salary of a professional soccer player.

It is true that Italy also participates in EU programs like Technology Assistance to the Commonwealth of Independent States (TACIS) and support for the International Science and Technology Center (ISTC), and this increases the amount of money devoted to preventing nuclear proliferation in Russia. But some basic change in attitude is needed in Italy, Europe, and beyond, especially after September 11, which made clear that catastrophic terrorism involving weapons of mass destruction (WMD) is a real possibility and danger.

The fact that significant proliferation of fissile materials or WMD expertise from the former Soviet Union does not appear to have occurred over the last 12 years does not guarantee that, in the future, we will be as lucky. More numerous and more aggressive groups are interested in pursuing acts of catastrophic terrorism and

hence are in principle more interested in obtaining fissile materials. This may enlarge the "market" for illegal nuclear material and increase the relevant risks.

Moreover, large stockpiles of materials are still to be disposed of—most notably, large amounts of the highly enriched uranium (HEU) that is supposed to be diluted in the U.S.-Russian HEU deal. The relatively small amount of nuclear smuggling detected to date is most likely proof that the Russian nuclear structure has been able to hold so far, but it is reasonable to wonder how long this situation can be sustained, under very difficult economic circumstances, when younger, possibly less motivated and less committed personnel will take over control and management of the various parts of the military and former military nuclear infrastructure.

In the years ahead, chances are that Italy and other European governments will see nonproliferation cooperation with Russia as a necessary element of a changed international security framework and will decide—as they should—to increase substantially the resources dedicated to this purpose. The G-8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction of June 27, 2002, is a step in the right direction; leaders have made an explicit commitment to raise $20 billion over the course of the next 10 years to support nonproliferation efforts. Let us hope this commitment represents a change in the basic attitude toward the enormous risks of nuclear proliferation and nuclear terrorism that exist today.

## Cooperation with the Russian Federation in the Dismantlement of Nuclear and Chemical Weapons

In the framework of G-8 commitments, Italy signed in 1993 a specific agreement with Russia to supply assistance in the dismantlement of nuclear arms, with an emphasis on improving people's safety. This bilateral program, concluded in 1999, was oriented toward fixed and mobile monitoring of the spread of radioactivity in the environment and in the population; individual means of radioprotection for the staff; and remotely placed appliances for operations in contaminated areas. The methodologies and equipment developed for this program were also used in those closed Russian nuclear cities that had produced weapons grade plutonium and HEU. Between 1993 and 1999, Italy devoted approximately $5 million to this program.

For the chemical weapons destruction program at Shchuch'ye, the Italy-Russia agreement has allocated approximately $8 million total for fiscal years 2000, 2001, and 2002 to assist the Russian Defense Ministry in its efforts. The Italian funds will be used to realize the infrastructures necessary for a destruction apparatus to function and to improve the living conditions of the local population, such as gas pipelines, an electric grid, sanitary equipment, and environmental protection.

Work on these infrastructures, as specified in the Italy-Russia agreement, will be realized by an Italian enterprise chosen by the Russian authorities, which is specialized in the above sectors and which has prior experience working in the Russian Federation. The text of the agreement includes specific clauses that ensure a verification mechanism by the Italian Ministry of Foreign Affairs in order to evaluate progress and keep track of payments to the Italian enterprise.

## AIDA-MOX-2 Project

The United States and Russia have both agreed that each country will dispose of 34 tons of plutonium (Pu) that have been declared in excess of military needs.

Russia's declaration of excess Pu does not clarify how much plutonium Russia is retaining for weapons purposes, as it has declined to declare its total plutonium inventory. That said, it is estimated that Russia has produced about 170 tons of plutonium for weapons, and there are about 30 tons of mostly reactor-grade plutonium recovered from processing spent fuel in VVER power reactors and naval reactors. This 30 tons of plutonium is stored at Ozersk (formerly Chelyabinsk-65 or Mayak).

For the time being, Russia presumably is planning to retain in operational status or in deposits at least as many intact nuclear warheads as the United States (i.e., on the order of 10,000 warheads under START I and possibly several thousand additional nonstrategic warheads).

On September 2, 1998, Presidents Yeltsin and Clinton agreed to begin negotiations on a bilateral agreement that will lay out concrete steps for plutonium disposition and cooperation in this area. The United States is pursuing two approaches to reduce the possibility of using the excess plutonium for weapons purposes. First is the so-called MOX option, in which the plutonium is used as mixed oxide (MOX) fuel in operational nuclear power reactors; the MOX fuel is burned in reactors; and the spent MOX fuel is disposed as waste in a geologic repository. Second is the so-called vitrification option, in which plutonium is immobilized into stable forms containing fission products as a radiation barrier. The plutonium oxide will be mixed with ceramic material and converted into a crystalline ceramic waste form called a "puck," and the pucks, together with other vitrified high-level radioactive wastes, will be sent to a geologic repository for permanent disposal.

Russia faces several major difficulties in disposing of its plutonium. It has opposed the vitrification option, but it has neither a MOX fabrication plant with adequate capacity nor the funds to construct one. Various proposals for constructing a MOX fabrication plant in Russia have been floated by U.S. and Russian officials and European nuclear industries officials. In June 1998, Russia, France, and Germany launched the "trilateral intergovernmental agreement AIDA-MOX 2 on cooperation in the frame of civil utilization of plutonium coming from dismantlement of Russian nuclear weapons."

Under the agreement, activities will be developed concerning

- research and development on the conversion of the military plutonium and on the preparation of the MOX fuel;
- safety studies on VVER 1000 and BN600 reactors oriented toward verifying the neutronic physics, the safety conditions, and the accidental analysis of the core with the MOX fuel; analyzing and individualizing the necessary changes in the VVER1000 reactors for the utilization of the MOX fuel; and

- design and fabrication of MOX fuel rods to irradiate them in a Russian VVER1000 reactor for demonstration.

These activities will define procedures for military plutonium utilization and design and fabrication of MOX fuel rods; verify the compliance with international safeguard; give assistance to the Russian Safety Authority in licensing procedure; execute the MOX fuel irradiation and perform the analysis and interpretation of irradiation and post-irradiation data.

Ultimately, the trilateral agreement is aimed at constructing a pilot MOX plant with an annual capacity of 1.3 tons (t) of plutonium, sufficient to supply MOX fuel for four VVER 1000 plants operating on 1/3 MOX cores (0.25 t Pu/reactor-y) and the BN600 reactor with a partial MOX core loading (0.3 t Pu/y). France and Germany are interested in constructing the Russian MOX pilot plant provided that someone else pays for it.

The construction of the proposed 1.3 t Pu/y pilot MOX fabrication plant partially solves the problem, because about 3 tons of plutonium are recovered annually by processing spent fuel. The pilot plant would be the first step of a more global strategy on plutonium disposition.

## Italian Participation in the France-Germany-Russia Agreement

In 1999 the Italian Ministry of Foreign Affairs, in the framework of nonproliferation cooperation programs with the Russian Federation, agreed to Italian participation in the trilateral AIDA-MOX-2 initiative, with plans to start formal implementation of the agreement in 2002. Italy will address research and development issues surrounding the conversion of excess military plutonium from the dismantlement of Russian nuclear warheads and the preparation of MOX fuel. In particular, Italian participation will be focused on safety studies on VVER100 and BN600 reactors and fabrication of MOX fuel rods in Russia and their irradiation in Russian VVER1000 reactors.

Italian participation in this program has been led by ENEA (Italian National Agency for New Technology, Energy and Environment). ENEA's activities include

- contributing to the international group (French-German-Russian) in the verification of Russian studies on the effects the utilization of MOX fuel rods has on the VVER100 reactor core, and in the validation of Russian studies by means of Monte Carlo and/or deterministic codes;
- sending ENEA representatives to technical meetings;
- contributing to studies for the definition of necessary modifications of reactor systems and for the evaluation of the new management costs as a consequence of the utilization of the MOX fuel.

The program has cost about $1 million in fiscal year 2002.

# Future Priorities

## European Nuclear Cities Initiative

The downsizing of the oversized nuclear weapons complex that Russia inherited from the Soviet Union remains a central international security challenge. It is important to achieve these goals as rapidly as possible to speed the process of irreversible nuclear arms reductions and to reduce the danger of proliferation of Russian nuclear weapons materials, technologies, and expertise. The core of Russia's nuclear-weapons complex is located in about 10 closed cities, often identified as the Russian nuclear cities (RNCs).

The economic situation of these cities, and more generally of the nuclear military complex as a whole, is eroding the standard of safety and security, making the entire system a serious proliferation risk. The task of military conversion is particularly challenging for the RNCs. They have high concentrations of scientific and engineering expertise, which is attractive to commercial entities, but their isolation and security controls make the development of normal business relationships difficult.

A number of EU-Russian cooperation programs (TACIS, ISTC, etc.) are in place and geared toward helping Russia's transformation on civil, economic, and nuclear security issues—including the economic conversion of the RNCs. The EU's common strategy and joint action have identified key priorities, but more can be done to coordinate ongoing EU programs and ensure their maximal efficiency and visibility. Specifically, the funds to the cities are not sufficient to create market-oriented civilian jobs, enhance the salaries of RNC scientists, or secure downsizing goals.

To meet these challenges, the Italian Ministry of Foreign Affairs, with the assistance of the Italian NGO Landau Network–Centro Volta (LNCV) and ENEA, proposed in 2000 a European Nuclear Cities Initiative (ENCI). The ENCI could be complementary and synergistic with the American Nuclear Cities Initiatives (NCI) and Initiatives for Proliferation Prevention (IPP) in order to develop alternative civilian jobs for the excess weapons workers in the RNCs.

ENCI's priorities are

- fostering initiatives to promote private-oriented research and development and conversion activities;
- enhancing joint science and technology research and development in energy efficiency, environmental and nuclear cleanup, nuclear safety, and advanced energy sources;
- assisting Russian nuclear institutes in nonproliferation research and training; and
- promoting the flow of direct investment into the nuclear cities.

The basic concept behind the ENCI is that scientific and technological projects must be selected on the dual basis of Western interest and local sustainability. The projects would include facilitating collaborations between EU manufacturers and

nuclear city experts in new energy efficiency/savings technologies. They would work to deploy efficient energy equipment and techniques in nuclear city buildings and heating systems and to develop waste management and remediation in the surrounding environment.

Collaboration could also include oil and gas saving technologies, as progress in this area could double Russian oil/gas reserves over a 10-year period by reducing waste and inefficiencies. Pursuing energy efficiency and environmental cleanup can help the RNCs solve several key problems, including underemployment and ballooning municipal energy-related debts—and also reduce the risk of plutonium proliferation by helping the Russians find alternatives to the energy produced in their plutonium reactors.

One possibility would be to organize the RNC's scientists and engineers into consulting groups based on energy and environmental areas of expertise and have them work in Energy Efficiency Open Centers and Environmental Open Centers to be established in the framework of the ENCI. These open centers could operate along the lines of the numerous consulting businesses in the West and might even become their counterparts. The open centers could also serve as focal points for innovation and market activities and could work with the RNC's administrations to create new jobs in the cities' surrounding regions.

## Establishment of an International Working Group

In 2001, Italy advocated establishment of an International Working Group, or IWG, on the RNC initiatives as a multilateral informal coordination structure to be chaired by the European Commission (EC). In coordination with other international cooperation programs, the IWG was established within the EC in 2002 to provide a forum for discussion and exchange of experiences, to establish possible synergies and financing mechanisms in the wider management of the different nuclear cities programs, and to attract private donors and Western/EU firms.

## ENCI Italian Law in the Framework of the G-8 Global Partnership Program

On December 1, 1997, a cooperation and partnership agreement was formed between the member states of the EU and the Russian Federation. On February 10, 1998, Italy signed the action plan for the agreement. On June 4, 1999, the European Council adopted the EU common strategy toward the Russian Federation, and in the same year Italy signed the Italy-Russia agreement for the actualization of this common strategy of the EU toward the Russian Federation. On July 13, 2000, in Moscow, Italy signed the agreement of the second session of the Italy-Russia Commission for Scientific and Technological Cooperation.

In all the agreements listed above, nonproliferation, disarmament, and military conversion with an explicit reference to the Russian nuclear cities are inserted as priority objectives.

Now Italy is considering drafting a specific law to finance selected ENCI projects finalized to conversion in the framework of the objectives of the G-8 Global Partnership Program stated at the 2002 G-8 summit in Kananaskis, Canada. The

law should appoint ENEA as the executive scientific organization of the program in synergy with the Italian Ministry of Foreign Affairs. The law should define the main areas of intervention and tasks of ENEA by setting concrete, measurable objectives for the program's execution. The main areas of intervention should regard decommissioning and conversion projects in the fields of clean advanced energy technologies and in the environmental/nuclear cleanup sectors.

## Lessons Learned from the Italian Experience

To ensure the greatest return on assistance funds requires establishing

- specific goals and measurable objectives for each program;
- transparency in the funding process;
- the means for channeling the expertise and know-how of workers in the Russian nuclear weapons complex into civilian activities.

These objectives can be more easily reached if international nonproliferation and conversion programs are restricted to the core of the Russian nuclear weapons complex—the 10 closed nuclear cities.

Although the United States is the leader in cooperation with RNCs, Europe has defined some areas of intervention and priorities in the field of nuclear disarmament and nonproliferation that can help the conversion of the Russian nuclear weapons complex. Further efforts have to be made to accelerate the downsizing of the RNCs and, at the same time, to tap the vast potential of expertise, scientific/technical knowledge, and market opportunities, represented by the scientists and technicians who work there.

More coordination among bilateral and multilateral international programs will be essential to avoid duplication of efforts and to better focus on key objectives.

If cooperative programs toward Russia are to be improved, it is essential to create a more comprehensive strategy at the Russian and Western political level and to encourage the following:

- The transfer of excess nuclear, biological, and chemical (NBC) workers from one sector to another to cope with specific nonproliferation and disarmament needs; for example, the utilization of MINATOM personnel and assets to help the Ministry of Defense with decommissioning studies and tasks;
- The selection and funding of Russian local projects that meet the basic market/R&D demands and provide services for the so-called Closed Administrative-Territorial Entities (known in Russian as Zakrytye Administrativno-Territorial'nye Obrazovaniya). Collaboration with the international community should be more at the level of consulting services and in helping Western applied research niches determined by a pull model;
- Better coordination between the Russian ministries and agencies involved with the NBC complex with the rest of the government, and in particular with the

Ministry of Finance, with the Ministry of Foreign Affairs, and with the Russian Federation Council;

- The creation of a special envoy at the level of the Russian presidency, charged with coordinating and rationalizing the different Russian budget provisions with the several bilateral and multilateral international assistance programs, including the future G-8 Global Partnership Program initiatives;
- The improvement of capacity building in business, in science and technology management, and in trading in each sector of the Russian NBC complex;
- The exploration of innovative new financial solutions that could improve the stability of the Russian NBC complex and salaries for its workers, such as the use of the Kyoto Protocol's credits for carbon emission trades for nonproliferation projects and security programs, and also the partial restructuring of the debt-swap due by Russia toward Paris Club creditor states to support nonproliferation and security/safety-oriented projects.

CHAPTER 9

# Japan

*Tsutomu Arai* and *Nobumasa Akiyama*
Japan Institute of International Affairs

## Threat Assessment

Since the end of the Cold War, significant progress has been made in promoting arms control and improving strategic stability. The strategic nuclear arsenals of the United States and Russia have been substantially reduced. At the same time, awareness has increased that the actual process of nuclear disarmament faces significant challenges—lack of funding key among them. Facilitating the process of disarmament, in particular ensuring the safe processing and disposal of nuclear and other weapons in the countries of the former Soviet Union, is a challenge for the international community as a whole.

The government of Japan (GOJ), long committed to nuclear disarmament, launched its participation in Cooperative Threat Reduction (CTR) efforts at the 1993 G-7 Joint Ministerial Meeting in Tokyo, where it announced its commitment to provide $100 million in the form of grant aid for the purpose of dismantling nuclear weapons in the former Soviet Union. At the G-8 summit in Cologne in June 1999, the late prime minister Obuchi pledged additional funds amounting to $200 million, an action motivated by the Japanese people's desire to help expedite the early achievement of START Treaty objectives. At the Kananaskis summit, the government of Japan announced a commitment of $200 million for programs related to the G-8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction. The GOJ has said that this amount is the bottom line rather than ceiling and that it would be ready for further contributions when appropriate projects are identified.

Japan's support for the denuclearization of Russia (and the Commonwealth of Independent States, or CIS, countries) is driven by four key objectives:

- Security—to promote disarmament in the Russian Far East by reducing unstable military factors (e.g., Russian nuclear submarines);
- Environment—to reduce the negative effects that might be caused by a possible leakage of radioactive materials into the Sea of Japan;

- Nonproliferation and counterterrorism—to promote the nonproliferation of nuclear materials or radioactive waste by assisting the safe storage, transportation, and effective disposal of these dangerous materials;
- Diplomacy—to improve diplomatic relations between Russia and Japan with a view to solving long-standing bilateral problems, such as the territorial issue of the northern islands off Hokkaido.

## Framework

The GOJ currently has three main areas of focus in its cooperative efforts to facilitate disarmament and nonproliferation in Russia.

The first is run by the intergovernmental Committee on Cooperation for the Elimination of Nuclear Weapons in Russia, which was established based on the bilateral agreement between the governments of Japan and Russia. This area has focused on three projects, the first of which relates to the disposal of radioactive liquid waste produced as a result of dismantling decommissioned Russian nuclear submarines. Cooperation in this category is primarily aimed toward resolving ecological or environmental problems related to the elimination of nuclear weapons. The second project deals with the dismantling of decommissioned general purpose nuclear submarines or multipurpose submarines (SSNs), which do not carry strategic missiles and are not covered under U.S. CTR assistance. In contrast to the relatively new strategic nuclear submarines (SSBNs), decommissioned general-purpose submarines are very old, and three of them have been severely damaged in accidents. They risk causing environmental problems in years to come. The third project aims to improve related infrastructure such as unloading and storage facilities and the transportation of spent nuclear fuel (SNF) derived from the dismantling process.

The second area of focus is a project undertaken by the Japan Nuclear Cycle Development Institute (JNC) under the auspices of Japan's Ministry of Education, Culture, Sports, Science, and Technology (MEXT) on the disposition of the surplus plutonium produced by BN-600, Russia's commercial fast-breeder reactor. The JNC has collaborated with Russian institutes for the disposition of weapons-grade plutonium using vibro-packed fuel fabrication technology. The weapons-grade plutonium is converted to uranium-plutonium mixed oxide (MOX) fuel and loaded into the BN-600 reactor for burning. If this option is employed, it is expected that 20 tons of plutonium can be disposed of in BN-600 by 2020.

The third area of focus is support for the International Science and Technology Center (ISTC), which aims to redirect the talent of scientists and engineers involved in research and production of weapons of mass destruction (WMD) to peaceful purposes and to prevent brain drain or proliferation of know-how. As a founding member of the ISTC, Japan has contributed $52 million since ISTC's establishment in 1992. This cooperation was implemented under the jurisdiction of the Science and Nuclear Energy Division of the Ministry of Foreign Affairs (MoFA).

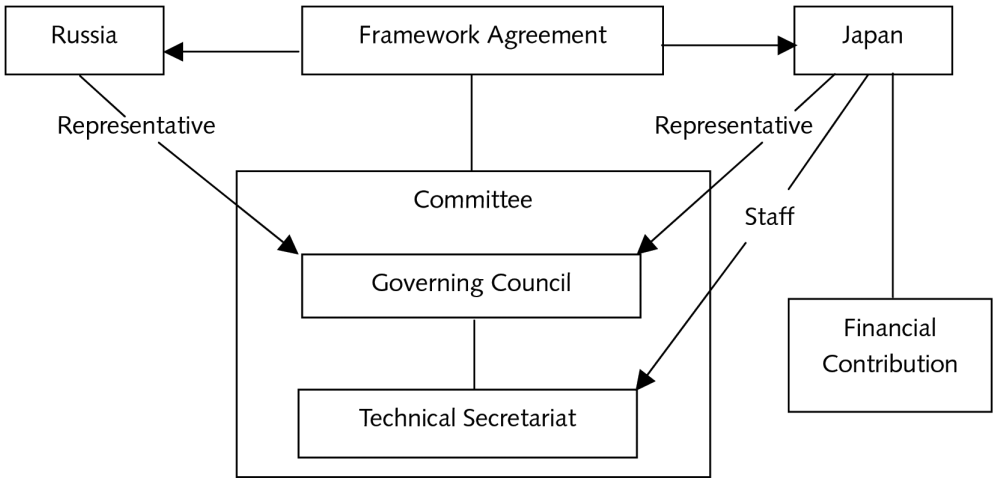
In 1993, Japan concluded a legal agreement with Russia for the implementation of aid programs, and agreements with Belarus, Ukraine, and Kazakhstan followed.

An intergovernmental committee was established under the bilateral agreement, which is composed of a governing council and a technical secretariat (see figure 9.1). The committee's main tasks are, *inter alia*, to decide the priority fields of cooperation, to draw up plans for specific cooperation based on the needs of the Russian Federation, and to implement the plans by providing necessary payments through the technical secretariat.

The governing council is composed of representatives from the Japanese and Russian governments. Each party appoints one representative. The council ultimately decides by consensus on the feasibility and priority of various projects. All the feasibility studies and procurement activities have been carried out on the basis of open and public tender in order to ensure the transparency of the procurement procedures.

The Tokyo-based technical secretariat is entrusted with the management of funding (provided by the GOJ) and the implementation of projects. The executive director and his staff (currently only 4 or 5) are appointed by the GOJ with the consent of the governing council. The technical secretariat's duties are enormous, including the recruitment of specialist engineers and technical consultants. It is required to remain as small a body as possible, which has meant it has had to appoint an agent for each project and entrust that agent with many tasks for the implementation of the program. For example, Crown Agents (UK) has been fulfilling that role in implementing the Suzeran project (construction of a facility for disposal of low-level liquid radioactive waste).

**Figure 9.1. Mechanism of the Intergovernmental Committee**




On the Japanese side, the Ministry of Foreign Affairs, or MoFA, is the responsible body—primarily the Arms Control and Disarmament Division and the Science and Nuclear Energy Division, which is in charge of peaceful nuclear energy. These divisions are in constant contact with the technical secretariat in the process of project

selection and implementation. The MEXT and the JNC have been cooperating with Russia on the project related to the disposal of surplus plutonium (see table 9.1).

On the Russian side, the Ministry of Atomic Energy (MINATOM) is the Japanese MoFA's counterpart. In addition, various ministries and agencies are involved in specific projects, including the Shipbuilding Agency, the Ministry of Economics, the Pacific Fleet, the Ministry of State Property, the Ministry of Foreign Affairs, the Ministry of Railroad Transportation, and the local governments.

**Table 9.1. Policy Schemes for Japan's Cooperation toward Eliminating Nuclear Weapons in Russia**

| Organization | Project | Status | Jurisdiction |
|---|---|---|---|
| Intergovernmental committee | Dismantling of SSNs and related projects | Completed FS, suspended implementation | Arms Control and Disarmament Division (ACD), MoFA |
| | Suzuran/low-level liquid radioactive waste disposal | Completed in 1997 and handed to Russia in 2000 | ACD & SNE |
| JNC | Disposition of weapons-grade plutonium (experimentation project for BN-600 and vibro-packed fuel) | Phase 0 will be completed in 2003; Phase 1 under preparation | MEXT |
| Science and Nuclear Energy Division (SNE), MoFA | Financial contribution to ISTC | Contributed $52 million | SNE |

## Quantitative Assessment

As described above, the sources of Japanese funding to Russia and the CIS are in the form of two government donations, motivated by Japan's political intention to participate fully in international cooperation toward nuclear disarmament and nonproliferation. The bulk of the $211.64 million in pledged funding has been allocated to Russia, Ukraine, Belarus, and Kazakhstan (see table 9.2).

The first commitment was announced by then prime minister Miyazawa at the G-7 Joint Ministerial Meeting in Tokyo (April 1993), providing $100 million in the form of a grant aid package for the purpose of dismantling nuclear weapons in the former Soviet Union. Of this amount, $70 million was allocated to cooperation with Russia. At the same time, other programs were announced in the form of humanitarian aid, technology assistance or transfer, and personnel exchange programs to assist post-perestroika Russia.

At the summit meeting in Cologne in June 1999, the second grant aid package was pledged by Prime Minister Obuchi, providing assistance for additional projects with a total value of $200 million, which includes the undisbursed portion of the 1993 fund. The actual amount provided by the GOJ was $111.64 million, of which $101.64 million was allocated to Russia. Only 32.2 percent of the $211.64 million pledged in 1993 and 1999 for cooperation in eliminating nuclear weapons in the CIS has been expended for projects and feasibility study.

**Table 9.2. Allocation of 1993 and 1999 Funds for Cooperation with Russia and the CIS on Disarmament and Nonproliferation** (in millions of U.S. dollars)

| Country | 1993 | 1999 | Subtotal |
|---|---|---|---|
| Russia | 70 | 101.64 | 171.64 |
| Ukraine | 15 | 4 | 19 |
| Kazakhstan | 10 | 5 | 15 |
| Belarus | 5 | 1 | 6 |
| Total | 100 | 111.64 | 211.64 |

The main projects Japan has undertaken so far may be categorized into four areas: (1) dismantling of decommissioned nuclear submarines in the Far East region; (2) promoting the conversion of military resources to the private sector; (3) disposing of surplus weapons-grade plutonium; and (4) supporting the International Science and Technology Center.

## Dismantling of Decommissioned Nuclear Submarines in the Far East Region

Dealing with decommissioned nonstrategic nuclear-powered submarines from the Northern and Pacific Fleets has become a challenge for Russia—economically, politically, and environmentally. As of September 2002, there are 76 decommissioned nuclear submarines in the Russian Far East, of which 17 SSBNs and 5 SSNs have already been dismantled. Fifty-four decommissioned nuclear submarines, most of which are regarded as SSNs, remain to be dismantled at Zvezda shipyard in the closed city of Bolshoi Kamen, situated on the west side of the Shokotovo Peninsula, about 35 kilometers east of Vladivostok.

The safe dismantling of decommissioned Russian nuclear submarines in the Russian Far East is an important and urgent international task, not only from the perspective of arms control and disarmament, but also from the environmental perspective of protecting the region surrounding the Sea of Japan. In fact, this issue is of great security and economic importance not only to Japan and Russia but to the entire Asia-Pacific region.

Efforts have focused on (1) construction of a low-level liquid radioactive waste treatment facility; (2) rehabilitation and upgrade of the railway between

Smolyaninovo station and Bolshoi Kamen; (3) provision of facilities for unloading, temporary storage, and loading of spent nuclear fuel from submarines; (4) dismantling of a Victor III–class submarine at the Zvezda shipyard; and (5) supply of emergency response equipment. The total cost for the (general purpose) submarine-related projects has so far amounted to around $170 million. It consists of some $70 million from the 1993 funding and $102 million from the 1999 funding.

## Construction of a Low-level Liquid Radioactive Waste Treatment Facility

The Soviet Navy's dumping of radioactive wastes in the Barents Sea, the Arctic Ocean, and the Sea of Okhotsk was made public by the Yablokov report in 1993, and in 1994 Greenpeace reported the Pacific Fleet's dumping of nuclear submarines' secondary cooling water into the Sea of Japan. A wide range of domestic organizations made appeals, especially local governments around the Sea of Japan, because fisheries, which represent an important regional industry, feared huge losses to the environment and to their reputation. In response to growing public and political concerns over environmental damage, the MoFA identified a project to construct a processing plant for low-level liquid radioactive waste as a top priority in cooperative threat reduction efforts with Russia. The MoFA arranged financial contributions to the project through a series of negotiations with the Russian Ministry of Foreign Affairs, the Russian Ministry of Atomic Energy, and the Russian Navy, among other relevant agencies. Following international bidding, a consortium formed by the Babcock and Wilcox Nuclear Environment Service and the Tohmen Corporation was given the contract.

Construction of a floating facility, named "Suzuran" or "Landysh" (meaning "lily of the valley"), was completed in 1997. It was towed to Zvezda Shipyard in November 2000 and successfully handed over to the Russian operator. The total cost for the construction of Suzuran was around $36 million. The facility is set on a Russian-made barge and is anchored without propelling power in the Bolshoi Kamen Bay near Vladivostok. It is designed to dispose of around 7,000 cubic meters per year of radioactive waste stored in old tankers near Vladivostok. In addition, the facility is expected to treat liquid waste from the dismantlement of strategic submarines, assisted and financed by the United States in the same region, and to deal with the radioactive waste from the submarines to be dismantled in the years to come. As of mid-September 2002, Suzuran processed 1,810 cubic meters of liquid radioactive waste. Extracted radioactive materials are kept in a temporary storage facility, which was constructed by the U.S. CTR program.

## Rehabilitation and Upgrade of the Railway between Smolyaninovo Station and Bolshoi Kamen

As the dismantling of submarines continues, a considerable amount of processed nuclear fuel and spent fuel will be produced. These materials will be transported to a fuel storage site at Mayak via the Trans-Siberian Railway. The Smolyaninovo–

Bolshoi Kamen Railway needs repairs and upgrading for the safe transportation of heavy spent fuel containers.

Technical consultants completed the feasibility study for a project to upgrade the railway in 2000. The official decision to implement the project was made at the governing council on January 12, 2001. It was agreed at the council that the maximum contribution to the project would not exceed $7 million. The draft implementation agreement on the project is being formulated.

## Provision of Facilities for Unloading, Temporary Storage, and Loading of Spent Nuclear Fuel from Submarines

This project is to provide facilities necessary for defueling multipurpose nuclear submarines at the Zvezda Shipyard, thus decommissioning four such vessels. The Zvezda Shipyard has proposed various measures, including the modification of a building for defueling equipment and the construction of a temporary storage facility for empty casks. Technical consultants completed the feasibility study for this project in August 2000. The draft implementation agreement has been under consideration by both sides.

## Dismantling of a Victor III–class Submarine at the Zvezda Shipyard

Japan has agreed to provide assistance in the dismantling of general-purpose nuclear submarines not covered by U.S. programs. One Victor III–class submarine has been chosen as a pilot project. The project also envisions the improvement of related infrastructure, such as procurement of special containers and dry-dock repair and the introduction of radio-ecological monitoring system. Project implementation was delayed because priority was given to the U.S. project of dismantling strategic nuclear submarines (SSBNs). The Zvezda Shipyard currently has the capacity to dismantle approximately four SSBNs or four to six SSNs per year. The Japanese project will facilitate the dismantling of more submarines, once an agreement is reached between the governments of Japan and Russia.

Technical consultants completed a feasibility study for this project in August 2000 and issued a final report. After consideration on the Russian side and exchange of views between Russia and Japan, a draft agreement was formulated by Japan and handed over to Russia. A draft agreement amended by Russia was returned to Japan, but because of policy reviews under way within the GOJ, this project was suspended in 2002. There is possibility that this project will be resumed when the report is published.

## Supply of Emergency Response Equipment

This project is to supply emergency response equipment in case of a possible incident or accident during the elimination of nuclear weapons. The governments of Japan and Russia have been holding negotiations on this issue for the past several years.

## Promoting the Conversion of Military Resources to the Private Sector

It is commonly accepted that the conversion of military resources to the private sector in Russia contributes not only to promoting disarmament in Russia, but also to promoting structural reform of the Russian economy by effectively utilizing industrial facilities and human resources. To this end, the GOJ has sponsored seminars through the Japan Centers in Vladivostok and Khabarovsk to assist retired military personnel and retired military reserve personnel in finding jobs in private industries in the Russian Far East. Some of the seminar participants have received further training in Japan. The GOJ intends to enhance cooperation in this area by providing necessary equipment and dispatching experts to help Russia open a center in Vladivostok for retraining retired personnel.

## Disposition of Surplus Weapons-grade Plutonium

A large amount of plutonium and highly enriched uranium is being extracted from thousands of dismantled nuclear warheads. Despite international cooperation to strengthen Russia's capacity to control its fissile material, many critical tasks remain. The disposition of surplus weapons plutonium accumulating in the Russian Federation and the United States has been prominent on the international agenda since the Moscow Nuclear Safety Summit and the subsequent International Experts Meeting in Paris in 1996.

The United States, France, Germany, and Canada, based on bilateral or trilateral agreements with Russia, have performed feasibility studies on Russian plutonium disposition utilizing VVER-1000/BN-600 reactors and other facilities. In June 2000, the United States and the Russian Federation each agreed to dispose of 34 metric tons of weapons-grade plutonium. The G-8 countries discussed the issue at the July 2000 Okinawa summit and agreed to develop an international financing plan for plutonium management and disposition, based on a detailed project plan for the Russian program and a multilateral framework to coordinate cooperation.

Coincidentally, the MEXT of Japan mandated the JNC to reevaluate Japan's domestic plutonium programs. The vibro-pack fuel production technology, promoted by the JNC, is considered one of the options for economically viable fast reactor development in Japan. Russia, in the meantime, expects the commercial use of MOX fuel, both at the VVER-1000–type light water reactor and the BN-600–type fast breeder reactor. The JNC and its Russian counterpart, the Atomic Reactors Scientific Research Institute (the RIAR) in Dimitrovgrad, launched a series of joint research projects in 1999 that covered production of MOX fuel from weapons-grade plutonium, irradiation tests in an experimental reactor, and acquisition of reactor physics data necessary to burn MOX fuel.

The JNC has proposed the BN-600 vibro-packed (vipac) fuel option for Russian weapons plutonium disposition. In this option, Russian surplus weapons plutonium would be disposed of as MOX fuel for BN-600 at the Beloyarsk Nuclear Power Plant (BNPP) using vipac fuel fabrication technology developed by the RIAR. The enriched uranium fuel currently being used as driver fuel in BN-600 would be replaced by MOX fuel. The disposition rate of plutonium is calculated as 0.3 ton/year for a partial MOX core (hybrid core) tested at Phase 1 and 1.3 ton/year for a

full MOX core that will be adopted for Phase 2. According to JNC estimates, approximately 20 tons of plutonium can be disposed of in 20 years, assuming that the lifetime of the reactor can be extended 10 years, as shown in table 9.3 below.

The BN-600 vipac option proposed is composed of the following three phases:

- Phase 0: Preparatory stage (1999–2003)
  - Preparatory studies for validity of the option conducted
  - Criticality experiments for BN-600 MOX cores using BFS-2 facility of IPPE
  - Fabrication and irradiation test of three MOX vipac fuel lead test assemblies (LTAs)
  - Cost estimate for BN-600 full MOX core
- Phase 1: Hybrid (Partial MOX) core (2003–2006)
  - Present enriched uranium driver fuel partially (approximately 20 percent) replaced by vipac MOX fuel
  - Blanket fuel assemblies replaced by reflector assemblies
- Phase 2: Full MOX core (2007–2020)
  - Enriched uranium driver fuel assemblies fully replaced by vipac MOX fuel

**Table 9.3. Estimated Amount of Disposed Plutonium**

| Step | Estimated Amount of Plutonium Disposition |
|---|---|
| Phase 0 | Approx. 0.02-0.07 t Pu |
| Phase 1 | Approx. 0.12t Pu+0.3 t Pu/year x 4 year = approx. 1.32 t Pu |
| Phase 2 | Approx. 1.3 t Pu/year x 14 year = approx. 18.2 t Pu. |

To date, JNC's commitment to BN-600 vipac option is limited to Phase 0 and part of Phase 1. The Japanese government has already pledged $33.5 million for the project and appropriated a $20 million budget for research. However, the G-8, or the United States and Russia, are expected to adopt the VVER-1000 option, which is chosen for burning U.S. plutonium, given the importance of parallelism in implementing the bilateral agreement. The GOJ will be ready to cooperate in international measures on this matter, which may be agreed among the G-8 members. At the same time, it would be appropriate for Japan to continue collaboration on research with Russia. If further reduction of nuclear warheads is to result from the implementation of the Strategic Offensive Reduction Treaty (Moscow Treaty of May 2002), the capacity of disposition of plutonium should be expanded—and if, as the JNC claims, a vipac option has advantages in terms of worker safety (or technical reliability) and cost effectiveness, this option could be an important alternative to supplement the VVER-1000 option.

### International Science and Technology Center

The GOJ continues to believe it is vitally important that scientists involved in the production of WMD be provided an opportunity to redirect their talents to peaceful activities, and that the scientists should be prohibited from proliferating any kind of WMD technology. That is why Japan was a founding member of the International Science and Technology Center (ISTC), to which it has contributed $52 million since the center's inception in 1992. By providing peaceful research opportunities to scientists and engineers previously engaged in weapons production, the center has successfully advanced its goal of "nonproliferation through science and technology cooperation."

## Lessons Learned

Although significant achievements had been made over the past 10 years, Japan and its partners in Russia and the NIS have repeatedly encountered problems in project implementation, and some programs have ultimately been abandoned.

A project to construct storage facilities at Tomsk was canceled after a reactor accident generated local opposition. Japan's participation in the construction work at Mayak was also canceled. Japan was going to provide financial support for a container for the plutonium pits from decommissioned nuclear warheads. Several container designs were prepared, and the United States and Japan agreed to jointly bear the expense for 50,000 sets. The Japanese government intended to order half of them from the United States for $35 million. When it came time for implementation, however, the Russians requested that Japan purchase Russian-made containers. This required further coordination among the participants and thus delayed progress. In 1998, the Russian side announced that a delay of spent-fuel reprocessing at Mayak had resulted in lower demand for containers than previously estimated. As a result, Japan withdrew its assistance proposal.

Supply of a missile fuel (nitrogen peroxide) disposal facility was also discussed without reaching agreement. A plan to supply new containers for the transport of nuclear warheads derived from SLBMs and ICBMs was canceled because the United States was supplying the same type of containers, which were regarded as sufficient to cover Russian requirements. In the final accounting, only one cooperative project has been implemented in Russia to date: the construction of Suzuran, the low-level radioactive waste treatment facility.

The main reasons for this slow progress include political sensitivities, technological challenges, and bureaucratic complexities within and among participating countries. Completion of each project demands a tremendous amount of time and energy, as well as significant financial resources. Practice is very different from theory. Japan has been engaged in various projects as described above, but a certain level of frustration prevails because, despite the substantial funds and efforts, concrete results have thus far been rather limited.

From the Japanese viewpoint, administrative and bureaucratic problems or complexities on the Russian side have negatively affected the process. More specifically, these problems include:

- Time required for reaching a concerted view among the different ministries and institutions involved in project implementation. Currently, Suzuran is unable to utilize its full capacity because of the delay in issuing the environmental standard for discharge level of tritium. Until the standard is set and issued by the Russian authority, Suzuran has to reprocess the processed liquid waste in order to discharge it into seawater. However, coordination among the 11 related agencies within the Russian government has not occurred.
- Time required for coordinating relevant policies between the central and local governments. For example, from 1993 to 1994, the GOJ proposed a land-based interim storage and plant for low-level liquid radioactive waste, and the Russian central government agreed with Japan. (The Japanese side did not like the idea of a plant on a ship with propelling power because of potential environmental risks.) But it failed to persuade the local government and people, and the decision on a barge-based plant, Suzuran, was made five months later.
- Problems related to openness and transparency for financial transactions.
- Difficulties of access to the sites where decommissioned submarines are located. This has caused a considerable delay in conducting feasibility studies.
- Lack of sufficient information on the status of the submarines to be dismantled. This has made it very difficult to prioritize a number of options for projects. (The first Victor III–class submarine was finally identified and priorities are now being put on several vessels to be dismantled. But it was not until a conference in September 2002 that the Japanese side got to know the exact number and states of decommissioned submarines in the Russian Far East.)
- Other technical problems such as tax exemption. In the course of implementing the Suzuran project, there were difficulties in customs clearance of the relevant items, despite a clause in the implementation agreement of the project that read, "Ministry and the Customer will take necessary measures to ensure prompt customs clearance of relevant items, and the exemption thereof from all customs duties and other fiscal levies." It was reported that before customs clearance of imported items, considerable time was consumed for administrative procedures within different sections of the Russian government.

On the Japanese side, there has been a lack of experience in the field of implementing disarmament measures. Some expertise has been gradually accumulated in Japan through the handling of old and abandoned chemical weapons in the process of implementing the Chemical Weapons Convention. Yet Japan has virtually no expertise in dismantling strategic or general-purpose nuclear submarines. In contrast to the case of official development assistance (ODA), Japan has no organization specializing in conducting the implementation of disarmament-related projects. The technical secretariat, which was established to support denuclearization of the former-Soviet countries, is not institutionally designed to conduct work relating to project implementation (but rather focuses on the disbursement of funds appropriated by the GOJ). Given its minimal staff, it must delegate such tasks to consulting companies.

Despite all these difficulties, Japan, as a nonnuclear-weapon state and as a country that has suffered from a nuclear tragedy, has an earnest desire to help realize a world free from nuclear weapons. According to August 27, 2002, newspaper reports, Japan has proposed to the United States the establishment of a multilateral framework with a view to improving donor collaboration in negotiations with Russia. This framework would focus on concluding contracts and the implementation phase of CTR programs, particularly in the field of dismantling decommissioned Russian nuclear submarines. Indeed, improvements in program management and better coordination in planning and implementation among the participants (governments, commercial companies, and experts) are necessary to achieve a desirable result. The exchange of expertise and experience among donor countries is also essential to make the most of available resources and avoid duplication, as is proactive cooperation from the recipient.

## Future Priorities

The Japanese government is now reviewing its entire framework of assistance to Russia in supporting the dismantlement of Russian nuclear submarines and other projects and is expected to complete this process by the end of 2002. It is therefore inappropriate to prejudge future priorities here. It should also be noted that in June 2002, an auditor from the Board of Audit of Japan visited Russia and interviewed the responsible Russian officials regarding the slow implementation of the projects described above. As of November 2002, no concrete assessment from the Board of Audit had been made available. It is important to point out in this context that it is the Committee on Cooperation for the Elimination of Nuclear Weapons in Russia that prioritizes the fields of cooperation based on the needs of the Russian government. That said, it is the opinion of the authors that a number of issues deserve priority attention.

- First, priority should be given to the dismantlement of those decommissioned general-purpose nuclear submarines with high levels of contamination, since they may cause serious environmental problems in the Russian Far East in case of a leakage of radioactive materials or waste. In this regard, Japan and the EU countries face much more pressing environmental problems than the United States.
- Second, it is important to think about preventive measures to ensure that radioactive waste does not fall into the wrong hands. One measure might be to increase temporary storage capacity for spent nuclear fuels and also to strengthen control over the storage sites of these materials. If simultaneous dismantlement of both strategic submarines and general-purpose submarines is to be conducted in the future, the current capacity for storage of spent fuel will be insufficient. It is also said that since reprocessing capacity is limited in Mayak installations, the transportation of spent fuel from the storage facilities in the Russian Far East may not be carried out as expected. It may, therefore, be necessary to construct more interim storage facilities as the dismantlement of

general-purpose submarines gets under way at the Zvezda Shipyard. In addition, more radioactive-waste containers usable for rail journey will be needed to transport nuclear spent fuel from the Russian Far East to Mayak. The lack of storage capacity for solid radioactive waste also will become a big problem as the work of dismantlement progresses. It may make sense to consider a project to address management of solid radioactive waste.

- Third, Japan should and will contribute to the disposition of surplus weapons-grade plutonium. In addition to ongoing research of JNC's vipac-BN-600 option, the GOJ pledged $100 million for an international organization that will be established by the G-8 for the disposition of plutonium. This is the half of the $200 million contribution announced at the Kananaskis summit.

## Comparative Advantage

It is premature to comment on comparative advantages, since we are still at the initial stage of disarmament cooperation and Japan is reviewing its assistance programs as a whole. That said, Japan has a highly developed peaceful nuclear industry and related expertise, for instance, in the field of safe storage and physical protection of nuclear spent fuel. Japan also has expertise in effective measures for safeguarding the environment and medical treatment for patients suffering from radioactive injury. Such measures have already been successfully implemented in Ukraine, Belarus, and Kazakhstan.

Problems related to assistance for denuclearization projects in Russia seem to stem largely from institutional and administrative mechanisms of both Japan and Russia in the implementation phase. The lack of a history of Russian-Japanese disarmament cooperation and collaboration is also one reason project implementation has been rocky. But it should be noted that both sides are quickly learning how to improve efficiency in decisionmaking and implementation through painstaking negotiations.

## Decisionmaking Environment

To date, the concerns of the Japanese Diet (the National Assembly) and the general public over denuclearization in Russia are rather limited. Recent political scandals involving the MoFA and its program of humanitarian aid to Russia, however, did trigger some Japanese media interest in these programs and their slow pace of implementation—particularly among critics of the Japanese government—and required an overhaul of humanitarian aid to the Russian Far East, as well as aid to the denuclearization programs. Japan's CTR projects themselves are not, and will not be, a subject of controversy. But to further facilitate the process of implementation, it is important to gain support from political circles and the public as well as to attract media attention.

It is also necessary to strengthen policymaking institutions within the GOJ. First, the "request-first principle" in identifying projects, which was required in the

bilateral agreement, hinders Japan from taking the initiative in enhancing the pace of decisionmaking. Amending this practice would help the Japanese side cope with administrative inefficiencies and bureaucratic complexities on the Russian side. As for the Japanese side, it would be helpful to establish an interagency coordination body as projects inevitably involve the interests of various actors such as MoFA, MEXT, the Ministry of Economy, Trade and Industry (METI), the Defense Agency, the Ministry of Environment, research laboratories, and the private sector.

Another potentially useful institution that could be established is an experts group to provide technical and scientific expertise to policymakers, as decision-making on this matter requires highly sophisticated scientific and technical knowledge.

Japan, as a nonnuclear state and sincere advocate of disarmament, views the cooperative threat reduction program as a very important item in its foreign policy portfolio. The existing policy framework has so far been constructed on four objectives with particular emphasis on environmental concerns. Although environmental concerns remain at the core of Japan's policy objectives, more emphasis on cooperation and partnership for threat reduction and disarmament would add additional value to Japan's endeavor in this field. Therefore, it is necessary and vital for the MoFA and members of the policy community to turn the current challenges into opportunities for revitalizing the program. The implementation process, once it starts taking place with a reasonable level of transparency and accountability, will increase the chances for promoting further assistance programs in the future.

CHAPTER 10

# Netherlands

*Marianne van Leeuwen*
Netherlands Institute of International Relations "Clingendael"

## Threat Assessment

### Declining Public Interest

In the Netherlands, the end of the Cold War has had an obvious effect on threat perceptions among the general public. At present, people tend to associate security issues with adolescent crime, with the effects of immigration of large numbers of non-Western people on Dutch society, and perhaps, with terrorism.[1] The Dutch also traditionally worry about a variety of environmental issues—among them, acid rain and climate change.

This is in marked contrast to the late 1970s, when security concerns, particularly those about nuclear weapons, figured prominently in domestic political debate. Such concerns were not concentrated solely on the military threat emanating from the Warsaw Pact but, rather, on the selection of means by NATO and our own country to counter that threat. First, U.S. plans to produce enhanced radiation weapons—reduced blast weapons, commonly known as neutron bombs—and the prospect that such a new generation of nuclear weapons might be introduced in NATO countries caused public uproar. Political dissent, lobbying by nongovernmental organizations (NGOs), and public demonstrations against production and introduction of the new weapon put the government in a tight spot.

Next, the prospect of the modernization of Theater Nuclear Forces (TNF) and the deployment of such modernized missiles in the Netherlands became a hotly debated issue between the government and Parliament. The government, acting as a loyal ally, did not oppose modernization in NATO but tried to postpone a decision on deployment as long as possible—and make it conditional on the results of arms control negotiations. In Parliament, however, bitter opposition to deployment led some to the conviction that leaving NATO ought to be considered and put to a vote, if deployment were pushed through. In this case, too, extra-parliamentary lobbying was intense. Some of the major groups active at that time still exist, such as the Interchurch Peace Council (Interkerkelijk Vredesberaad or IKV) and Pax Christi.

1. The effects of the September 11, 2001, attacks on public threat perceptions already seem to wane.

Eventually, these nuclear weapons issues were overtaken by events. The Dutch government was saved from making and implementing hard decisions because of improvements in the relationship between the Soviet Union and the United States and the subsequent progress in arms control and reduction, resulting in the Intermediate-Range Nuclear Force (INF) agreement. In the end, the Netherlands was never asked to deploy the controversial cruise missiles.

Another issue provoking significant public debate in the 1970s was the use of nuclear power for civil purposes and the generation of electricity in particular. Many people worried about the environmental harm that accidents with reactors might cause and about the difficulty—or, as many argued, the impossibility—of safely dealing with nuclear waste. For a while, demonstrations against nuclear power stations were common, some of them resulting in clashes with the police. The issue lost much of its urgency, however, as the international market for nuclear energy collapsed. It became clear that no new nuclear power stations would be built in the Netherlands in the foreseeable future. Dutch natural gas reserves proved to be extensive and capable of generating electricity over the long term.[2] Public demonstrations against nuclear energy ceased as a consequence, and the Broad Social Debate (Brede Maatschappelijke Discussie) on nuclear energy, organized by the government in 1983, failed to draw significant public attention.

Since then, public awareness of nuclear-related issues has only declined further, even as "demonstration fatigue" has settled over the population.[3] Thus, the indefinite extension of the Nuclear Non-Proliferation Treaty (NPT) in 1995 was not an issue of public debate, nor was there a public outcry of any significance after the French held a last series of nuclear tests later in the same year. Any lingering concerns focused on environmental effects, with Greenpeace leading the lobbying charge.[4]

In the aftermath of the September 11, 2001, attacks in the United States, media warnings about terrorist strikes against nuclear installations briefly aroused public concern. Chemists' shops noted a significant increase in the demand for sodium tablets (which are effective against specific radiation affecting thyroid glands, though of little benefit in the case of a major nuclear disaster.) In the absence of attacks, concern died down fairly quickly. Similarly, although the Netherlands, like many other countries, was plagued by a number of anthrax letter hoaxes during the fall of 2001, no genuine cases occurred, and once the novelty wore off for the perpetrators, public worries about biological attacks diminished as well.

## Persistent Efforts by Bureaucratic and Political Elite

Over the past few decades, a dedicated but small bureaucratic and political elite has remained well informed and has made persistent efforts to contribute to various

2. Nuclear power, in any case, generates no more than about 7 percent of total electricity production.

3. Although that may change if the war in the Palestinian-occupied territories and the suicide attacks in Israel continue.

4. More details in Marianne van Leeuwen, "The Netherlands," in *European Non-Proliferation Policy, 1993–1995*, ed. Harald Müller (Brussels: European Interuniversity Press, 1996), pp. 170, 171.

international nonproliferation regimes.[5] Dutch diplomats were very active in the period leading up to the 1995 extension and review conference of the Nuclear Non-Proliferation Treaty, tried to promote a fissile material cutoff agreement, and strived hard to help create a Comprehensive Test Ban Treaty. They were also actively engaged in efforts to formulate a verification protocol to the Biological Weapons Convention (BWC).

According to Article 90 of the Dutch Constitution, the government promotes the development of the international legal order. This has been one major reason why successive Dutch governments and parliaments have supported the international nonproliferation regime, including CTR projects (apart from the intrinsic security importance of that regime, of course). Dutch governmental and bureaucratic elites aim to put the Netherlands on the map as a prominent center of international law—as illustrated by their efforts to promote the country, particularly The Hague, as venue or residence for a number of international courts and tribunals. They have also succeeded in attracting the offices of the Organization for the Prohibition of Chemical Weapons (OPCW) to The Hague and had lobbied energetically to achieve the same for the offices of the BWC inspectorate. (The latter ambition had to be temporarily abandoned after the U.S. Senate's refusal to ratify the protocol. It cannot be denied that the strongly unilateral approach to international issues in general and issues of international security in particular by the present U.S. administration have caused concern in The Hague.)

Among politicians and parliamentarians, there are a small number of individuals with a consistent interest in security issues. Support for international nonproliferation regimes in general and for Dutch contributions to CTR in particular is not controversial among political parties, though it is not an issue they would play up during election campaigns or to which they would devote long parliamentary debates.

The one occasion when CTR was debated in some detail in the Second Chamber of Parliament was in April 1995, when the main item on the agenda was the bill to ratify the Treaty of Paris of January 31, 1995, concerning the prohibition of the development, production, storage, use, and destruction of chemical weapons—in short, the Chemical Weapons Convention (CWC).[6]

During this debate, members of the Christian Democratic Party and a few of the smaller Christian parties, the Liberal Party, Democrats 66, and the Social Democrats all mentioned the need to help Russia destroy its chemical stocks. As the debate on the CWC was focused on security issues, parliamentarians concentrated on security arguments concerning CTR as well. They worried about the risk that nonconventional material might fall into the "wrong" (terrorist or rebel) hands, or former employees of Soviet nonconventional weapons programs might market themselves to undesirable regimes. A number of speakers referred to Aum Shinrikyo's sarin gas attack on the Tokyo metro, which had only recently occurred. Some

5. I have elaborated on this in Marianne van Leeuwen, "The Netherlands," in *Europe and Nuclear Disarmament: Debates and Political Attitudes in 16 European Countries*, ed. Harald Müller (Brussels: European Interuniversity Press, 1998), pp. 117–123.

6. Handelingen van de Tweede Kamer der Staten-Generaal, April 25, 1995, 68-4089-4114. Tweede Kamer, *Vergaderjaar 1994–1995*, 23 190 (R1515) en 23 911, nr. 8, April 25, 1995.

also emphasized that Russia's ability to destroy its chemical weapons would be of major importance to the CWC's success or failure. Many parliamentarians stated that the Netherlands should contribute to CTR programs and that funds should be allocated to this purpose. Foreign Minister Van Mierlo answered that the government was studying various ways to provide precisely such aid, but cautioned that implementation might be less than easy. The Second Chamber moved on May 2, 1995, to recommend extra efforts by the government to help destroy chemical weapons in the territory of the former Soviet Union.[7]

In practice, the Ministries of Foreign Affairs and Defense have the lead in providing CTR support to the Russian Federation. During the first government led by (Social Democratic) Prime Minister Kok, which acted from 1994 to 1998, Minister of Defense Joris Voorhoeve was personally and energetically involved.[8] During the second Kok government (1998–May 2002), the Foreign Ministry has taken the lead. The Ministry of Foreign Affairs has coordinating and diplomatic responsibilities, while the Ministry of Defense is concentrating on technical program implementation. In both ministries, as stated, a small but dedicated group of staff are working on CTR projects.

## Quantitative Assessment: Programs, Experiences, Results, and Delays

### Finance

Total assistance concerning the destruction of chemical weapons amounts to €11.34 million (Dfl 25 million). These funds are to be spent on a transformer for the Gorni facility and other destruction projects that have yet to be identified. The maximum amount allotted to supporting the destruction of nuclear weapons/submarines of the Northern Fleet amounts to €2.72 million (Dfl 6 million). This money is to be spent specifically on storage casks for burned submarine fuel.[9]

CTR funds have been allocated from the HAGIS budgets.[10] HAGIS covers all important foreign expenditures. At first, the Ministry of Defense took the lead and allocated funds to CTR that had originally been reserved for participation of Dutch forces in international peacekeeping efforts. These funds were temporarily less than fully used because of the backlash after the Srebrenica debacle, but that situation changed again in 1998. Since then, Dutch military personnel have been serving in various peacekeeping missions. CTR projects are now mainly taken care of by the

7. Tweede Kamer, *Vergaderjaar 1994–1995*, 71 4270, May 2, 1995.

8. When he was still director of the Netherlands Institute of International Relations "Clingendael," Voorhoeve had already installed a working group on the possibilities for military-civilian conversion in the Russian Federation and Ukraine.

9. Calculations courtesy of the Ministry of Foreign Affairs. The amounts are "ballpark" figures, in view of the fluctuating value of the U.S. dollar. It should be noted that it is not clear when actual payments will take place; the dates given in the matrix are targets rather than certainties.

10. HAGIS stands for Homogene Groep Internationale Samenwerking (or Homogeneous Group for International Cooperation).

Ministry of Foreign Affairs, which each year searches for room in the HAGIS budget.

Expenditures under the HAGIS budget are evaluated annually. If a request for funds has not been followed up by expenditures within the year, the program may be entered into the race for next year. All projects proposed under HAGIS are weighed for relative urgency and relevance. Competition for CTR projects has increased. Although the overall amounts voted for by Parliament stand, the speed with which projects under those overall sums may be funded—and executed—depends on the competition with other "good causes" (e.g., the antiterrorism project within the International Atomic Energy Agency, which has been granted €250,000 in 2002).

The Foreign Ministry is understandably cautious in indicating when the CTR money is to be disbursed, as disbursal depends on actual programmatic progress, and that very much depends on Russian policy priorities. The ministry is hopeful, however, that the project for the production of transformers (see below) may be financially finalized this year.

## Programs

Dutch contributions are concentrated on the destruction of chemical weapons, with a smaller program on the safe dismantlement of nuclear weapons.[11] To date, there has been no Dutch participation in CTR programs focused on disarming the biological weapons projects of the former Soviet Union, in programs promoting export control, or in programs concerning the safety of the nuclear fuel cycle.

### The Chemical Program

Dutch interest in chemical CTR programs is directly related to the Netherlands' desire to function as a capital of international law and specifically as host to the OPCW headquarters. As progress in the destruction of Russian chemical stockpiles is essential to the success of the Chemical Weapons Convention, The Hague has two stakes involved in these programs: improving international security and safeguarding Dutch standing in the world.

In December 1995, implementing the wishes of the Second Chamber and armed with a preliminary technical and financial evaluation drawn up by the Dutch organization TNO (Toegepast Natuurkundig Onderzoek or Research in Applied

11. The texts of the agreements between the Kingdom of the Netherlands and the Russian Federation are to be found in *Tractatenblad van het Koninkrijk der Nederlanden: Jaargang 1999* nr. 179: Verdrag tussen het Koninkrijk der Nederlanden en de Russische Federatie inzake de Nederlandse assistentie bij de vernietiging van voorraden chemische wapens in de Russische Federatie. 's-Gravenhage, December 22, 1998; *Jaargang 2000* nr. 29: Verdrag tussen het Koninkrijk der Nederlanden en de Russische Federatie inzake samenwerking op het gebied van de veilige ontmanteling van de kernwapens die in de Russische Federatie worden afgestoten en van de atoomonderzeeboten van de Russische marine die in de noordelijke regio uit bedrijf worden genomen, Maart 14, 2000; *Jaargang 2000* nr. 127: Verdrag tussen het Koninkrijk der Nederlanden en de Russische Federatie inzake samenwerking op het gebied van de veilige ontmanteling van de kernwapens die in de Russische Federatie worden afgestoten en van de atoomonderzeeboten van de Russische marine die in de noordelijke regio uit bedrijf worden genomen, met bijlage.

Physics), a first Dutch delegation went to Moscow and to the town of Kambarka, where large stocks of lewisite and mustard gas are waiting to be destroyed, in order to identify suitable projects. This marked the beginning of a sometimes frustratingly slow process of negotiations with Russian partners.

In May 1996, the government promised the Russian Federation support for the destruction of about 6,500 tons of lewisite near Kambarka. In Moscow in December 1996, Prime Minister Kok and his Russian counterpart Chernomyrdin signed a letter of intent to conclude an agreement on this issue. Since then, a number of Dutch negotiators from the Ministries of Foreign Affairs and Defense have held talks with their colleagues in Moscow on technical, fiscal, and legal aspects of the arrangement and on further issues related to implementation.

On December 22, 1998, a formal agreement was signed between the two countries. At that time, the Dutch government allocated a total sum of about €11 million (Dfl 25 million) to the project, to be disbursed in installments upon completion of specific items within the overall project. The Dutch Parliament approved the agreement on July 10, 1999. This basic agreement was to be followed by implementation agreements. Unfortunately, these proved difficult to reach.

Following the expert assessment by TNO, the Dutch originally intended to provide methods and equipment for the decontamination of soil polluted with lewisite or mustard gas (at a value of maximum Dfl 9 million to Dfl 10 million); a mobile monitoring laboratory (at a maximum value of Dfl 2 million); medical support and therapy in connection with contamination risks; and the production of a transfer station (maximum value of Dfl 10 million). Initially, the Netherlands wanted to perform research on the spot, but the Russians refused. They preferred to analyze the type and character of the contamination themselves and present the results to the Dutch, who could then provide the equipment on the basis of the Russian assessment.

Rather disappointingly to the Dutch, the Russians did not initiate any work at Kambarka. Russian activities did, however, take place at Gorni and Sutchi, where the Germans and Americans were implementing projects involving substantially larger amounts of money. The Hague concluded that it might be wise to join the German project for the time being. The Russians and the Germans agreed. The Russians indicated that they could use funds for the installation of high-voltage cables and transformers, water pipes, and gas conduits for the chemical agents reprocessing plant (to be equipped with machinery by the Germans), with a priority for the first item: high-voltage cables. Russian workers would install those. The Russians sent construction drawings and a financial tender to The Hague. Accountants from the Ministry of Defense roughly halved the proposed funds—an adjustment the Russians accepted without much ado. They started work.

By December 2001, the new approach was formalized by an amendment of the basic agreement of 1998; any reference to a specific place where the program was to be implemented was removed. In March 2002, the installation of the cables and transformers was completed. The actual costs so far have been calculated at €2.3 million, which in all likelihood will be disbursed in fiscal year 2002, after a Dutch engineering bureau has checked the Russians' work.

At present, Ministry of Defense and Foreign Office staff are hopeful that in Gorni, the actual program to destroy chemical weapons stocks may be initiated in 2003. Now that the transformer project has been successfully completed, the Foreign Office has asked its Russian negotiating partners to indicate new projects. Only when agreement has been reached on this subject will it be possible to calculate funds to be provided within the total amount of €11 million allocated under the basic agreement. The Germans, being the main financiers and technical supporters of the Gorni project,[12] perform most of the negotiation and oversight tasks. The German project leader visits the set every month, whereas Dutch visits are few and far between.

## The Nuclear Program

Dutch participation in nuclear CTR projects to date is very modest. Considering that the Netherlands, apart from the Dutch co-ownership of the URENCO ultracentrifuge plant in Almelo, has little stake and little relevant practical experience in dealing with important aspects of the civil nuclear cycle, the country is not an obvious partner in major nuclear CTR programs.

The Netherlands, together with other donor states, is involved in negotiating the implementation of a Multilateral Nuclear Environmental Program for Russia, which would require Russian cooperation in a number of sensitive issues in dealing with nuclear safety. Unlike Belgium, France, or Great Britain, the Netherlands would have no commercial interest in participation, as it has no reactor building, reprocessing, or storage industry. Dutch contributions would be inspired by considerations of environmental and military security—and, unfortunately, that could well mean that finding room in the budget will be difficult. Meanwhile, the Dutch attach great value to strict environmental standards in the project on temporary storage of used fuel rods from submarines of the Russian Northern Fleet that they are involved in (see below).

The Dutch-Russian basic agreement of March 14, 2000, identifies two main projects. Dutch financial assistance (to a maximum of €2,722,681 or Dfl 6 million) will be given (1) to contribute to the safe and secure storage of fissile materials resulting from the dismantlement of nuclear weapons; and (2) to an early, environmentally safe and cost-effective dismantling of Russian nuclear-powered submarines withdrawn from the Northern Fleet. Specifically, the projects concerned the production of inserts in containers for a facility under construction at the Mayak site, meant to provide safe storage for fissile materials, and the production of concrete and metal containers for the transport and/or long-term storage of spent fuel rods of nuclear submarines. All this would take place in a multilateral context, with the Dutch clearly as junior partners.

The basic agreement was put to Parliament for advice and consent. The government argued that reasons of environmental protection as well as security-related arguments made acceptance of the agreement necessary. Parliament accepted the

12. They contribute about DM 90 million; they receive financial support from the European Union.

agreement including the financial details on September 23, 2000, without any substantial debate.

Details of project implementation were to be arranged by separate agreements, and these have thus far proven troublesome. As to the first project, a major disagreement developed between the Russians and the Americans—main contractors of the project—concerning the characteristics of storage. The Russians wanted a form that would allow reusage of the inserts for weapons purposes, which was unacceptable to the Americans. As a result of this controversy, the project came to nothing, and Dutch support was not activated. With regard to the second project, in which the Norwegians are the leading contractor (they produce the containers) and the Dutch a subcontractor, intra-Russian differences have arisen regarding certification of the security of the containers. As a result, technical implementation of the agreement has been delayed.

## Lessons Learned

Working with the Russians is complicated for the Dutch. Indeed, the complexity of negotiations with Russian colleagues on CTR was raised by all those interviewed for this survey. Russian counterparts at the highest level are seen to be cooperative and clearly convinced of the need for CTR. Thus, reaching basic agreements, while somewhat time consuming, has been the easiest part. Reaching agreement on technical and financial details, including issues concerning taxation of donated goods, paying for visas, and liability in case of accidents, has, by contrast, proven to be an extremely cumbersome process. According to involved Foreign Office and Ministry of Defense staff members, the Russian mid-level bureaucracy has raised unnecessary or even harmful obstacles on the road to implementation.

Dutch experts ascribe this partially to bureaucratic culture, the continuing influence of the ways in which decisions were taken in the times of the Soviet Union. In addition, many mid-level Russian counterparts do not seem to share Western perceptions (and the perceptions of leaders like President Putin) that CTR is a matter of reducing security-related and environment-related risks. They rather tend to see CTR projects in purely economic terms: a way to make money out of conversion.

One interviewee warned that donors should not be seen as too eager or enthusiastic by mid-level Russian bureaucrats, if they want to avoid a hike in the price they pay for being allowed to help. Some interviewees, including former minister of defense Voorhoeve, noted that the local population, by contrast, seemed to be quite convinced of the security- and especially the environmental-protection interests involved in the programs. They believe that people living close to the sites where weapons and weapons materials are stored are eager to see projects implemented. A secondary, or perhaps to some primary, argument is that programs create local employment.

Staff members of the Dutch Ministry of Defense remarked on the strikingly different speed with which the chemical and nuclear projects are going ahead. They note that with regard to the chemical project, the replacement of the Russian Min-

istry of Defense as partner by an Ammunition Agency, which falls directly under the president's office, has clearly eliminated an important bureaucratic stumbling block, even though on the Russian side the same persons are still involved. The change of hats (and change of room, though not of building!) is making a major positive difference. Internally in The Hague, future attempts at identifying new projects will probably be made the responsibility of a specialized desk of the Ministry of Economic Affairs called CENTER. CENTER has people working in the Russian Federation on other issues as well and knows the negotiating terrain very well.

Apart from bureaucratic inertia, there is another key reason for the slowness of CTR program implementation, according to a spokesperson at the Foreign Office: There clearly are genuine limits to Russia's absorption capabilities, technically and financially. The task of dismantling and destroying nonconventional weapons in the country is enormous, while the Russian Federation is at the same time facing a host of other pressing problems. Western partners should for that reason exercise patience and accept an incremental, gradual process of implementation.

Many interviewees commented on the Russian preference for bilateral negotiations, as they may consider such negotiations helpful to play off one donor against the other. For the same reason, Western partners should cooperate as much as possible and promote multilateral negotiations. This would, for instance, facilitate negotiating about liability clauses. Voorhoeve mentioned that he had raised the original plan for decontaminating soil polluted with lewisite at a meeting of his fellow ministers of defense at NATO but concluded that accepting support from this particular side would be too sensitive for the Russians. After the September 11 terrorist attacks, and now that NATO-Russian relations have been structurally strengthened, NATO might arguably become financially and practically more interested in CTR projects from a security point of view, and Russia might have fewer objections to a NATO role.

European support for CTR is another matter. Until now, the European Union has been parsimonious in offering financial support to CTR projects. It could and should do more. Particularly with regard to environmental aspects, the issues at stake are arguably even more pressing to European countries than to the United States. As for the security aspects, security issues in general have not been major business of the European Union, although that could change when a common European Defense and Security Policy becomes effective.

## Public Response to CTR Programs

To date public response has been negligible in the Netherlands, but then, public *political* response has been virtually absent. As noted above, part of the explanation may be that CTR is neither a subject of controversy among political parties nor a subject of major importance to them. It can be argued cynically that only a major disaster deriving from the still-existing unconventional weapons stocks in the former Soviet Union would be an effective wake-up call for the larger public. Former minister of defense Joris Voorhoeve admitted he has been somewhat surprised (and slightly disappointed perhaps) by the lack of active interest for CTR among parliamentarians. On the other hand, given the wide political acceptance of

the programs, the willingness of successive ministers of foreign affairs and defense to pursue them, and at the same time the major impediments to expedient implementation, it could be argued that more public interest would not serve any clear positive purpose.

A small number of parliamentarians may be expected to maintain an active and positive interest in CTR, although some of the more knowledgeable members left after the May 2002 elections. These elections caused a political landslide, as the ruling parties (Social Democrats, Liberals, and D66) lost dramatically; the Christian Democratic Party won a huge number of seats; and a new, populist, right-wing party, the so-called List Pim Fortuyn (LPF), managed to gather some 25 seats in the Second Chamber of Parliament. As a consequence, the LPF was invited to participate in the new government, led by Prime Minister Balkenende (a Christian Democrat). The Balkenende government did not last long. Bitter internal controversies within the LPF culminated in a major fallout between two LPF ministers, and by October 2002 Balkenende had already offered his government's resignation. Elections were planned for January 2003. Many familiar and experienced members of Parliament were expected to vacate their seats as a spell of renewal descended upon politics in the Netherlands and the major opposition parties were looking for ways to win back electoral favor. Foreign affairs was not expected to be a prominent issue in the election campaign, as Dutch voters were seen to be primarily concerned with issues of domestic security. It will certainly be worthwhile and necessary to try to spark interest in CTR among new members of Parliament, particularly the new members of the relevant parliamentary committees, but this could best be achieved by seminars with expert introductions rather than by major public events.

Modest public interest could probably be stimulated if the environmental dangers of the continued presence of chemical and nuclear stocks and hardware in the Russian Federation are stressed alongside the security threat. A small number of fairly influential journalists specializing in security issues might well be interested in writing about CTR. Likewise, NGOs like the IKV and Greenpeace could potentially be interested in CTR issues. It is unlikely, however, that Dutch financial contributions will be raised dramatically as a result of public pressure, if only because the slow pace at which CTR projects are progressing has made it difficult enough to disburse annual allotments as it is.

## Future Priorities

The Dutch can make innovative contributions in the diplomatic and the technical field. In the margins of the meetings of the OPCW Executive Council, which take place four times a year, the Netherlands organizes informal talks of donor countries on the destruction of chemical weapons. At the express wish of the United States, representatives of the Russian Federation have recently been invited to join these talks. In 1999, the United States launched the Expanded Threat Reduction Initiative (ETRI), a meeting at the level of ministerial staff. The Dutch organized the follow-up conference in 2000. This particular initiative now lives on as the Non-proliferation Disarmament Cooperation Initiative. One Dutch civil servant somewhat

irreverently described it as an annual fair for ideas to be brought up at a practical rather than a political level. It is as yet unclear whether more conferences are to follow. If so, it would be an opportunity to facilitate contacts between Russians and their Western counterparts.

As to technical issues, spokespeople at the Ministry of Defense are hoping that the original Kambarka plan may still be revitalized. At present, Dutch technical input is extremely limited, though there is a rich reservoir of high-tech expertise in the fields indicated by the TNO study—the decontamination of polluted soil, the building of automated steering systems, and the disposal of radioactive waste. The Dutch also have expertise in salvaging wrecked ships under extreme circumstances. More recently, the TNO's Prins Maurits laboratory has evaluated, at the request of the Russian Academy of Sciences, an innovative technique invented by the Russian TIPS institute for destroying heavily toxic materials. The innovative aspect is that the system applies technology used in the combustion chambers of missiles, allowing complete burning of the material through extremely high temperatures. Moreover, the combustion installation is small enough to be made mobile.

The TNO tests were promising, suggesting that chemicals could be permanently disposed of by this technique in a way harmless to the environment. It would, however, mean that the Russians accept complete destruction rather than recycling. It would also mean that the Americans and the Germans would have to consider this approach rather than more fanciful approaches with far more interesting financial results for the good donors. The Dutch Foreign Ministry appears willing to try and find funds for building a full-scale mobile combustion laboratory, provided that the Russian Ammunition Agency is willing to work with it.[13] Unfortunately, however, the disappointing state of the economy may be an impediment to large increases in funding in the short term.

## The Budgetary Process and Key Decisionmakers

Realistically, even though there may be general sympathy for the concept of CTR among politicians in the Netherlands, advocates of CTR should not expect to see the funds for their projects increased in the short term. To start with, the Netherlands' economic situation has changed for the worse. In the spring and early summer of 2002, the formation of a new cabinet was being accompanied by gloomy predictions about lack of funds and even the need to cut back in essential and politically sensitive budgets. Under these circumstances, Parliament will not be inclined to increase funds for projects that have in the recent past proven very difficult to get started in the first place.

It will, on the other hand, still be very useful to interest newly elected defense and international relations specialists in Parliament in CTR issues. The same is true for the new cabinet, if only to guarantee the continuation of efforts to implement already designed or running projects. The focus should be on the Ministries of Foreign Affairs and Defense. Possibly, the Ministry of Environmental Affairs may also have some funds available, but those funds would be very modest.

13. Information provided by Vice Admiral Lutje Schipholt (Ret.), director of the Prins Maurits Laboratory.

Looking ahead, the Netherlands will remain interested in CTR for the two major reasons repeatedly mentioned above: its ambition to promote the international legal order and its concern for international security, both from a military and an environmental perspective. Commercial or industrial considerations to participate have been and are likely to continue to be basically irrelevant.

The Dutch have rightly abandoned their previous bilateral approach to CTR projects with the Russians. It will be more effective for the Dutch to join larger projects, either with preferred partners such as the Germans, the Norwegians, or the Americans, or within the context of a strengthened EU program—or even possibly in the context of future NATO efforts. Should new multilateral projects be initiated and appear viable, Parliament may well prove willing to allocate more money to CTR programs, especially when the economic tide turns again. For the time being, however, it will be hard enough to see existing CTR projects implemented, and efforts must focus on safeguarding the allocated funds for those projects.

Thus, advocates of CTR should focus on

- effecting existing plans, arguably with an emphasis on chemical projects because of the diplomatic interests the Dutch have in maintaining the CWC and also because bureaucracy concerning chemical projects has been cut back on the Russian side;
- raising awareness of CTR issues among the new government and new parliamentarians;
- identifying possibilities for the Dutch to join larger, multilateral initiatives;
- assessing possible Dutch technical input into these larger, multinational initiatives;
- encouraging international progress on a verification protocol to the Biological Weapons Convention; and
- locating the executive office (OBWC) in The Hague, which would raise the stakes for the Dutch government and Parliament to help fund projects to create civilian employment for Russian biological weapons experts.

CHAPTER 11

# Norway

*Morten Bremer Mærli*
Norwegian Institute of International Affairs

## Threat Assessment

For reasons of geography, Russian nuclear activities in the northern area may pose a specific risk to Norway and Norwegian interests.[1] 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.

Russia's Northern Fleet is in heavy sea, with severe local pollution hazards and global proliferation risks in the wash of its nuclear propulsion and nuclear weapon activities.[2]

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.

---

1. The implementation and results of joint Norwegian-Russian nuclear cooperation have been formally evaluated twice. Both evaluations, one commissioned by the Norwegian Ministry of Foreign Affairs and the other by the Office of the Auditor General, and the recommendations given herein form a natural basis and point of departure for this evaluation. See Royal Norwegian Ministry of Foreign Affairs, "Evaluation of the Norwegian Plan of Action for Nuclear Safety: Priorities, Organization, Implementation," *Evaluation Report 7/2000*, prepared by Geir Hønneland and Arild Moe, The Fridtjof Nansen Institute, at <http://odin.dep.no/archive/udvedlegg/01/01/00133012.pdf>, and Office of the Auditor General (Riksrevisjonen), "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker," Dokument nr. 3:9 (2000–2001). A recent summary report entitled "Military Nuclear Waste and International Cooperation in North-West Russia" and an updated report by the Bellona Foundation, "The Arctic Nuclear Challenge," serve as important background information. See 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; and Nils Bøhmer, Aleksandr Nikitin, Igor Kurdik, Thomas Nilsen, Michael H. McGovern, and Aandrey Zolotov, "The Arctic Nuclear Challenge," *Bellona Report* 3 (2001). The author would like to thank John Kristen Skogan and Sverre Lodgaard, both at the Norwegian Institute of International Affairs, Torbjørn Norendal at the Norwegian Ministry of Foreign Affairs, and Nils Bøhmer at the Bellona Foundation, for useful comments and discussions during the preparation of this report. Skogan has, moreover, contributed in writing to some of its sections.

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

In addition to military submarine operations, several civilian nuclear-powered naval surface vessels are home-ported in the region.

According to Norwegian news reports, there is a secret military facility outside Murmansk that could be a storage site for chemical war agents.[3] Russian authorities, however, 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 the Murmansk and Archangels regions, rumors about chemical weapon storages in the region thus seem questionable. Nor are there any open source materials or indications of biological weapon activities in the northern region.

## Decommissioning and Dismantling of Nuclear Submarines

Since 1958, the Soviet Union and Russia have constructed 249 nuclear-powered submarines, representing more than half the nuclear submarines produced worldwide.[4] Two-thirds of these vessels were delivered to the Northern Fleet; the rest were destined for the Pacific Fleet.[5] Most Russian submarines are equipped with two reactors. The overall 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.[6] Twenty-four reactors are believed to have been designed to use uranium enriched to 90 percent U-235.[7] 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 reached a high point in 1989, when approximately 196 submarines were in service.[8] Now, 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. It was the first submarine to leave the Sevmash production facility in Severodvinsk in three years.[9] 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 during the next coming years, while three new ones are under construction in Severodvinsk.[10]

Russia is likely to maintain only a limited number of strategic submarines (SSBNs) in the coming decade.[11] With the decline of Russian strategic forces, some

3. 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>.

4. This number includes 92 ballistic-missile submarines (SSBNs), 67 cruise-missile submarines (SSGNs), and 90 attack submarines (SSNs).

5. 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-size land-based submarine-training facilities have been produced.

6. Oleg Bukharin and William Potter, "Potatoes Were Guarded Better," *Bulletin of the Atomic Scientists* 51, no. 3 (May/June 1995): 48.

7. Oleg Bukharin, "Analysis of the Size and Qualities of Uranium Inventories in Russia," *Science and Global Security* 6, no. 1 (1996): 63.

8. Oleg Bukharin and Joshua Handler, "Russian Nuclear-Powered Submarine Decommissioning," *Science and Global Security* 5, no. 2 (1995): 246.

9. Agence France Presse, "Russia to Test New Nuclear Submarine," November 15, 2000.

have asserted that the military complex on the Kola Peninsula is becoming increasingly irrelevant for strategic stability.[12] However, if Russian military sea readiness continues to decline, consolidation of all strategic naval operations in the northern area could become an attractive and possible option.

Plans for floating nuclear power plants (FNPPs) have, moreover, been a long-term goal for the powerful Russian Ministry of Atomic Energy, MINATOM.[13] The idea is for naval reactors mounted on barges and using highly enriched uranium (HEU) to provide electricity to remote coastal areas.[14] The construction of such mobile power plants could give a badly needed boost to Russia's nuclear industry. It could also, however, lay the ground for new HEU markets outside international control.[15] MINATOM announced in March 2001 that it would build a floating nuclear power plant in Severodvinsk,[16] but 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. The vessels await dismantlement, a process with huge safety (pollution) and security (proliferation) challenges.[17]

The Russian nuclear submarine decommissioning and dismantlement process involves the following steps:[18]

---

10. 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, at <http://www.bellona.no/no/internasjonalt/russland/nyheter/25318.html>.

11. William Arkin and Hans Kristensen, "Dangerous Directions," *Bulletin of the Atomic Scientists* (March/April 1998): 29.

12. Ingemark Dörfer, "Kola Has Lost Significance," *Proceedings of the U.S. Naval Institute* (March 2002), p. 80.

13. For a survey of different aspects of FNPPs in the northern region, see V. M. Kuznetsov 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 (Moscow, 2000).

14. For the last 10 years, 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 kilos of HEU enriched to 60 percent. A lifetime of 40 years is anticipated for the floating electric producing barge, with refueling intervals of 10 to 12 years. From Kuznetsov et al., *Floating Nuclear Power Plants in Russia*, p. 16.

15. Morten Bremer Mærli, "Deep Seas and Deep-Seated Secrets: Naval Nuclear Fuel Stockpiles and the Need for Transparency," *Disarmament Diplomacy*, no. 49 (2000), at <http://www.acronym.org.uk/dd/dd49/49fuel.htm>.

16. Associated Press, "Russia Plans Floating Nuclear Power Plant," March 14, 2001.

17. For descriptions of the challenges related to the decommissioning of the Russian submarine fleet, see Bukharin and Handler, "Russian Nuclear-Powered Submarine Decommissioning"; James Clay Moltz and Tamara Robinson, "Dismantling Russia's Nuclear Subs: New Challenges to Non-Proliferation," *Arms Control Today* (June 1999); and James Clay Moltz, "Russian Nuclear Submarine Dismantlement and the Naval Fuel Cycle," *Nonproliferation Review* (Spring 2000).

18. Jill Tako and Tamara Robinson, "Decommissioning and Dismantlement Overview," Monterey Institute of International Studies, 1998, http://www.nti.org/db/nisprofs/russia/naval/decom/decomovr.htm.

- 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 of the reactor compartment for long-term storage (currently 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.[19] As of March 2002, Russia has decommissioned 190 nuclear-powered submarines, but nuclear fuel has been removed from only 97 of them, and many vessels are languishing in ports, waiting to be dismantled.

In addition to contamination from leaking spent-nuclear-fuel storage facilities, an environmental contamination risk could emanate from an accident while decommissioned Russian nuclear submarines are laid up or during defueling. According to open source reports, five Russian Navy criticality accidents have occurred, twice during refueling operations.[20] 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 up to now has been limited.

## 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 the following:[21]

---

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

20. U.S. Department of State, "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, October 2001, p. 9.

21. Based on Ole Harbitz (director general the Norwegian Radiation Protection Authority), "Threat Assessment and Contingency Planning," Norwegian Atlantic Committee's 34th Annual Conference, Leangkollen, February 1–3, 1999, with modifications and amendments.

- 4 operational reactors at the Kola nuclear power plant and 4 operating reactors at the Sosnovij Bor nuclear power plant close to St. Petersburg. Additional nuclear reactors are planned at both these locations;
- 13 operational reactors in the eight 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;[22]
- ocean-dumped radioactive waste and spent nuclear fuel and wrecked nuclear submarines;[23]
- river-transported radioactivity from nuclear industries (Mayak and others) and from European reprocessing facilities;
- contamination from nuclear testing at Novaja Zemlja and from peaceful nuclear explosions (PNEs);
- lighthouses with large strontium energy sources;
- insufficient physical protection, accounting, and control of fissile material; and
- Russian imports of radioactive waste.

In addition, incidents of 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.

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." This report stated, "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."[24]

Some 33,600 spent fuel assemblies are stored in land-based storage sites and in a variety of run-down service/storage vessels in the northern region.[25] An equivalent number is still onboard inactive submarines, and the total number of spent fuel assemblies will likely grow to as many as 100,000 over the next decade.[26] This will

22. Dörfer, "Kola Has Lost Significance," p. 81.

23. The *Komsomolets* sank in the Norwegian Sea in April 1989. Most of the *Kursk*, that sank August 2000, killing all 118 crewmembers, was successfully removed from the Barents sea bed in October 2001.

24. Quoted in U.S. Department of State, "Environmental Security Threats from Decommissioned Russian Marine Nuclear Reactors," p. 2.

include fuel from submarines still in operation, submarines earmarked for retirement, and the civilian nuclear-powered icebreakers in Murmansk. The control over decommissioned submarines, spent fuel, and radioactive waste has now been transferred from the navy to MINATOM.[27]

Despite international restrictions, until 1992, the Soviet Union and Russia had been dumping radioactive waste, including some nuclear submarine reactors containing fuel, at sea.[28] 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 inventories of the other 12 nations that had carried out disposal activities at sea.[29]

MINATOM is 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.[30] 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 contributing to problems in the future.[31] Norwegian officials have expressed concern about the plans, as the spent fuel could 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.[32]

## Quantitative Assessment

### Bilateral and International Assistance Programs in the Northern Region

An important part of departure for all Norwegian cooperative activities is the conviction that the handling of Russian fuel and waste remains a sole Russian responsibility, as is the security and safety associated with all their nuclear activities.

25. Contact Expert Group, "Working Material of the 11th Meeting," vol. 2, Cherbourg, France, October 25–27, 2000, p. 248; for a summary of the 11th meeting, see <www.IAEA.org/worldatom/programmes/CEG/meeting11.htm>. Also see this chapter's footnote 94.

26. Thomas Nilsen, "Mayak spent fuel storage moves to Kola," March 20, 2000, <http://www.bellona.no/imaker?id=15894&sub=1>.

27. Jurisdiction is transferred according to a May 28, 1998, governmental decree.

28. 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.

29. U.S. Department of State, "Environmental Security Threats from Decommissioned Russian Marine Nuclear Reactors," p. 2.

30. Fred Weir, "Russia as Nuclear Garbageman?" *Christian Science Monitor*, February 21, 2001.

31. U.S. Department of State, "Environmental Security Threats from Decommissioned Russian Marine Nuclear Reactors."

32. Generally, there seem to be a sentiment among Norwegian officials that the plans may be hard to realize. Much of the fuel Russia wants to import is of U.S. origin.

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 currently lacks a comprehensive and satisfactory "cradle to grave" system for decommissioning its nuclear-powered submarines and warships—and will for the foreseeable future. Although the government of Russia clearly has the responsibility to address this situation, international donors—recognizing their own interests—have initiated several bilateral and multilateral assistance programs. Among the most important are the U.S. Cooperative Threat Reduction Program and the U.S. Material Protection, Control, and Accounting Program.

Norwegian assistance has mainly been channeled 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. To scientifically map the levels of anthropogenic pollutants, the Arctic Monitoring and Assessment Program was established in the early 1990s as a joint cooperation between the Arctic countries.

## Cooperative Threat Reduction Program in the Northern Region

Given the Cooperative Threat Reduction (CTR) Program's initial objective of assisting Russia in carrying out strategic arms reductions down to START levels, support for Russian dismantlement of ballistic-missile-carrying submarines (SSBNs) was an early priority.[33] In 1993, some 2,600 submarine-launched ballistic-missile (SLBM) warheads were reported deployed on 52 Russian SSBNs,[34] exceeding 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.[35]

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 Northern Fleet SSBN dismantlement. So, too, did the broadened definition of elimination, in this respect to mean not just the removal of their weapons and launch devices but complete dismantlement 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.

---

33. This section was written by John Kristen Skogan.

34. *The Military Balance 1993–1994* (London: Brassey's, for the International Institute for Strategic Studies, 1993), pp. 99, 236.

35. Each one of the Typhoon-class carried 20 missiles armed with 10 warheads per missile.

In the early 1980s, the total number of Northern Fleet SSBNs was reported to be 45. By 1992, it was 36 and in 2001 only 12.[36] By the end of 2000, a total of 183 Russian nuclear-powered submarines had been retired from service, 113 from the Northern Fleet.[37] It was clear that complete dismantlement 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 rather expensive. Yet, prior to the 1990s, Russia was 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 their dismantlement.

CTR support for the disarming and dismantlement of Northern Fleet SSBNs has been both direct and indirect. Initially, technology and equipment for SSBN dismantlement were provided to three Russian shipyards, one at 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 dismantlement 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.[38] By 1998, only five SSBNs had been dismantled under this arrangement over the preceding three years. By then, CTR support had already changed to the 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 dismantlement.

This new arrangement soon proved to be 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.[39] 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 makes a total of 41 Russian SSBNs eventually dismantled with direct assistance from the CTR program, estimated at $470 million.[40] Of the 41 SSBNs, 20 are foreseen to come

---

36. *Jane's Fighting Ships, 1982–1983* (London: Jane's Publishing Co., 1982), and *Jane's Fighting Ships, 1992–1993* and *2001–2002* (London: Jane's Information Group, 1992 and 2001). The number of Kola-based submarines taken out of service as SSBNs during the 1982–1992 period was larger 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 were converted to other roles.

37. *Nordisk Sikkerhet, Militærbalansen 2001–2002* (Oslo: The Norwegian Atlantic Comnmittee, 2001), p. 112.

38. Moltz, "Russian Nuclear Submarine Dismantlement," p.78.

39. Ibid., and "Cooperative Threat Reduction Scorecard" on the CTR web site at <http://www.dtra.mil/ctr/ctr_index.html>. This also means that CTR-assisted SSBN dismantlement at the Pacific coast Zvezda shipyard over the coming years will be more extensive that at the Russian shipyards in the northwest.

40. Jon B. Wolfsthal et al., eds., *Nuclear Status Report: Nuclear Weapons, Fissile Material, and Export Controls in the Former Soviet Union* (Washington, D.C.: Carnegie Endowment for International Peace, and Monterey, Calif.: Monterey Institute of International Studies, 2001), pp. 50–51.

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 dismantlement by helping ensure satisfactory disposal of spent nuclear fuel from decommissioned SSBNs and nuclear waste from their dismantlement. 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 their dismantlement.

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 1998–1999, 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.[41]

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.[42] 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 dismantlement 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 obligated or expended for elimination of conventional weapons or the delivery vehicles primarily intended to deliver such weapons."[43] 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.

## U.S. Material Protection, Control, and Accountability Program

In the past, highly enriched Russian naval fuel has been particularly exposed to theft,[44] prompting the Northern Fleet to seek assistance in upgrading security at its facilities. Now, the U.S. Material Protection, Control, and Accounting (MPC&A)

41. Sawhill and Jørgensen, "Military Nuclear Waste and International Cooperation in Northwest Russia," p. 26.

42. Ibid., and "Russia Programs: Spent Naval Fuel Disposition" on DTRA's CTR Web site at <http://www.dtra.mil/ctr/ctr_index.html>.

43. National Defense Authorization Act 2001, 114 *U.S. Statutes at Large* 1654, sec. 1303. This prohibition was first included by the Congress in the FY 2000 Defense Authorization Act and made permanent a year later.

Program for Russian naval fuel has made strides in reducing the vulnerability of large amounts of HEU and nuclear weapons.[45] Most fresh Russian naval fuel in the northern region is consolidated into a central facility.[46] In addition, the United States has helped develop physical protection upgrades for service ships involved in refueling operations.[47] There are, however, unconfirmed indications that the northern central storage facility for fresh fuel has already reached its 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 under way or completed.[48]According to the U.S. Department of Energy, these nuclear-weapon sites also contain some 260 tons of nuclear material.[49]

## 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, with the protection of health, the environment, and business against radioactive contamination and pollution from chemical weapons, as overriding goals.

In particular, the plan aims to[50]

- 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;

---

44. Morten Bremer Mærli, "U.S.-Russian Naval Security Upgrades: Lessons Learned and Future Steps," *Yaderny Kontrol* (Summer 2002).

45. U.S. 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. For an extensive summary of ongoing MPC&A programs, refer to the database of the Center for Nonproliferation Studies, <http://www.nti.org/db/nisprofs/russia/naval/ff_naval.htm>.

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

47. Moltz and Robinson, "Dismantling Russia's Nuclear Subs."

48. 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 Mærli, "U.S.-Russian Naval Security Upgrades."

49. U.S. General Accounting Office, "Security of Russia's Nuclear Material Improving," p. 32.

50. Ole Harbitz (director-general, Norwegian Radiation Protection Authority), "Threat Assessment and Contingency Planning," Norwegian Atlantic Committee's 34th Annual Conference, Leangkollen, February 1–3, 1999.

- 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 hazards. In addition, a category called "miscellaneous projects" covers matters like NGO support, conferences, and workshops.

Although the plan of action covers both radioactive and chemical challenges, in practice, there is a strong emphasis on nuclear safety and security. Generally, in its cooperation with Russian authorities and nuclear entities, Norway has tended to put more emphasis on environmental problems than proliferation risks (as the name 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 11.1).

**Table 11.1. Project Distribution in Five Project Areas for the Norwegian Plan of Action for Nuclear Safety Issues, August 2001**

| | Safety measures at nuclear facilities | Waste and spent fuel management | Radioactive pollution | Arms-related environmental hazards | 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 | – |

The majority of projects relate to safe waste and spent fuel management and remedial and preventive measures for radioactive pollution. Safety measures at nuclear installations to avoid releases, pollution, and human exposure represent approximately one-third of the projects. Only about one-quarter concern arms-related hazards; in this category, fewer projects are completed, and two projects have 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 protec-

tion upgrades at the nuclear-powered icebreakers, has been deferred due to lack of progress in a different project 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 in the region, was cancelled after the United States initiated a parallel project at the shipbuilding plant. The *Lepse* project to dismantle a storage vessel for radioactive waste continues despite delays and administrative problems.[51]

As of May 2002, approximately NOK 750 million (nearly $100 million) have been allocated to implement the plan of action.[52] About two-thirds of the money has been allocated to the first two priority areas. Because of delays, however, the amount of money actually spent has been somewhat lower. The funding matrix for the plan of action since its instigation to August 2001 is shown in table 11.2.

**Table 11.2. Funding Matrix for the Plan of Action for Nuclear Safety Issues, 1995**
(NOK millions spent in the five different priority areas, by percent)*

| Priority Area | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Total | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 11. 7 | 26.2 | 48.6 | 1.8 | 30.1 | 63.4 | 4.8 | 186.6 | 39 |
| 2 | 3.6 | 10.8 | 22.7 | 70.0 | 12.9 | 12.5 | 2.5 | 134.9 | 28 |
| 3 | 17.1 | – | 3.7 | 3.3 | 10.8 | 14.1 | 7.5 | 56.5 | 12 |
| 4 | 4.0 | 4.2 | 23.0 | 18.4 | 2.9 | 4.6 | 7.3 | 64.3 | 14 |
| 5 | 2.4 | 2.8 | 6.2 | 4.4 | 4.5 | 7.6 | 4.0 | 31.9 | 7 |
| Total spent | 38.8 | 44.0 | 104.3 | 97.8 | 61.1 | 102.2 | 26.1 | 474.3 | 100 |
| Total allocated | 129.5 | 100.0 | 88.0 | 28.0 | 0 | 102.2 | 147.2 | 594.9 | |

* Figures given in Norwegian kroner, or NOK (1 USD = approximately 7.7 NOK).

## Summary of Prominent Projects

**Priority Area 1: Safety measures at nuclear facilities.** These projects aim to improve nuclear reactor safety through international cooperation, improve licensing and supervision activities, back cost-efficient safety measures, contribute to a lower dependence on nuclear energy in Northwest Russia, improve Norwegian competence on nuclear safety and effects of nuclear accidents, improve early warning systems for nuclear accidents, and finally, improve and elaborate an international regulatory system for nuclear accidents.

51. A working agreement was signed September 21, 2002, exempting interested parties from liability.

52. According to exchange rates of June 2002, 1 USD = 7.66 NOK.

Projects under this priority area focus mainly on safety upgrades at nuclear power plants adjacent to Norway: the reactors at the Kola nuclear power plant, Sosnovij Bor in St. Petersburg, and Ignalina in Lithuania.[53] In addition, money has been allocated for remedial actions for the sarcophagus at Chernobyl in Ukraine. Some of the projects are bilateral, while others are trilateral or multilateral.

The bulk of the funds have been allocated to safety upgrades at the Kola plant, some 200 km from the Norwegian-Russian border. Two of the four reactors at the plant have been characterized as "high-risk" reactors,[54] and worst-case scenarios indicate that radioactive releases from the plant may reach parts of Norway within four hours. The goal of the project that was initiated in 1993 was to increase the plant's operational safety, 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 NOK 104 million has been spent on the initial three phases. In addition to the Norwegian contribution, €2 million have been allocated to the power plant through the Nuclear Safety Account (NAS), administered by the European Bank for Reconstruction and Development (EBRD).[55] The Kola power plant has itself contributed financially; estimates indicate that some NOK 2 billion were spent on security upgrades at the plant in the period 1987–2000.[56]

The NAS was established to secure and phase out high-risk reactors in the former Soviet Union. However, as Russia has not presented any plans to phase out old nuclear-power plants (on the contrary, in 2000 Russia adopted a plan to escalate nuclear power in the coming 50 years),[57] 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 development of 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 needed legislative and financial framework. Furthermore, the projects should contribute to the safe handling of spent fuel and dismantlement of nuclear submarines and radioactive waste. It is a stated Norwegian goal to improve international cooperation in these fields.

Most projects in this category have been dedicated to the safe dismantlement of Russian nuclear submarines and associated waste and fuel problems in the region.

---

53. 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," Norwegian Radiation Protection Authority, Strålevern Rapport 2002:3, June 2002, <http://www.nrpa.no>.

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

55. See <http://www.ebrd.com>.

56. Office of the Auditor General, "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker," p. 31.

57. Ibid., p. 25.

These projects are included in the associated Norwegian-Russian framework agreement, which has eased their implementation as well as 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 the 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 the project in 1995. Unfortunately, technical and bureaucratic problems have limited the project's progress.[58]

As a matter of convenience, and to secure tax exemption and resolve liability questions, projects not directly related to the dismantlement 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*.[59]

**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 swift and environmentally safe destruction of weapons of mass destruction, prevent illicit trafficking in nuclear material, secure high standards of physical protection and control, and promote peaceful application of weapons-related know-how.

58. After a testing period, new defects were recently discovered and the official commissioning of the plant was again postponed.

59. *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 particular, funds have been allocated to improve the accountability and physical protection of the civilian nuclear-powered icebreaker fleet. These ships use highly enriched uranium. 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 radionuclides 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, passive gamma-sensitive radiation detectors that can be worn on a belt.

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 NOK 18 million have 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 money has been channeled through the British Ministry of Defence, serving as a CTR subcontractor.

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

## Formal Evaluations

The 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 comes into line 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.[60] The findings of this "internal" evaluation were presented in a report 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

60. "Terms of Reference of the Evaluation of the Plan of Action for the Implementation of Report No. 34 (1993–1994) on Nuclear Activities and Chemical Weapons in Areas adjacent to our Northern Borders," Fact Sheet 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 Hønneland and Moe (see this chapter's footnote 1).

Nuclear Issues.[61] Again, the goal was to assess the progress of the action plan and the extent to which its objectives were 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).

## Arctic Monitoring and Assessment Program

The Arctic Monitoring and Assessment Program was established in 1991. At that time, ministers from the eight Arctic countries asked 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.[62]

## Arctic Military Environmental Cooperation

Arctic Military Environmental Cooperation (AMEC)[63] is a tripartite arrangement among the United States, Russia, and Norway to address deleterious effects from military activities in the northern region. The initiative was taken in 1995 by the then Norwegian defense minister Jørgen Kosmo. 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 although there is no particular focus on radioactive pollution in the declaration, most of the projects planned or carried out within the AMEC program relate to the danger of nuclear contamination from military sources in the northern region and, in particular, from decommissioned Russian nuclear submarines and their scrapping. This ties in nicely with CTR efforts in the region; indeed several AMEC projects are conducted in a close and synergistic relationship to the CTR program. Most of the AMEC projects are included as separate projects under the Norwegian Plan of Action. 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, based on the kinds of radioactive material or sources of radiation on which the projects focus:

---

61. Office of the Auditor General, "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker."

62. For more on the Arctic Monitoring and Assessment Program and for ordering of AMAP assessment reports, see <http://www.amap.no>.

63. This section was written by John Kristen Skogan.

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

In addition, AMEC also pursues a number of "nonnuclear" projects. Table 11.3 shows a more detailed list of all the AMEC projects and their categorization as presented after the initial phase of planning.

**Table 11.3. Overview of AMEC Projects as Presented by the Year 2000.**

| 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 pretreatment 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 nonradioactive 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 |

Source: Based on Sawhill and Jørgensen, "Military Nuclear Waste and International Cooperation in North-West Russia," 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>.

All the 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. The 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 naval spent nuclear fuel casks. The purpose is to facilitate and expedite spent nuclear fuel handling; 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 aim 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 a year-round liquid waste processing capability 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 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. The containers are usable for rail and ship transport, as well as for interim storage of radioactive waste. Such storage is foreseen at Polyarnyi in association with the planned complex for nuclear-waste processing.

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

There has been notable progress in Project 1.5 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 Halden reactor project.)

The "nonradioactive" projects also have made some headway, addressing, 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 waste water handling on ships.

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, was until recently putting 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 in the 1992 CTR Umbrella Agreement apply to U.S. participation in the AMEC "nuclear" projects (all considered supportive of CTR objectives). The signing later in 1998 of the Framework Agreement between Russia and Norway

provided legal coverage for most of the projects in the Norwegian Plan of Action, though initially only for 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 among the three parties have now been taken up again for a trilateral agreement providing separate legal coverage for AMEC projects. U.S. participation in AMEC is scheduled to terminate September 30, 2002.[64] As the time of writing, the continuation of AMEC remains somewhat uncertain.

## Lessons Learned

Norway has been engaged in practical large-scale cooperative measures with Russia to reduce dangers from nuclear activities in its adjacent areas since 1995. Formal evaluations show that there is 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 believed to have contributed to the protection of health, the environment, and trade and business activities,[65] as well as increased international attention and cooperation—including with the United States and EU. According to the Ministry of Foreign Affairs, work associated with the plan of action has given Norway additional insights on the political decisionmaking environment in Russia and Russian security and safety prioritizing.

At the same time, a certain level of frustration seems to prevail in the Norwegian Ministry of Foreign Affairs, which administers 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.[66] A senior Norwegian officer notes that "it looks like everything is supposed to take time, with limited results as the ultimate goal."[67] Moreover, Norway faces a range of underlying dilemmas in its nuclear safety cooperation with Russia,[68] relating inter alia to competing priorities, the organization of activities on the Norwegian side, and communication with Russian partners.

It is difficult to reach a clear-cut evaluation regarding the long-term security benefits resulting from the Norwegian-Russian bilateral nuclear security and safety cooperation. The projects vary considerably both in scope and funding; general characterizations are therefore likely to lead to simplified assessments. There are, however, some observations and overall conclusions that can be drawn.

---

64. Ibid., pt.10 in "Report to Congress."

65. Office of the Auditor General, "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker," p. 1.

66. 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.

67. Ambassador Torbjørn Norendal, private communication, March 11, 2002.

68. Royal Norwegian Ministry of Foreign Affairs, "Evaluation of the Norwegian Plan of Action for Nuclear Safety," prepared by Hønneland and Moe, p. 9.

Results vary widely among the four major areas of the plan of action. They are particularly disappointing in the area of treatment, storage, and disposition of radioactive waste and spent nuclear fuel (priority area 2), but 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 construction of physical objects in Russia, as do many of the priority area 2 projects.[69]

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,[70] 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 in later stages of some of the projects. As mentioned earlier, some projects have even been abandoned.

Moreover, some of projects carry an inherent conflict of goals. Safety measures at the Kola and Leningrad nuclear power plants have reduced the risk of accidents. At the same time, however, the aid has most likely contributed to extending the lifetimes of the facilities that Norway would like to see closed down. Thanks to Norwegian safety assistance, Russian parties now argue in favor of prolonging the plants' operation.

Given the highly pragmatic approach of the Norwegian plan of action, the Office of the Auditor General questions the money spent on basic research, as such activities could have been financed through other sources. Support to the International Science and Technology Center in Moscow is criticized for not directly supporting the pragmatic and fairly immediate goals of the plan of action.

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

---

69. Ibid., p. 11.

70. According to Ambassador Norendal of the Norwegian Ministry of Foreign Affairs, private communication.

## 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[71] and a high level of mutual understanding of the problems and possible remedial action. Moreover, 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 concise legislative framework and appurtenant laws and regulations, long and inefficient licensing and evaluation procedures, lack of willingness to take 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 decisionmaking. Another recurring problem is the tendency of somewhat excessive Russian bids during negotiations for contractual working agreements.[72] Often the Russians see a business opportunity in the assistance provided. Although getting tenders is difficult due to the specific competence needed, this tends to prolong and sometimes 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 for financial transactions.[73]

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

To ease 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

71. Many of these exceptions to smooth cooperation seem to involve the Interbranch Coordination Centre Nuklid. Nuklid was established in 1990 to coordinate attempts at 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, this means that Nuklid works on contracts with the ministry and that the ties between the two are tight. From Sawhill and Jørgensen, "Military Nuclear Waste and International Cooperation in Northwest Russia," pp. 11, 25.

72. According to Ambassador Norendal of the Norwegian Ministry of Foreign Affairs, private communication.

73. Ibid.

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 and cooperation between the Northern Fleet and Murmansk Shipping Company.[74]

## Norwegian Responses to Past and Present Cooperative Activities

The formal evaluations described above were 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 been minor, and the specific recommendations of the evaluations have been only partly implemented. However, the Ministry of Foreign Affairs has pledged to follow projects more closely, with more strict reporting requirements during their implementation and at their 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 is likely to contribute to and strengthen the expert evaluation of project proposals, together with representatives of the Norwegian Radiation Protection Authority.

Furthermore, the Ministry of Foreign Affairs plans, finally, to issue statutes for the activities of the IMSGO. But no fresh money has been allocated to administrative project follow-up on the Norwegian side. The current "minimum solution" for follow-up 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 Norwegian cooperative nuclear safety activities with Russia. The recommendations that have been put before the Norwegian parliament for consideration include the following requirements for future projects:[75]

- independent environmental evaluations of projects before they are adopted and financed by Norway;
- written provisions that the Gosatomnadzor (GAN) should have the right to approve the projects, before, during, and after their implementation;
- written provisions that Norwegian and/or international experts are allowed to inspect the implementation of the projects before, during, and after they are developed to make sure that the installations are used in accordance with their intended purposes;

74. Ibid.

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

- no support for any infrastructure projects that could be used to assist 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 develop 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 public as long as they do not contain information that can damage the national security of the countries;
- no Norwegian support to projects that involve continuous reprocessing at the Mayak plant; and
- improved economic and political support to the Russian federal civilian nuclear agency, Gosatomnadzor, to improve their position in Russia.

## An Institutionalized Cooperative Framework

To solve some of the problems associated with bilateral cooperation, Norwegian authorities signed a framework agreement with Russia in 1998.[76] The agreement ensures inter alia that technical assistance provided by the Norwegian party shall be exempt from taxes, customs duties, and other fees in accordance with the legislation of the Russian Federation. It is also refers specifically to the Vienna Convention of May 21, 1963, on Civil Liability for Nuclear Damage.

During negotiations for the framework agreement, the Russian counterpart participated actively in determining which projects would be included. Initially, only 10 projects related to the handling of spent fuel were included; since then, more have been added.[77] The majority of projects based on the plan of action, however, remain outside the 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.[78] This law applies to all international assistance. Even projects not specifi-

76. "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.

77. 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 tons container), together with all the AMEC projects funded under the Norwegian Plan of Action (from Ambassador Norendal, private communication, March 11, 2002).

78. 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.

cally listed in the framework agreement may thus be exempted from taxation if qualified in accordance with the law. Reportedly, however, the evaluation process for such an exemption can be a protracted endeavor.[79]

The Norwegian-Russian framework agreement, covering solely liability for nuclear or radiological accidents, is somewhat less comprehensive than its U.S.-Russian equivalent. However, given that Russia feels that the CTR-agreement is too far-reaching, both in terms of contractual conditions and access and inspection requirements, it is unlikely that the Russian Duma will accept equally comprehensive agreements with other countries.[80]

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 (MNEPR) 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 radioactive waste problems in Russia. The agreement remains unsigned, however, 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. Failure, so far, to secure from Russia required legal protections for donor assistance have prevented conclusion of the MNEPR and Trilateral AMEC agreement—prompting the United States to partially suspend three ongoing waste-management projects in Russia.[81]

The June 2002 commitment by the G-8 to raise up to $20 billion over the next 10 years to fund nonproliferation projects, principally in Russia, could provide additional impetus toward progress in further negotiations on this multilateral environmental aid agreement.[82]

## Effectiveness of the Norwegian Approach to Funding Cooperative Activities

There has been broad political support from the outset for Norwegian economic support and engagement with Russia in the field of nuclear safety. This has created a sound platform for cooperation and, initially, fairly spacious budgets. 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.

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

80. Ibid.

81. U.S. Department of State, "Environmental Security Threats from Decommissioned Russian Marine Nuclear Reactors."

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

This has, in part, caused a backlog of projects to be implemented and of course additional frustration on both sides. A more uncertain financial situation renders long-term planning and sustained nuclear security and safety harder to accomplish. As seen in table 11.2, the money made available has fluctuated somewhat over the years, though with an annual average of roughly NOK 100 million. Continued Norwegian political interest in maintaining nuclear safety support to Russia, however, means that sustained funding is likely in the coming decade. For 2003, NOK 350 million, more than three times annual average, was allocated to nuclear safety and security under the plan of action.

## Future Priorities

### Initiatives under Way

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 is likely to 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.

One project that could demand a lot of 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 the hazardous fuel storage facility. Progress has been slow, as no access to the area has been granted until just recently.

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

Across the Andreeva Bay, in the fjord Zapadnaya Litsa, 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 and 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 Norwegian and Russian parties, and access was granted.[83] A step-by-step approach will focus first on the improvement of infrastructure and living conditions at the naval base. Vast remedial challenges remain, however, once new roads, electricity, and housing are provided. A great deal of money—and donor states—are needed. Conservative estimates indicate clean-up costs in the range of $120 million.

---

83. 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.

Norway has provided NOK 15 million 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.[84] According to Norwegian officials, these funds are supposedly dedicated to improving storage conditions in the Andreeva Bay.[85] Still, no formal commitments by the other Nordic countries appear to have been made.

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

These recent developments are nothing less than a breakthrough in Norwegian 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.

## Recommendations for Future CTR Activities

Some of the projects proposed in this section combine both 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 seen, 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. Although these emphases may be understandable from a geopolitical perspective, a clear line between nuclear safety (primarily pollution and accidents) and security (primarily proliferation) may be hard to draw in practical arms control efforts.

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.[86] Moreover, the threat of "dirty bombs" in

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

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

86. 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, May 7–11, 2001.

which radioactive materials are used in conjunction with conventional explosives highlights the risk associated with spent fuel.

At the many 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—is 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.[87] Spent-fuel security upgrades, however, are only partly covered by this cooperation. No onshore spent fuel storage facilities have been secured, and only some of the service ships of the Northern Fleet (ships involved in the handling of both spent and fresh fuel).

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

**Dismantling of attack submarines.** Despite the many problems the United States has had with its overall assistance programs in the former Soviet Union, it has had notable success in its nuclear submarine dismantlement program.[88] 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.[89]

As of March 2001, there were 56 decommissioned "general purpose" submarines in Russia's Northern Fleet, 43 of them with fueled 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 dismantlement of Russian attach submarines, despite the possible availability of dismantlement equipment provided and installed by the United States. With fresh international funds, a direct offer to the NERPA shipyard to conduct a phased dismantlement of SSNs and SSGNs could be considered.[90]

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

**Handling of spent fuel in the Andreeva Bay and at Gremikha.** As indicated, once projects get going in the Andreeva Bay, international funds and donors will be urgently needed to support the range of remedial safe handling of fuel. Conservative estimates for the clean-up costs indicate figures well above what Norway or Russia is capable or willing to provide alone. The transparency opening

87. Wolfsthal et al., *Nuclear Status Report*, p. 59.

88. James 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.

89. 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 Moltz's memo to Volleback, March 7, 2001.

90. As suggested by Moltz memo to Volleback, March 7, 2002.

offered to Norwegian authorities may serve as an opportunity for other interested parties. Getting 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. Like Andreeva Bay, storage and radiation protection conditions are poor.[91] 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, there are no active submarines based there, which could ease the implementation of future cooperative projects.

Given the Norwegian emphasis on the Andreeva Bay, Gremikha is likely to receive little or no specific attention from Norwegian authorities in the coming years. Russian authorities will likely pursue increased participation from other actors. Care should, however, be taken not to initiate any unfortunate "competition" between the two storage sites. Rather, international efforts should be coordinated and run in parallel to secure 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 the 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 for the transport of spent nuclear fuel from decommissioned nuclear submarines has been provided.

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, the existing storage capacities in the region are highly congested and unsatisfactory. To solve the problems associated with the spent fuel and radioactive waste, construction of new facilities seems a paramount priority. The cleanup of both the Andreeva Bay and Gremikha most likely requires such efforts. Second, the periodic breakdowns in transportation of spent fuel to Mayak and the prolonged shipping procedures create an unfortunate bottleneck for the spent fuel handling. Third, an onshore radioactive waste-storage facility would obviate the need for potentially hazardous sea shipments to Novaja Zemlja, the planned regional repository for (low and intermediate level) radioactive waste. Finally, the establishment of an intermediate storage facility could at the same time allow for proper physical protection and increased accountability of the spent fuel.

**Pursue options for increased nuclear transparency and accountability.** Limited access and lack of transparency have been recurrent problems. Ideally, transparency can help each side understand the other's (nonoffensive)

91. 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.

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.[92]

The naval fuel cycle remains one of the most sensitive areas. Yet, many of the 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 weapons depots.[93] The close working relations established and the fuel consolidation 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 nonintrusive 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 current problems other parts of cooperation are 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 bilateral or multilateral cooperation.

## Comparative Advantage

For historical, cultural, political, and geographical reasons, Norway has a number of 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. Norway's proximity to Russia could, moreover, allow for 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 nonnuclear-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 Norway increasingly is trying to play in international nuclear safety projects in the northern areas.

---

92. Morten Bremer Mærli 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>.

93. Mærli, "U.S.-Russian Naval Security Upgrades."

Norway has long promoted the need for increased international attention to the environmental threats associated with civilian and military nuclear activities in our 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 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, assure that priorities are properly assessed and made known to the international community, and provide points of contact to facilitate cooperation.[94]

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.

## Decisionmaking Environment

Norway's nuclear cooperation with Russia is managed through four principal networks.[95] 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 is through the Norwegian Radiation Protection Authority (NRPA) and its Russian sister organization, the Russian Federal Supervisory Authority for Nuclear and Radiation Safety (Gosatomnadzor or GAN).[96] Finally, defense-related cooperation takes place under the auspices of AMEC.

Norwegian organizational structure for nuclear security and safety cooperation with Russia is thoroughly described in the evaluation report prepared by the Fridtjof Nansens Institute for the Ministry of Foreign Affairs:[97]

---

94. See <http://www.iaea.or.at/worldatom/Programmes/CEG/history.html>.

95. Sawhill and Jørgensen, "Military Nuclear Waste and International Cooperation in North-West Russia," p. 37.

96. 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.

97. 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," p. 23, <http://odin.dep.no/archive/udvedlegg/01/01/00133012.pdf>.

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. The former consists of deputy ministers from the following ministries: the Ministry of Foreign Affairs (MFA), the Ministry of Defense (MOD), the Ministry of the Environment (ME), the Ministry of Fisheries (MF), the Ministry of Agriculture (MA), the Ministry of Health 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 decisionmaking 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 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 Decisionmakers

The traditional approaches for influencing decisionmakers in Norway include seminars, direct contacts and briefings, and 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 the implementation of the cooperative projects—have been widely publicized over almost a decade, not least by a highly active NGO community.

Among the most prominent is the Bellona Foundation, a nongovernmental 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 breakup of the Soviet Union. Their focused approach, an offensive media strategy, and active political engagement were one of the driving forces behind the nuclear safety interests of the Norwegian government and political community in the beginning of the 1990s. In November 2001, Bellona published its third report on potential sources of radioactive contamination of the Arctic, *The Arctic Nuclear Challenge*.[98]

Norwegian authorities also see the (potential) benefits of the group. Despite the fact that some official Russian counterparts remain highly skeptical of Bellona's activities, the group has received substantial support from the Norwegian govern-

98. See <http://www.bellona.no/imaker?id=22347&sub=1>.

ment: NOK 25.6 million 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 nongovernmental organization that has focused substantial attention on environmental threats from Russian marine reactors is 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.[99] However, given that it is less connected with the political and bureaucratic environment in Norway, its impact on Norwegian nuclear assistance policies has likely been smaller.

## Conclusion

Many nuclear safety and security challenges remain in northwest Russia. Years of international cooperation—and substantial funding—will be necessary to deal with the legacy of the extensive naval nuclear activities of the Cold War. Among the area's more urgent projects that call for international attention are the safe dismantlement of nuclear attack submarines; cleanup at naval storage facilities such as the one 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. Important progress has been made—and hard lessons have been learned along the way. However, the dialogue and connections that have been established, the cooperative framework that has been institutionalized, and today's more nuanced understanding of the concerns, priorities, and practices of the different actors involved should create a sound basis for new rounds of cooperative, concerted efforts to limit the persistent nuclear security and safety risks in the region.

99. See <http://www.nti.org/db/nisprofs/russia/naval/ff_naval.htm>.

CHAPTER 12

# Sweden

*Tor Larsson*
Stockholm International Peace Research Institute

## Threat Assessment

### Historical Background

It is no surprise that Sweden,[1] a small country situated close to a great military power like the Soviet Union, would perceive that neighbor as a potential threat, especially given that Swedish history is one of recurring wars with Russia. Nor is it surprising that the threat was perceived to be of a general nature and not specifically linked to any particular category of weapons. Sweden's prime concern for policy and planning was the ability to defend the homeland if the threat did manifest itself in an attack—a challenge complicated by Swedish adherence to a nonaligned position.[2]

1. This report was written on behalf of Stockholm International Peace Research Institute (SIPRI) at the request of CSIS. The facts and figures have been checked to the fullest possible extent with the responsible agencies. Value judgments and opinions expressed, on the other hand, are those of the author and should not be attributed either to SIPRI or to any official Swedish body.

2. Documentation on Swedish efforts in the threat reduction field is quite scarce even in Swedish and virtually nonexistent in English. The few exceptions from this general rule are as follows: Paul Ek, Lars Wredberg, Sarmite Andersson, *Swedish Support Program on Nuclear Non-Proliferation in Central and Eastern Europe and Central Asia,* Swedish Nuclear Power Inspectorate, SKI Report 00:23 (June 2000), ISRN SKI-00/23-SE (a report that lists all nuclear projects completed and ongoing at the time and is one of the main sources for the account given in this chapter); also see Petra Lilja, Roger Roffey and Kristina S. Westerdahl, *Disarmament or Retention: Is the Soviet Biological Weapons Program Continuing in Russia?* National Defense Research Institute, FOA Report FOA-R-99-01366-865-SE (December 1999); and Roger Roffey and Kristina S. Westerdahl, *Conversion of Former Biological Weapons Facilities in Kazakhstan: A Visit to Stepnogorsk* (July 2000), Defense Research Agency, FOI Report FOI-08-SE (May 2001). Although the two latter reports do not describe any projects (as there are none), they give insight into Swedish thinking about the subject.

Some recent documents related to the collaboration within the EU in this field: "Council Decision of 25 June 2001 Implementing Joint Action 1999/878/CFSP with a View to Contributing to the European Union Cooperation Program for Non-Proliferation and Disarmament in the Russian Federation" (2001/493/CFSP), published in *Official Journal of the European Communities* (March 7, 2001); Council of the European Union 13154/01, October 23, 2001: *Report on the Implementation of the Council Joint Action 1999/878/CFSP of 17 December 1999* by the Commission Services, DG E VII, October 2001. An account of EU activities and ambitions, formulated during the Swedish presidency, is found in "Statement by Ambassador Stefan Noréen on behalf of the European Union at the Conference on Non-proliferation and Disarmament Cooperation Initiative," March 8, 2001.

Nuclear weapons added a new dimension to the threat. In the 1950s and early 1960s, Swedish leaders sought enhanced means to meet this challenge, including the aborted attempt to create an indigenous nuclear force. The nuclear threat persisted even after political and technical developments rendered it less credible—but it was seen as impossible to meet effectively and thus lost prominence in Swedish defense planning. Simultaneously, Sweden emerged on the international scene as a vigorous proponent of nuclear disarmament—a commitment that has become, over the decades, a tenet of Swedish foreign policy.

Chemical weapons (CW) have traditionally been regarded as a more realistic threat to Swedish forces and to the homeland than nuclear weapons. Swedish CW protection research started in 1936 at what, between 1945 and 2000, was called the National Defense Research Institute (Swedish abbreviation, FOA), at which time it was renamed the Defense Research Agency (Swedish abbreviation, FOI). FOI is an agency under the Defense Ministry.

Though the consequences of a CW attack would be less serious than those of a nuclear strike, it would nevertheless be extremely difficult for Sweden to face an aggressor armed with CW with any hope of success. Thus, a general desire to eliminate the CW threat prompted Sweden to actively support the creation of the Chemical Weapons Convention (CWC) and the work done by the Organization for the Prohibition of Chemical Weapons (OPCW) in The Hague.

There was always an awareness of the biological warfare threat in military and scientific circles. However, in defense planning, biological weapons (BW) were primarily considered tools for saboteurs. Although responsibility for disease control and medical countermeasures mainly rests with civilian authorities, BW defense research was and is undertaken by FOA/FOI. The work undertaken is not comprehensive in this field, but what is done is of a high standard, and its scope has been expanded gradually. Over time, a substantial effort has also gone into measures to strengthen the Biological and Toxin Weapons Convention (BWC) and to develop a potential verification protocol for that treaty.

International disarmament negotiations have been conducted by the Foreign Ministry, supported throughout by technical experts, particularly in the area of nuclear, biological, and chemical (NBC) weapons. Experts have mainly been recruited from FOA/FOI, supported by separate funding from the Foreign Ministry. Experts from the Swedish Nuclear Power Inspectorate and other agencies subordinated to various ministries have also received separate funding from the Foreign Ministry to support disarmament negotiations. The Defense Ministry itself has been only marginally involved in NBC disarmament work, although one of its functionally subordinate agencies has had a key role.

## Current Assessment

The demise of the Soviet Union brought with it a sea change in Swedish threat perception. If a Soviet invasion of Sweden no longer seemed plausible, the social chaos that resulted from the former Soviet Union's collapse was seen as a potential breeding ground for all kinds of criminal activities, not to mention dangerous accidents. At the same time, the Cold War's end permitted increased focus on international peacekeeping operations, which also created new threats, vulnerabilities, and challenges.

A number of NBC risks became clear, some of which affected Sweden more than others. These included (in unranked order):

- Accidents in nuclear reactors on land or in ships;
- Other accidents with severe humanitarian and/or environmental consequences—for instance, in chemical or biological weapons facilities;
- Unauthorized use of NBC weapons in Russian internal conflicts;
- Use of radioactive, chemical, or biological agents in Sweden for terror or blackmail;
- Smuggling of such materials through Sweden;
- Use of nonconventional (primarily biological or chemical) weapons against peacekeeping forces in international operations.

Some of the above examples are clearly related to the general proliferation problem. A state or a substate actor could possibly acquire weapons, components, or precursor materials stolen in Russia, or hire qualified NBC experts at salaries far beyond what the Russian government could pay. Thus there seem to be several approaches to help Russian authorities reduce proliferation risks, all of them in line with the established Swedish commitment to nonproliferation and NBC disarmament in general. Other aspects of the problem have to be considered, however, in order to understand why Sweden has acted the way it has.

First, many issues outrank proliferation in the public eye and, consequently, on the political agenda. Among the truly global issues, environmental degradation probably ranks highest, although taking a back seat to local and personal issues such as unemployment, street violence, and domestic ethnic and religious conflicts.

Second, Swedes seem to have a strong propensity for humanitarian assistance, which is reflected in the way foreign aid is planned and executed.

Third, Sweden's rank among wealthy nations has been slipping for a number of years, and public expenditure has to be kept under very tight control.

Fourth, and most important, Sweden is increasingly coordinating its international activities with the rest of the European Union and channeling many of its efforts through the CEC (Commission of European Communities).

Other elements that may also affect Swedish decisionmaking in certain circumstances are a decided preference for multilateral treaties in the disarmament area, and a political commitment to renounce nuclear energy.

## Quantitative Assessment of Threat Reduction Activities

The "functional framework" provided by CSIS is not an ideal tool for describing Swedish disarmament and nonproliferation efforts in the former Soviet Union (FSU). Nevertheless, it will be used as far as possible to facilitate comparisons. What follows is a brief account of the activities undertaken under each of the main headings in the framework, with particular comments on those that do not fit.

Figures given in the funding matrix (see table 12.1) are estimates, resulting from an attempt to apply a rather strict scheme to very fragmented raw material. It is reasonably clear that Sweden has spent somewhere between $10 million and $15

**Table 12.1. Sweden: Funding Matrix for Cooperative Threat Reduction Assistance** (U.S. $ millions)

| Main Area | Projects | Actor | Year | Previous | 2000–2001 | Total |
|---|---|---|---|---|---|---|
| **Nuclear weapons** | | | | | | |
| Delivery systems: Submarine fuel | Physical protection | SWE/SKI | 1998 | 0.15 | 0.03 | 0.18 |
| Legislation | Excess material | SWE/SKI | 1998 | 0.06 | --- | 0.06 |
| **Nuclear fuel cycle** | | | | | | |
| Power reactors | MCP&A general | SWE/SKI | 1994 | 3.20 | 1.70 | 4.90 |
| Fuel fabrication | Accountancy | SWE/SKI | 1994 | 0.10 | --- | 0.10 |
| Research reactors | Physical protection | SWE/SKI | 1997 | 0.13 | 0.09 | 0.22 |
| People | Instruction/ training | SWE/SKI & other | 1992 | 0.90 | 0.04 | 1.00 |
| Legislation/ mgmt. | General nonproliferation | SWE/SKI & other | 1994 | 0.80 | 0.60 | 1.40 |
| **Chemical weapons** | | | | | | |
| Facilities: Storage, destruction | Health & environment | SWE/FOA/ FOI | 1992 | 0.40 | 0.20 | 0.60 |
| **Export controls** | | | | | | |
| Regulatory framework | | SWE/SKI | 1995 | 0.1 0 | --- | 0.10 |
| **People** | | | | | | |
| ISTC & STCU | Research support | SWE/FOA/ FOI | 1995 | 6.00 | --- | 6.00 |

Note: For abbreviations of Swedish agencies, see the text.

million on nonproliferation-related projects over the past 10 years. There are many reasons for uncertainty about the exact figure, including whether allocated funds equal actual expenditures; whether internal administration costs are included; and the fact that many projects are funded one year but carried out over one or more later years. Another important factor creating uncertainty is the shifting rate of exchange. At the time of writing, the rate is about 1 USD = 10.4 SEK, but during the 1990s, it has varied from just over 6 SEK to almost 11 SEK. For the sake of simplic-

ity, figures in the table for funds originally quoted in SEK are recalculated using 1 USD = 10 SEK.

## Nuclear Weapons

Sweden has not undertaken any warhead-related projects. Two small projects with the objective of improving the security of submarine fuel at facilities in the Severodvinsk area (the Sevmash and Zvyozdochka shipyards) fall under the subheading "delivery systems." Fresh submarine fuel, some of it weapons grade, is being stored under inadequate conditions. One project involved the development of computer codes for the registration and control of navy nuclear fuel. The other was the planning of and specifications for physical security systems at these shipyards. However, in 1998, the Russians called a halt to this latter work, allegedly following a request from the United States. The total cost of these projects was about $150,000.

Another small weapons-related project that is difficult to fit into the established scheme was the provision of advice on the national legislation Russia needed to legalize transfer of "excess material" from the military program to civilian authorities (Gosatomnadzor, or GAN) and to international control. This project cost roughly $60,000.

These projects were managed by the Swedish Nuclear Power Inspectorate (Swedish abbreviation, SKI). Some were conducted in cooperation with the Norwegian Radiation Protection Agency or other foreign agencies. (Norwegian and other external funding is excluded from the funding matrix.)

The total spending under the heading "nuclear weapons" comes to about $240,000, almost all of which was spent before the year 2000. Only about $30,000 were accounted for in 2000 and 2001.

SKI has also organized numerous seminars and training courses for Russian and other FSU officials concerning nonproliferation. This is discussed further below. It is impossible to identify participants according to their earlier involvement or noninvolvement in weapons programs.

Some support for technical specialists has been provided through the International Science and Technology Center (ISTC) in Moscow and the Science and Technology Center in Ukraine (STCU) in Kiev. The Swedish contributions, managed by FOA/FOI, will be described separately below.

## Nuclear Fuel Cycle

A significant number of small projects have been undertaken in the Russian Federation and in many other former Soviet republics, with particular emphasis on Ukraine and Kazakhstan. The word "small" refers to the cost of the projects—almost all of them in the $10,000 to $100,000 range. All of these projects have been sponsored by SKI, and they started as early as 1991. By June 2000, 109 such projects had been initiated in total, of which 22 were still running: 11 in Russia, 7 in Ukraine, and 4 in Kazakhstan. As of spring 2002, there are 15 projects running in the Russian Federation.

Including completed projects reveals an even stronger predominance of projects in Ukraine and Kazakhstan. Eleven of these projects were carried out in Russia, 24 in Ukraine, and 21 in Kazakhstan. These figures include those projects still ongoing mentioned in the preceding paragraph. The total Swedish funding for the work from 1991 up to and including 1999 was about SEK 60 million or $6 million. Of this, about 15 percent was spent on internal administration. In some projects there was technical and economic cooperation with Norway and also with Finland, Japan, and the UK.

In 2001, a political decision was taken to concentrate efforts on Russia—particularly the northwest region—and Ukraine, while phasing out support to the Baltic states. The decision reflects the overwhelming importance of Russia and Ukraine with regard to both nonproliferation and general security policy considerations, as seen from a Swedish perspective. Another SEK 25 million have been set aside for new activities.

In the classification used by SKI (rather than that of CSIS), the projects fall into five categories: Nuclear legislation, nuclear material control, physical protection, export/import control, and combating of illicit trafficking.

The first of these categories has been given top priority, given that the basis of all nonproliferation activities should be a clear and comprehensive system of laws, rules, and regulations. SKI has been instrumental in these efforts and also took the initiative, in 1994, of establishing the International Group of Legal Experts (ILG). The ILG has members from Australia, Finland, and Norway, in addition to Sweden, and has also cooperated with the IAEA. By the year 2000, the ILG had cooperation arrangements with Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Latvia, Lithuania, Moldova, Ukraine, and Russia. To account for these efforts, a new subheading called "legislation/management" has been introduced into the funding matrix. The costs associated have been estimated at about $1.4 million, with about $800,000 spent before 2000. However, as much of the work in this respect is of an informative and educational nature, some of the costs are entered under the subheading "people." These, together with a few items mentioned below, add up to about $1 million, most of it spent before the year 2000.

Some projects in the area of "nuclear material control" are entirely for instruction and/or training and will be reported under "people." However, this group also includes a significant number of projects aimed at providing authorities in the FSU with modern computer systems (software and/or hardware) for material accountancy. These systems are mainly applied to power reactors, including all nuclear power plants (NPPs) in Ukraine, as well as to the Ulba fuel fabrication plant in Kazakhstan.

A related project involved the provision of office equipment, including computers and software, and training of staff for the regional office of GAN at Yekaterinburg. This office is responsible for control and supervision of a facility in the Mayak area intended for the storage of spent nuclear fuel from Murmansk and Arkhangelsk.

All in all, projects aimed at "material control, protection, and accountancy" in power reactors (and to a small extent in fuel fabrication)—apart from those

included under "people"—have been funded so far with about $5 million, of which two-thirds were spent between 1994 and 1999.

There are far fewer projects classified as "physical protection" than in the two previous groups. Some were of a conceptual nature; several others just aimed at upgrading existing systems. Apart from the submarine-related project described above, there are a few projects in this group worth noting. One is the ongoing improvement of the physical protection of fuel for the nuclear-propelled icebreakers stationed in Murmansk. Sweden is also participating in a large-scale effort to provide physical protection at the Kharkiv Institute for Physics and Technology, Ukraine (an enterprise where the United States and Japan carry the main financial burden), at the Sosny research reactor in Belarus, and currently, at the Nerpa reparation shipyard near Murmansk. The latter project is aimed at protection of nuclear materials from decommissioned nuclear submarines. Only about $180,000 has so far been spent on these efforts.

A few projects classified by SKI as "export control" will be treated under that main heading below.

The group of projects called "combating illicit trafficking" comprises only three items, of which only one is interesting in this context. It aims at improving the security of nuclear materials during transportation and intermediate storage in Russia, both by proposing physical means for prevention, detection, and response and by developing procedures and manuals. These projects are included under the subheading "people," mainly because there is no way of assigning them elsewhere.

Although SKI proper is handling the nonproliferation-related issues, there is a special project group called the Swedish International Project (SIP) under the aegis of SKI but also collaborating with the National Radiation Protection Agency (Swedish abbreviation, SSI) and the Swedish Nuclear Fuel and Waste Management Company (Swedish abbreviation, SKB). SIP works to improve reactor safety, waste management, radiation protection, and emergency preparedness at NPPs in Central and Eastern Europe. Most of its efforts so far have been concentrated on the Ignalina NPP in Lithuania, where problems related to the imminent decommissioning of the plant abound. Even though the budget for SIP activities far exceeds that of SKI's nonproliferation projects, it will not be entered into the funding matrix as the undertakings seem to be outside the scope of this report.

## Biological Agents

There is virtually no history to recount of projects related to biological agents or the redirection of former BW scientists (apart from a few that fall under the heading of ISTC). Since 1994, Sweden has attempted, without much success, to establish some kind of cooperation with Russia in this field. Some research cooperation has occurred between Swedish and Russian institutes on potential BW agents like tularemia. This year may see possible cooperation in research on smallpox diagnostics between Vektor in Novosibirsk and the Swedish Institute for Infectious Disease Control (Swedish abbreviation, SMI). Some money has been allocated to this project, but no work has started yet. In June 2001, SMI and FOI organized a conference in Stockholm, initiated by ISTC, on population health problems in Russia, at a cost of about $10,000—an amount too small to be included in the funding matrix.

SMI also acts as collaborator on two ongoing ISTC projects on biosafety and biosecurity, one at Obolensk and one at Novosibirsk. As these projects are funded by the United States, they will not be included in the funding matrix.

## Chemical Weapons

Swedish efforts in the CW area started in 1992. They have been focused almost solely on the storage facility in Kambarka, Udmurtia, where 6,000 tons of lewisite are stored. The first project was to estimate what risks the depot and the future handling and destruction of the CW agents posed to the local population. It was found that the risks were much smaller than the anxiety-raising projections of the local media.

After the Russian ratification of the CWC in 1997, a second step was taken: The provision of a computerized decision-support system for the military authorities, intended for training purposes as well as for use in a possible accident, and the establishment of a public communications center in the town of Kambarka (population about 11,000). This was made after a Swedish suggestion, and Sweden paid for the renovation of office facilities, equipment, and furniture as well as for training of the staff at the center.

The latest development in this enterprise was to supply the local hospital in Kambarka with medical analysis equipment to gauge the content of arsenic in humans. The intention is to start checking the population before destruction of the stored agents begins, in order to have reliable reference data.

Similar small projects may also be envisaged. Support to any substantial Russian CW destruction will most likely be channeled through European cooperation. The projects in Kambarka have been managed by FOA/FOI. In the funding matrix they will be entered under the subheading "destruction," although this is probably inappropriate considering the purpose of the projects.

## Export Controls

A few of the projects managed by the SKI, as already mentioned above, were denoted thus in the SKI classification scheme. Three of these projects were aimed at Russia and Ukraine and one at Latvia. All could be seen as an outflow from the substantial work made earlier in trying to introduce a Western type of nuclear legislation compatible with the rules laid down by the Nuclear Suppliers Group and the Zangger Committee. Three projects were studies of export/import routes and routines in the northwest region of Russia or in Latvia, together with suggested improvements in the current system, all presented in 1998. The fourth was a seminar in the summer of 1996. The total cost for Sweden of the four projects was about SEK 1.2 million (included in the total sum quoted under "nuclear fuel cycle"). Other than that, all work in the field of export control is undertaken in multinational groups created for the purpose, such as the Missile Technology and Control Regime.

## ISTC and STCU

Sweden supported the establishment of science and technology centers in Moscow and Kiev from the very beginning, and a government decision to join the project

was taken in June 1992. The initial constitutional and bureaucratic difficulties in Russia and Ukraine delayed the start of the operations until 1994 in the case of Russia and 1995 in Ukraine.

The financial commitment was unique in that the government allocation was made in U.S. dollars. The amounts were $4 million for ISTC and $1.5 million for STCU, converted at the then-current rate of exchange, 1 USD = 8 SEK. However, for most of the time that Sweden was funding research projects through the two centers, the actual exchange rate was closer to 1 USD = 6.5 SEK. In 1997, an additional $0.5 million was allocated for STCU at a different exchange rate.

From December 1995 to November 1998, the money was spent on a total of 76 research projects plus contributions to the administrative budget of the two centers. More precisely, support for the research projects amounted to $3.83 million at ISTC and $1.70 million at STCU, while the administration costs were $0.33 million and $0.48 million respectively.[3] In addition to the payments made to the centers, about SEK 5 million was spent on domestic costs and costs associated with the deputy directorship at STCU. Total expenditures thus add up to about SEK 48 million or roughly $4.6 million. This is the figure to be used for comparisons with other current contributions, although the original allocations totaling $6 million have been entered into the funding matrix. Among the 76 research projects wholly or partially funded by Sweden, 32 were through ISTC and 44 through STCU. Most of the projects were cofunded with the United States, the EU (in Russia), or Canada (in Ukraine). Only 14 (7 in each country) were entirely funded by Sweden.

It is virtually impossible to ascertain which of these projects—perhaps only parts of projects—should be regarded as truly contributing to threat reduction and, if so, in which areas. Listing the projects under the subheadings used during the operation and in reporting back to the Foreign Ministry would give the results noted in table 12.2. The third entry in the list comprises mainly projects intended to contribute to better clinical treatment of patients. Only three of them were somehow related to BW. The penultimate entry represents projects involving the detection of nuclear weapons material, methods for on-site inspection, and alternative use of rocket fuel. The aggregate picture reflects Sweden's priorities and threat assessment, as described earlier.

## Lessons Learned

Lessons learned abroad fall into two categories, those related to the conduct of projects and those that attempt to evaluate achievements. A third and separate category would be domestic experiences.

3. That these figures add up to more than $4 million and $2 million, respectively, reflects interest accumulated by the deposited funds during the operation.

**Table 12.2. Number of ISTC and STCU Projects Supported by Sweden, by Category**

| Category | Number |
|---|---|
| Materials technology | 19 |
| Environmental protection | 16 |
| Biology, medicine, medical technology | 10 |
| Reactor safety | 8 |
| Basic physics | 7 |
| Information technology | 6 |
| Hazards analysis (other than nuclear) | 3 |
| Recycling methods | 3 |
| Active disarmament | 3 |
| Alternative energy sources | 1 |

## Conduct of Projects

Swedes who have been acting as project managers or have been involved in conducting fieldwork generally report that the ordinary Russian (or other FSU) counterpart is always friendly. This is perhaps not surprising, since these are the people who are going to benefit from the money or information that the donor is about to part with. FSU counterparts may not always be easy to understand, however, not because of language difficulties but because of cultural differences that occasionally show in basic values and thought patterns.

Although this can be a minor nuisance in dealing with people "on the floor," it sometimes manifests itself in a very awkward way in the case of officials who are not personally involved in the project but in a position to affect the way it is conducted and performed—whether lab directors, bank managers, or tax and customs officials. Bluntly speaking, there is still a good deal of "Soviet-type mentality," especially in the older generation. For example, it was initially very difficult to persuade Russian or Ukrainian applicants for leadership of ISTC and STCU projects to accept that their project proposals would be scrutinized and perhaps even rejected by Western specialists, in spite of the fact that they (the proposers) were professors and academicians. When a proposal was accepted and funded, some of them were very reluctant to accept that payments would go directly to the people working on the project and not through them.

At the outset, FSU counterparts often suspected that everybody coming from the West into the FSU would be a spy, trying to steal all the technically and commercially useful secrets if not actually threatening state security. This attitude is now by and large gone among scientists and other technically oriented people, but

not necessarily in the military and security forces. The problem of intellectual property rights still impedes quite a few projects.

The difficulties encountered with customs and tax authorities are well known and will probably be mentioned in every country report. Sweden's overall impression is that in many cases the executives are either ignorant of decisions made at the political level about, for instance, customs and tax exemptions for goods and services provided in different assistance operations—or they just disregard the decisions. One may speculate about the reasons behind this. It could be that information is not disseminated or taken in properly, that lines of command are unclear, and that the legality of a given decision is questioned by other political bodies; in some cases there may be personal greed on the part of officials at different levels. The story (which will not be recounted here) about the STCU building in Kiev, provided by the Ukrainian government, is another illustration of the general confusion that prevails. Experience to date suggests there is still a long road ahead to a comprehensive, internally consistent, and reliable system of laws and regulations, together with an adequate practice of law enforcement, in the FSU states.

On a more positive note, there are certainly many individuals, political decisionmakers as well as low-rank officials, who truly wish to move away from the rigid and anachronistic bureaucracy and toward a more open society and a more Western way of doing business. There is also, in many cases, a willingness to conform to international rules and regulations corollary to a treaty, even when the country in question has not ratified the treaty as such. It has also been noted that small enterprises seem to be more honest and less corrupt than the large ones or the military.

A particularly difficult case, of course, is the problem of gaining access to microbiology labs that are organized under the Russian Defense Ministry. Here it seems to be not just a question of old-fashioned bureaucracy but one of planned and organized secretiveness, as all efforts in this direction have been effectively stymied.

## Achievements

Evaluating the second category of lessons learned is more difficult. Generally, achievement equals implementation. Introducing a particular piece of nuclear legislation, for instance, is only truly an achievement if that law is known, observed, and, if necessary, enforced. It may be difficult to ascertain from the outside whether and when that is the case.

There are no examples of projects undertaken that have been outright failures in the sense that nothing was achieved for the money spent. One reason might be the flexibility Swedish agencies and ministries have shown: If it seems unlikely that a proposed project will succeed, the proposal is simply dropped and the money shifted to a more promising area.

Implementation is easier to check when the assistance involved providing physical objects such as protective devices or computers, but the will to use the hardware properly is still crucial and hard to quantify. By and large, however, the outcome in this regard has been satisfactory for the projects described above.

With regard to ISTC and STCU operations, some wonder whether the support really has prevented proliferation of know-how. Sweden has been in no position to

investigate the scientists whose projects have been funded but has relied on U.S. estimates of the so-called purity of objective of each project. Some critics have also maintained that the support helps to perpetuate a competence that would have been better lost altogether.

One objective of the ISTC/STCU work was to make itself redundant as the research it supported would be either sponsored by the state government or commercialized. Both these processes have been much more time consuming than originally expected and are still very far from completion. The governments in question remain unable to fund their scientific academies and institutes, even for basic research.

The scientific work in the FSU is often of a very high quality. Many researchers also obtain results with a potential for civilian applications. There are obstacles to exploiting the results, however. One is the high level of specialization and compartmentalization—partly due to the division of labor in the old Soviet system—which may make it difficult to find the right partner for commercializing an idea. Another is a lack of understanding about how markets work and how new products could be brought to market. A third is, of course, the poor living conditions in the FSU, which often make it imperative to find short-range solutions to personal problems and push the pursuit of a long-range possibility into the background. The property rights problem adds to the difficulties.

In this context it should be noted that the Swedish attitude to security and safety improvements in the FSU is perhaps of a somewhat wider scope than that of certain other nations, including the United States. The Swedish view is that all sectors of societal life are interrelated, implying that support for improved environmental conditions, economic change, and so on will also contribute to nonproliferation. To put it simply, in a richer and better-maintained society, there is both less temptation and less opportunity to steal and smuggle nuclear materials and other contraband.

## Domestic Response

In Sweden, basically the whole complex of threat reduction–related activities attracts very little attention except from specialists. At the political level, "threat reduction" is not even a term in use. The current heading is "common security in the Baltic region," and stemming proliferation of WMD is only one item among many under that heading. The media coverage of the program has been almost nil, except for the occasional brief notice of something that was just started or finished in one of the Baltic states or on the Kola Peninsula. Emphasis is invariably placed on environmental concerns or reactor safety issues.

Apart from the Pugwash movement, there is also negligible interest on the part of NGOs. The possible reasons for this general lack of interest were set out above, in the threat assessment. It should be acknowledged, however, that after September 11, 2001, a few voices have warned about the possible consequences if terrorists were to obtain NBC weapons. A subjective judgment of the bottom line in that debate is that biological agents are more scary than chemical and more credible than nuclear. So far the impact of the debate has been minimal, as the vast majority of people in Sweden do not consider their country a prime target for terrorist attacks.

Returning to the lack of commercialization of research in the FSU, the nonresponse of the industry in Sweden is also noteworthy. Efforts were made—probably too feeble but certainly to no avail—to inform different industrial companies in Sweden about the potential benefits of qualified but cheap (compared to Sweden) research that might be undertaken on their behalf. Some reasons behind their coolness can be surmised: a high level of specialization in the West, entailing very narrow and very targeted R&D efforts in most companies, and a reluctance to invest even modest sums in something that was basically unknown and seemed difficult to handle.

Even though Swedish companies were not eager to buy research in the FSU, there seems now to be an increasing commercial interest in Russia both as an investment area and as a market, although public interest in the transitions going on in the FSU has faded since the early 1990s.

## Funding Effectiveness

Funding of Swedish projects has been quite effective in the sense that there have been few bureaucratic hang-ups when money has been allocated. On the other hand, in many cases project leaders—not to mention the recipients—would have liked more money than was allocated. Some potentially good ideas have certainly been shelved because of a shortage of funds.

Normally, funding comes from the Foreign Ministry, either directly to the agency carrying out the operations or through the Swedish International Development Cooperation Agency (SIDA), an agency subordinated to the Foreign Ministry. Only very small contributions have come from the Defense Ministry or from other sources, including the CEC. The projects on which the money will be spent are decided in a dialogue between the operating agency and the funding party, and the operator is required to report back at regular intervals on the progress being made. In addition to enterprises paid for by earmarked funds, some very minor expenses have been met by the operating agencies within their own budgets in cases where the experiences would be considered valuable to their normal activities.

Funding effectiveness could be defined otherwise, however. Russian critics have remarked that too much U.S. assistance is spent in the United States. That criticism may also be valid for at least some of the Swedish undertakings. It is probably possible, but too complicated, to calculate how much of the Swedish money has been spent on salaries for Swedish officials and other domestic expenditures, and how much has been transferred to the recipient countries as goods, salaries, or hospitality. The only exception to this is the support to ISTC and STCU (see above).

A third and perhaps more rewarding approach to describe funding effectiveness would be to assess achievement per dollar in different undertakings. Although this is also very difficult to do in a fair manner, it must be noted that several operators seem very satisfied with what they have been able to do with the rather limited funds at their disposal. The Swedish approach is to use the money for purposes that other nations consider less important. Particularly with regard to efforts related to the nuclear fuel cycle, operators maintain that the Swedish willingness to perform

project management tasks that other donors tend to avoid has made it possible to make very good use of much larger contributions (from others) than Sweden would have been able to provide.

Another factor that may contribute to a good achievement-per-dollar rate, provided that it exists in the programming, is the previously mentioned flexibility. Sweden cannot address all the existing problems, and so it may allow itself the luxury of choosing to focus on a few that seem rewarding.

## Future Priorities

The government's attitude toward continued threat reduction work is at least partly described by some quotations from the budget proposal for the year 2002. (The translation is the author's own.)[4]

The preamble, describing the general objectives, says under "common security":

> A substantive portion of the support for strengthened security goes to efforts to augment the knowledge of and enhance the application of different disarmament treaties. Support for disarmament and nonproliferation in Russia is given high priority.

A little later, however, under the heading "evaluation of results":

> Funding of efforts for strengthened security is expected to decrease over the next two years while the cooperation is successively phased out. The coupling to EU membership in some of the sectors comprised in the support for the strengthened security, however, is generally weaker than in other areas of cooperation, while at the same time these efforts are judged to be very important to Swedish security. This applies not least to the area of total defense, where there is a need for support over a longer period of time.[5]

This paragraph refers only to the Baltic states, all of them candidates for EU membership, rather than to Russia or other FSU republics. The support in question will probably be only peripherally related to nonproliferation objectives (as noted above, the SKI is phasing out support of this kind to the Baltic states). The overarching conclusion is the one already mentioned above and indeed corroborated by high-ranking officials: Most of the heavy work associated with disarmament and nonproliferation in Russia will be left to the CEC to handle and will also be funded from the EU budget.

This notwithstanding, Sweden will probably pursue a number of small but important bilateral and trilateral projects, and SKI will continue to work along similar lines as in the past. Although some efforts will aim to strengthen the civilian Russian authority vested in GAN vis-à-vis MINATOM, there are also negotiations

4. Quotations from *Regeringens Proposition 2001/2001,* vol. 4 (Stockholm: Elanders Gotab, 2001).

5. "Total defense" is a specifically Swedish term that means the sum of military defense, civil emergency management, and general emergency preparedness in different societal bodies.

to support MINATOM's material protection, control, and accountability efforts in certain installations. One proposal is to centralize the control of nuclear materials in the submarine shipyards through the new Russian Shipbuilding Industry (RAS).

There will be a push for follow-on work in the Kambarka project and also to take an interest in Grosnyj. Attempts to initiate some form of cooperation with Russia in the biological area continue, and one proposal for a joint discussion of future roles for BW and CW and future needs for BW and CW protection has been forwarded by the Swedish defense minister to his Russian counterpart. As yet, however, there are no allocations or even budget requests for these activities.

As Lithuania becomes a member of the EU, the work of SIP is going to shift its focus from Ignalina to Sosnovy Bor in the St. Petersburg region. (It has already been noted that reactor safety and related issues are outside the scope of this report.)

Globally, Sweden will no doubt pursue its traditional policies in the usual international forums—such as the United Nations and specially targeted conferences. This means calling for the observance, implementation, and verification of all multinational disarmament treaties such as the NPT, the CTBT, the CWC, and the BWC. Here again, Sweden's voice can be expected to be in unison with those of other EU countries. It also means a continued call for treaty-bound control of, and decrease in, stockpiles of so-called tactical nuclear weapons.

With regard to ISTC and STCU operations, Sweden, like any EU member, has the right to recommend which projects should be supported by the CEC. However, the CEC expects any country that votes for a project to provide a collaborator for it. Moreover, both the CEC and the various member countries have a strong wish that European commercial life should somehow benefit from projects undertaken in the FSU. For both these reasons and seen against earlier experiences, it is unlikely that Sweden will be very active in this area.

## Comparative Advantages

When considering Sweden's comparative advantages, it is tempting to quote Dr. Samuel Johnson's famous remark about snakes in Iceland: "There are none." But the truth is somewhat more subtle.

There is a widespread belief, particularly among left-wing politicians, that Sweden, as a NATO nonmember, enjoys greater confidence in Russian eyes and therefore has an advantage over NATO members in negotiations with Russia. Although right-wing politicians tend to dismiss this belief, some project leaders think that there is empirical evidence to support the theory. Ultimately, Sweden's position is probably an asset in certain circumstances and totally irrelevant in others. Either way, the aid that Sweden is able to give is so meager compared with that of the larger states that it is debatable whether greater confidence makes much difference at the end of the day.

Although Swedish competence is respectable in some areas—such as reactor safety or biological and chemical agents—it is in no way outstanding compared with that of several other nations. For this reason, it is difficult to see how the competence as such would entail any comparative advantage for Sweden. More useful is

the fact that over the years some Swedish institutions have built good relations with some of their counterparts in the FSU.

Some advantage certainly accrues from geography. Sweden's proximity to Russia makes it more credible to the Russians that the problems we offer to help resolve are really of concern to both parties. Paradoxically, it might also be an advantage that the funds allocated are so small. This fact makes it necessary to discuss and scrutinize every potential project in detail, a process that is believed to create and cement a deeper insight on the part of the recipients of the importance of nonproliferation.

How the possible Swedish advantages would fit into a broader international program is not easy to answer. However, serious efforts are being undertaken in the European parliament and in the CEC to streamline the support given by the European Union to disarmament and nonproliferation and also to coordinate this support with other forms of assistance. Hence, this question should really be raised with the EU.

From a Swedish point of view, there is no articulated policy to decide what should be carried out through bilateral projects and what should be carried out through multilateral projects. Within the rather limited financial constraints, mainly random factors have been operative until now and will probably remain so for some time to come. The fact that contacts have been established previously and experience gained on the ground (on both sides) will obviously influence the choice of projects. At the same time, there is certainly a willingness in principle to participate in what seem to be worthwhile efforts undertaken by combinations of other states or by the EU as a whole.

## Decisionmaking Environment

It may be useful to know that the administration in Sweden, contrary to the case in most other countries, is based on a small number of relatively small government ministries and a large number of relatively big and strong agencies that form the operative part of the executive branch. All of these agencies, which include FOA/FOI, SKI, SIDA, SMI and others, are subordinated to one or another ministry. A more comprehensive description of how the state administration is organized can be found on the Internet.[6]

It should also be noted that the Swedish fiscal year equals the calendar year. The process by which it is decided to do or not do something starts in principle with a political statement where the government lays out the road ahead in fairly broad terms. Based on this and on an ongoing debate in the government, each ministry issues planning instructions to its subordinated agencies early in the year. These instructions are studied in the various agencies to see what kind of changes, if any, in current activities might be derived from them. During the spring, all the agencies then present their plans and associated budget requests to the respective ministries. Having had their own budget limits already set by Parliament, the different minis-

6. See <http://www.sweden.gov.se> and its associated links.

tries more likely than not will strike out some things in the agencies' plans and cut down their budget requests accordingly.

Some time in late spring or early summer, each ministry has finished compiling what is considered a reasonable plan for the activity in its sector during the next fiscal year. All these plans then go to the Ministry of Finance where, during early fall, they are compiled into the aggregated budget proposal for next year. This is presented for consideration by Parliament and its committees no later than September 20 (later in election years). The Parliament then decides how to dispose of the total state expenditure over the 27 principal areas that government responsibility comprises. At the same time are also set total expenditure limits for the next three years.

In November, the detailed plans for appropriations to various activities are submitted to Parliament. At this time, priorities within any of the 27 areas may be slightly adjusted, but the framework is nonnegotiable. The final decisions are made in early December, and the aggregated state budget for the next year is completed just before Christmas. The agencies then receive a formal confirmation about what they are expected to do during the year and at what cost. Shortly after that, the next planning cycle starts. The Web site of the Ministry of Finance provides a more detailed description of the budget process.[7]

Once the budget cycle is complete, the agencies work independently but report back to their ministries. A ministry may request an agency to do something that was not planned because an emergency has occurred or other unexpected developments haven taken place. But otherwise, the ministries do not meddle with the operations undertaken by the agencies. It would be against the political culture and considered unethical to do so. An agency could undertake some redistribution of its funds after approval from the ministry, but only within narrow limits and with relatively small sums.

On the other hand, projects of the kind discussed in this report are mainly funded by allocations that are accessible at any time during the fiscal year and are decided on by the government based on a proposal prepared by an Eastern Europe Group, with representatives from different ministries and agencies. This means that, within this framework, money may be available as soon as a project is ready to start.

Nonetheless, it should be clear from this account that it is quite difficult to bring about any major changes in the allocations for different purposes, especially if they are sudden. Experience shows that even very good ideas initiated by the agencies or by middle-level officials in the government will take at least five years to reach fruition, and then allocations will normally be at the expense of something else in the same area. Only proposals from the top political level, or very well anchored there, will go through without too much delay. Even so, the government is nowadays very sensitive about everything that may entail an increase in taxes, so the keyword is still redistribution. In most cases it is also necessary for the government to conduct a study (very much part of the Swedish political culture) to bolster their proposed changes. Such a study may take from a few months to several years.

7. See <http://www.finance.ministry.se/budgetprocess/>.

The key decisionmakers in the current context are obviously the prime minister and the foreign minister, and to a lesser degree the defense minister, along with their undersecretaries and political advisers.

To influence any of those decisionmakers, an outside proposal would have to reflect strong support from a group of voters deemed important by the ruling party. An example could be a party motion in the Parliament, or a multiparty motion provided that members from the ruling party are among the signatories. It could also emanate from a subgroup within the party, such as the Women's League or a regional organization. Given the current Social Democratic government, an important lobbying group would be the National Organization of Trades Unions.

CHAPTER 13

# United Kingdom

*Paul Cornish*
Centre for Defence Studies, King's College London

## Introduction

The Nunn-Lugar Cooperative Threat Reduction (CTR) Program was launched in the United States in 1991. Initially, CTR was a U.S. program focused on the disposal of nuclear weapons–related material in the former Soviet Union (FSU). Over time, however, the technical scope of the program has been broadened to cover chemical and biological weapons–related materials, and the geographical scope widened to involve other countries in Central and Eastern Europe and the sponsorship of CTR-related initiatives taken up by other interested countries.

This chapter covers recent and current UK involvement (governmental and commercial) in CTR-type initiatives (nuclear, biological, and chemical) in Russia, the Commonwealth of Independent States (CIS), and Central and Eastern Europe.[1] The aim of this largely descriptive work is to catalog the various UK contributions to CTR-type activities and to provide a factual basis for further critical analysis of UK policy.[2]

---

1. This chapter is a contribution to the Strengthening the Global Partnership project, led and coordinated by the Center for Strategic and International Studies in Washington, D.C. Completion of this chapter has been made possible by the financial support of the UK Department of Trade and Industry (DTI). The DTI, the UK Ministry of Defence, and the UK Foreign and Commonwealth Office provided advice and information during the course of the project. Grateful acknowledgment is also due to experts from the commercial sector, together with independent analysts and specialists, who have supported the project throughout. Preparation of the chapter would not have been possible without the skilled research and editorial work of Christian Le Miere. This chapter has no formal standing as an official policy statement on behalf of the UK government or of any commercial or other organization. Any errors of fact or judgment are the responsibility of the author.

2. "Cooperative threat reduction" (CTR) is not an officially established description of UK policy. Nevertheless, the term is used throughout this chapter as a shorthand reference to those CTR-*type* activities in which the UK, like several other countries and international organizations, is involved.

## UK CTR Policy

The catastrophic explosion of the Unit 4 reactor at Chernobyl, Ukraine, in 1986 made a deep impression on nuclear reactor operators around the world, and it resulted directly in the establishment in May 1989 of the World Association of Nuclear Operators (WANO), a global nuclear industrial grouping dedicated to the exchange of information on nuclear safety issues and to the improvement of nuclear safety standards around the world.[3]

Owing to their geographical proximity to Ukraine and to their vulnerability to downwind nuclear pollution, nuclear reactor operators in western and northern Europe were among those most concerned by the Chernobyl 4 disaster. In the UK, the nuclear industry moved quickly to join, and support, the activities of WANO and other similarly oriented organizations and initiatives.

Following the launch of the Nunn-Lugar program in 1991, the UK government moved to provide Russia with secure containers and vehicles for transporting nuclear warheads (see below). During the 1990s the UK funded a series of bilateral assistance projects with FSU countries (and Central and Eastern European, or CEE, countries). As multilateral projects—the International Atomic Energy Agency (IAEA), G-7/8, European Community/European Union (EC/EU), NATO—developed during the 1990s, the UK contributed with financial support and expertise or served as multilateral project manager or leader.

By early 2002, the bulk of UK effort had been in the area of civil nuclear, rather than nuclear weapons, chemical weapons (CW), or biological weapons (BW), although the UK had funded/organized initiatives in all these areas. In evidence to the House of Commons Select Committee on Foreign Affairs (FAC) in June 2000, then foreign secretary Robin Cook outlined UK policy as it had evolved during the 1990s:

> By and large what has happened between the division of responsibility in Europe and the United States is that Europe has focused its funding, which is quite substantial, on nuclear safety within Russia in terms of the civil reactor programme and the costs there are very substantial indeed. We are also of course examining that in relation to the Ukraine in the context of Chernobyl. The tendency has been that the United States as part of that basic sphere of influence take major responsibility for handling the disposal of fissile material from the nuclear weapons, in part of course because the nuclear weapons being dismantled are a consequence of the START programme of which the European Union is not a member. We have formidable challenges of the nuclear environment from Russia, both of the waste, of the nuclear reactor programme, and of the nuclear weapons programme.[4]

Following this approach, the UK's principal concern has been with reactor safety, materials accountancy, and environmental issues. UK assistance has concen-

3. World Association of Nuclear Operators, <http://www.wano.org.uk/>.

4. House of Commons Select Committee on Foreign Affairs (FAC), Examination of Witnesses, June 28, 2000, Question 219, Robin Cook, secretary of state for foreign and commonwealth affairs.

trated on technical upgrades and advice, improvements in reactor operations and emergency procedures, enhancement of regulatory regimes, and pressure for the closure of the most dangerous reactors. The UK government elected early on to concentrate on specific bulk handling facilities such as Mayak in Russia and the ULBA Metallurgical plant in Kazakhstan, with a view to making the best of limited UK involvement and building on particular UK safeguards expertise.[5] A leitmotif of the UK government's approach has been the emphasis on establishing operator-to-operator contact between UK industry (e.g., British Nuclear Fuels Limited, or BNFL) and agencies (e.g., the United Kingdom Atomic Energy Authority, or UKAEA), and their FSU counterparts, in order to facilitate the transfer of knowledge and expertise.

The UK did, however, play an indirect though important role in nuclear warhead security through the provision of secure containers and armored transports (see below). In addition, the UK announced an initiative in 2001 contributing to the decommissioning and destruction of obsolete Russian nuclear submarines.

As far as CW disposal is concerned, the UK's involvement was minimal until the launch of a set of CW projects in July 2000. As of August 2002, various biological nonproliferation projects are envisaged but have yet to begin (see below).

## UK CTR Organization

Through much of the 1990s, the UK government did not pursue a single coordinated policy. Instead, separate government departments developed, funded, and implemented their own policies. Principal departments involved were the Ministry of Defence (MOD), the Foreign and Commonwealth Office (FCO), and the Department of Trade and Industry (DTI). More recently, the Department for International Development (DFID) and Department of the Environment, Transport, and the Regions (DETR, until June 2001) have also contributed to the policy debate.[6]

Steps to coordinate the various approaches, polices, and projects within the UK government were taken in late 2000. On October 1, 2000, the UKAEA Directorate of Civil Nuclear Security was transferred to the DTI as the Office for Civil Nuclear Security (OCNS). The purpose of the move was to establish the regulatory office independently from the UK civil nuclear industry. OCNS has "operational and regulatory autonomy within DTI to fulfill its primary responsibility for the regulation of security in the civil nuclear industry." OCNS also "manages the UK's program of

5. G. Andrew, A. Barlow, M. Bearman, B. Burrows, and M. Ward, "UK Co-operation with the Russian Federation and Kazakhstan in Nuclear Material Accountancy and Control" (working document for the 17th annual meeting of the European Safeguards Research and Development Association, May 1995).

6. A reorganization of UK government departments followed the June 7, 2001, general election. The functions of the Department of the Environment, Transport, and the Regions were allocated to two new departments: the Department for Transport, Local Government, and the Regions (DTLR) and the Department for Environment, Food, and Rural Affairs (DEFRA).

technical assistance to countries in Eastern Europe and the former Soviet Union to improve security at their civil nuclear sites."[7]

Given the UK's emphasis on civil nuclear matters, placing OCNS under DTI command has made DTI the UK government's lead department for CTR-type activities. Through OCNS and the Nuclear Industries Directorate (NID), DTI now coordinates UK nuclear policies and activities and manages UK contributions both to multilateral assistance programs and bilateral projects in the nuclear field.

In CW, where the emphasis is on the disposal of weaponry and production facilities—rather than improved management of the civil chemical industry and controlling access to dual-use material and technology—the UK government's lead department is MOD. The MOD is also lead department in the biological area.

## UK CTR Budget

As part of an effort better to coordinate the efforts of various UK government departments, and in conjunction with a review of UK government spending plans for the period April 1, 2001, to March 31, 2004 (Spending Review 2000), a Cross-Departmental Review of Nuclear Safety and Security was conducted between December 1999 and July 2000. The so-called Cross-Cutting Review resulted in a new interdepartmental pooled budget of £83.8 million for 2001–2004 to address nuclear problems in FSU countries and to deal with nuclear safety issues in a "more joined up and effective way." The joint fund—the FSU Nuclear Legacy Programme budget—is managed by DTI and incorporates all previous UK funding for improving nuclear safety in the FSU. All current and projected UK nuclear CTR-type expenditure will come from the joint budget managed by DTI, as will expenditure on any new projects.[8]

The joint, DTI-managed budget amounts to £83.8 million, allocated as follows:

| | |
|---|---|
| 2001–2002 | £23.9 million |
| 2002–2003 | £27.4 million |
| 2003–2004 | £32.5 million |

The review took into account a further £8 million for 2000–2001 already allocated to existing programs managed by DTI, MOD, FCO, DFID, and DETR. All such projects were to be "subsumed within the new pooled fund from 2001–2002."[9]

At the June 26–28, 2002, G-8 summit in Kananaskis, the UK prime minister committed up to $750 million over 10 years to support the G-8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction. The UK's

---

7. See chapter 9 ("Energy"), in UK Department of Trade and Industry (DTI), *The Government's Expenditure Plans 2001–02 to 2003–04 and Main Estimates 2001–02* (London: Her Majesty's Stationery Office, 2001), <www.dti.gov.uk/expenditureplan/expenditure2001/objective_c/chapter9>.

8. Ibid.

9. HM Treasury, *Spending Review 2000: New Public Spending Plans 2001–2004* (Cm 4807, July 2000), p. 143, < http://www.hm-treasury.gov.uk/Spending_Review/Spending_Review_2000/spend_sr00_index.cfm>.

Kananaskis commitment covers all CTR-type activities (nuclear, biological, and chemical), including the £83.8 million referred to above, with a separate £12 million allocated to the MOD for chemical and biological safety projects (see below). The FSU Nuclear Legacy Programme therefore forms a major part of this public commitment, with the budget expected to be at around current levels over the next 10 years.

Overall strategy and policy development of the program is set on the advice of an interdepartmental advisory committee with particularly strong input from MOD and FCO—the two other UK government departments with most interest in projects initiated under the program. The many problems associated with the nuclear legacy of the FSU, which the program aims to address in partnership with other donors and FSU countries, can be summarized under three key categories:

- **Operational safety** of nuclear power stations and facilities inherited from the Soviet era. The key aim here is to encourage former Soviet states to adopt Western standards of safety and regulation for their operating nuclear plants and to assist in the provision of systems, training, and expertise;
- **Security** encompassing the threats posed by the proliferation of both materials (for example, surplus weapons-grade plutonium falling into the hands of terrorists) and knowledge, where there is an urgent need to prevent the spread of nuclear weapons expertise to countries of proliferation concern. A key aim here, for example, is to develop a portfolio of projects in the closed nuclear cities, which will help to create an environment capable of refocusing a significant proportion of the substantial scientific and technical know-how remaining in the nuclear cities, from weapons development to sustainable nonweapons industries;
- **Mitigation of nuclear legacy** including tackling the threat posed by more than 100 out-of-service nuclear submarines and helping with the social and economic impact of the closure of nuclear facilities. The key aim here is to support projects that help make sites and plant safe (as with spent nuclear fuel from submarines); that help to improve quality of life and generate new jobs (as with UK projects in Ukraine); and that will eventually result in FSU countries being in a position to confront nuclear challenges without UK assistance.

The FSU Nuclear Legacy Programme remains committed both to providing support for bilateral projects and to contributing to multilateral initiatives involving a number of other donor countries.

# Quantitative Assessment of UK Nuclear Projects

## Multilateral

### European Union PHARE and TACIS

The UK has contributed to European Community/European Union CTR-type projects, particularly through the PHARE and TACIS Nuclear Safety Programs

(NSP), which deal with the safety of nuclear reactors in Central Europe and the New Independent States.[10] The December 1994 Essen European Council approved a report on illicit traffic in radioactive substances and nuclear materials, commenting that "projects in the field of nuclear materials accountancy and control should be given an adequate priority in the implementation of the TACIS and PHARE programs." The UK saw and sees this as an opportunity to use funds to develop safeguards collaboration at Mayak and ULBA.[11]

PHARE and TACIS NSP funding pledges for the period 1991–1998 came to a total of €838 million (€181 million under the PHARE and €657 million under TACIS).[12] By December 1999, approximately €500 million of that total had been committed, with the UK contributing some 13 percent (€65 million).[13]

### CEE/FSU: EBRD Nuclear Safety Account

At the 1992 G-7 summit in Munich, FSU and CEE countries were offered a framework of multilateral assistance to eliminate dangers associated with nuclear reactors. In consequence, the EBRD established the Nuclear Safety Account (NSA) on April 14, 1993, for three years, with the terms extended in 1996. The NSA has concentrated on pre-decommissioning work at Chernobyl, and short-term plant safety upgrades at some early FSU reactors still in operation. By late 1999, the NSA had become "by far the largest multilateral program,"[14] with pledges amounting to €260 million from the European Community/Union and 14 other countries.[15] UK contributions to NSA from March 1993 to August 1998 amounted to £18.25 million.[16]

### CEE/FSU: Reactor Decommissioning

The goal of this project is to aid the closure of Chernobyl and other reactors in EU accession candidates. Chernobyl will stay closed. Ignalina Unit 1 (Lithuania) will be closed by 2005, and Unit 2 by 2009.[17] Kozloduy Units 1-2 (Bulgaria) will be closed by 2003, and Units 3-4 by 2008 (TBC).[18] Bohunice Units 1-2 (Slovakia) will be closed by 2008.[19] A Project Management Unit (PMU) to manage the program of decommissioning preparation and work has been established in Lithuania. A simi-

---

10. For an overview of PHARE/TACIS NSP, see <http://europa.eu.int/comm/external_relations/nuclear_safety/intro/index.htm>.
11. Andrew et al., "UK Co-operation with the Russian Federation and Kazakhstan."
12. See <http://europa.eu.int/comm/external_relations/nuclear_safety/intro/context.htm>.
13. FCO Supplementary Memorandum, December 8, 1999.
14. FAC Minutes of Evidence, December 8, 1999, supplementary evidence submitted by FCO.
15. See <http://www.ebrd.org/english/new/index.htm>.
16. DTI, "Nuclear Safety in the Countries of Central and Eastern Europe and the Former Soviet Union," <www.dti.gov.uk/nid/safetyfsu.htm>.
17. In early 2002, Lithuania confirmed its commitment to close Ignalina 2 by 2009, as foreseen during Lithuania's EU accession negotiations.
18. Bulgaria has confirmed its commitment to close Kozloduy 1 and 2. Confirmation of the closure dates for Units 3 and 4 is awaited.
19. The Slovak Republic wrote its closure commitments into its energy policy, which was adopted in January 2000.

lar unit for Kozloduy is currently subject to a tendering exercise. Slovenske Elektrarne, the Slovakian nuclear utility, has established a PMU for Bohunice, but has requested the services of a consultant to assist the PMU in the management and implementation of the Bohunice fund. Terms of reference for this contract are currently being developed. Grant agreements for the first packages of work in Lithuania and Bulgaria have been approved.

The UK pledged €1.5m to EBRD-managed decommissioning funds in 2001–2002. All sums were dispersed in that year. Under the EBRD-managed Nuclear Safety Account, support is also being extended for decommissioning facilities at Chernobyl, and further requests for UK assistance may be required. The main risk to the project is perceived by the UK government to be that of beneficiaries extending the scope of the project and/or requesting increasing financial support for decommissioning, beyond the scope of the current EBRD-managed funds.

### CEE/FSU: Social Consequences Project (2002 Start)

The Social Consequences Project supports wider objectives of nuclear plant decommissioning through helping local communities address the social and economic consequences of closure. Overall goals of the project are to aid the economic diversification/regeneration of those FSU regions/locales most adversely affected by nuclear plant closure, to contribute to developing wealth creation and jobs in affected communities, and to ensure high levels of operational safety during preclosure operation of plants scheduled for early closure, where such closure has been requested by the international community. Work in Lithuania and Ukraine will continue. Scoping projects will be undertaken to develop country-specific plans for these countries and for Bulgaria and Slovakia. PE International has been established as project manager for the Social Consequences Project. A further contract was awarded in early 2002 to undertake the work to develop a social consequences plan for Slavutych/Chernobyl. This will look at both support to the ICC and the potential for projects within the town of Slavutych. Specific projects include the following:

- Promoting the activities and capabilities (including communications) of the International Chernobyl Centre (ICC) and aiming for self-sustainability of the ICC at the earliest opportunity;
- Investigating further projects in Slavutych, including the possibility of assisting with the communications infrastructure there;
- Helping to establish in 2003 a "new business incubator" in the Visaginas area near the Ignalina nuclear power plant (NPP) in Lithuania;
- Developing human resources plans for Ignalina NPP during the period running up to closure of Unit 1 in 2005; and
- Identifying further activities that might be undertaken in Lithuania, Bulgaria, and Slovakia in 2002–2003.

## Russia: Plutonium Disposition

Originally a bilateral U.S.-Russia project announced on June 4, 2000, the scheme builds on an initiative launched in the mid-1990s. The aim of the project is to reduce the threat posed by the proliferation of fissile nuclear material by converting at least 34 tonnes of weapons-grade plutonium (Pu) extracted from dismantled surplus nuclear weapons, into a nonweapons-usable form.

After some uncertainty, the United States has completed a review of its nonproliferation programs and reaffirmed its commitment to the Pu disposition program. The United States is anxious, however, that the project should be made more efficient and that the burden of the project should be spread multilaterally. With this in mind, the G-8 Plutonium Disposition Planning Group (PDPG) has made efforts to broaden the base of contributions to enable the Russians to participate. The PDPG met on April 16 and June 7, 2002, and agreed to establish a negotiating group (the Multilateral Plutonium Disposition Group), with the aim of concluding negotiations by July 2003, to enable a multilateral agreement on the Russian disposition program to come into effect as soon as possible thereafter. In parallel, the U.S. and Russian costings groups have expanded their work to include an evaluation of the cost and effectiveness of hitherto unexplored disposition scenarios. In June 2002, an alternative approach to Russian Pu disposition—the Franco-German-Russian trilateral initiative—collapsed as a result of German objections in principle to MOX burning.

With a budget of $200 million, the early initiative funded research and project planning activities and drew up project estimates of $2 billion. At the Okinawa G-8 summit, the UK pledged £70 million over 10 years (all of which will be drawn from the FSU Nuclear Legacy Programme budget, part of the UK's $750 million Kananaskis pledge in 2002).

By summer 2002, UK spending on Pu disposition projects had been limited to project/bureaucratic set-up costs (negligible), while the government examined the various initiatives and proposals before deciding which to support. With moves to multilateralize the 2000 PDP within the G-7/G-8 moving slowly, and with the failure of the Franco-German-Russian trilateral, by summer 2002 it appeared that a decision would be made in favor of supporting the core U.S.-Russia bilateral approach. Insufficient international funding might put further pressure on the UK government to increase its pledged contribution beyond £70 million.

## Russia: Nuclear Materials Accountancy and Control, 1992 to Present

This is a multilateral project to improve safeguards and nuclear materials accountancy and control (NMAC) in Russia (and Kazakhstan), which works both nationally and at facility level. The project also takes in appropriate physical protection measures. Improved NMAC should help to obtain political, public, and international acceptance of nuclear power, lay the foundation for safeguards systems, and deter and defeat theft or misuse of nuclear material. Project objectives include explaining and "selling" NMAC throughout the nuclear system and laying the groundwork for an IAEA State System of Accountancy and Control (SSAC).

With Russia, initial UK involvement stems from 1992 contact between the Russian nuclear regulatory organization, Gosatomnadzor, and the Swedish Nuclear Power Inspectorate (SKi). Thereafter, DTI agreed to fund the first UK safeguards conference with Russia in December 1992. BNFL, UKAEA, and Euratom safeguards inspectorates were all involved. Russian participants included representatives from Gosatomnadzor, MINATOM, and specialists from MINATOM facilities at Tomsk, Krasnoyarsk, Chelyabinsk, and Dmitrovgrad. The second seminar, held in April 1993, involved Gosatomnadzor and MINATOM including specialists from the Mayak RT-1 reprocessing plant and the Institute of Physics and Power Engineering. The third seminar in October 1993 looked more closely at safeguards for reprocessing plants.

In January 1993 DTI funded shipment of computers, software, and other equipment to Gosatomnadzor, particularly for establishing safeguards information systems for large nuclear facilities (such as those at Mayak) in the Urals.

March 1993 saw the beginning of DTI/BNFL/UKAEA safeguards liaison with the Mayak RT-1 reprocessing plant. This subsequently led to a commitment to a joint BNFL/Mayak study on NMAC arrangements at RT-1, as well as work to improve NMAC at the Angarsk uranium centrifuge enrichment facility.

By 2002, the Russia NMAC project had been rolled into the FSU Programme. Work at Mayak and Angarsk continues, managed by UKAEA on behalf of DTI (as part of the UK Safeguards Programme) and involves exchanges between British and Russian NMAC specialists. Note that "intellectual" (as opposed to "hardware") input by Russian facilities has not been funded by DTI, resulting in a risk of delays in project delivery.

### Russia: Physical Protection of Proliferation-Sensitive Nuclear Materials

The object of this project is to ensure that proliferation-sensitive nuclear materials in the FSU are adequately protected from theft and/or sabotage. The UK contribution is to assist with the protection of such materials in the FSU to international standards. The UK collaborated with Sweden to provide a physical protection system for a nuclear-propelled cargo ship, the *Sevmorput*, in northwest Russia.[20] The UK contribution was £500,000.

This project was successfully completed by the target date of September 2001. Further projects are under discussion with MINATOM but may take some time to finalize, as MINATOM's suggestions were not considered suitable. Potential future proposals may include buildings on a civil/military site(s) and a proposal from the Russian Navy. The UK will also be exploring, as part of the work on northwest Russia, whether any of those projects merit including physical protection elements (e.g., Andreeva Bay). Multilateral collaboration with the IAEA is also planned.

The major risk with this project is that the equipment supplied and fitted would either not be properly operated or maintained during its designed life. Projects are evaluated 6 and 12 months after completion, and equipment is warranted for two

20. For basic information on the *Sevmorput*, see <http://www.nordnett.no/NN2_arkiv_eng.htm>.

years by the supplier to minimize this risk. DTI plans longer-term assessment of the project as part of an overall FSU Legacy Programme evaluation in 2004.

## Northwest Russia: Decommissioning Nuclear Submarines and SNF Disposal

At the Blair/Putin press conference in December 2001, the leaders announced the signing of an agreement to provide up to £12 million to help destroy Russia's stock of CW. Prime Minister Blair added, "I also said we hope this year [2002] to be in a position to complete agreement on assistance for the cleanup of nuclear submarines."[21] Some 100 nuclear submarines in northwest Russia are said to be in need of nuclear decommissioning. Defueling and decommissioning these submarines is essential in order to diminish the risks of a nuclear accident or leakage of large amounts of radioactivity into the environment.

The UK government's goal is to increase the annual rate of decommissioning of submarines. Before projects can begin in earnest, the UK is seeking to use G-8 processes to bottom out the remaining liability issues and ensure Russian understanding of the UK grant-aided funding system. Thereafter, UK short-term project goals are as follows:

- Construction of a spent nuclear fuel (SNF) interim storage facility at Polyarni;
- In collaboration with Norway, funding the construction of a SNF cask transport ship (currently awaiting a Norway/UK memorandum of understanding);
- Analysis of SNF feasibility at Andreeva Bay, including a site characterization program;
- Funding for complete dismantling and cutting up of an early generation Russian nuclear submarine, and associated works—probably a Victor class boat, most of which have been laid up for decommissioning, but none of which had been dismantled by July 2002;[22]
- Preparation for complementary project work under the Arctic Military Environmental Cooperation Programme (AMEC), in conjunction with Norway, the United States, and Russia.

Efforts are continuing to ensure that these projects/areas of work are ready to start as soon as negotiations for a UK/Russia Supplementary Agreement are concluded. In early 2002, the UK government was confident that agreement would be reached soon, but by October 2002 the agreement had yet to be signed. The principal risk to northwest Russia projects is the further delay or absence of the supplementary agreement. Other risks relate to the general problems Russia has with legal framework agreements as a whole. Financial risks, as with all FSU Legacy

21. "Russia," *Hansard* (UK House of Commons Daily Debates), January 21, 2002.

22. See chapter 9 ("International Nuclear Safety and Global Clean Up") in DTI, *Managing the Nuclear Legacy: A Strategy for Action* (London: Her Majesty's Stationery Office, 2002), <http://www.dti.gov.uk/energy/nuclear/announce_pubs/conspubs/nuclear_legacy/index.shtml>. See also, UK Ministry of Defence Press Release, 073/02, March 14, 2002.

Programme projects, will be minimized by close project management (in this case by RWE NUKEM) to ensure value for money, a modular approach to project design, and payment only on achievement of milestones. There may also be construction delays for some projects.

### Russia: International Science and Technology Center

The International Science and Technology Center (ISTC)—a multilaterally supported, Moscow-based, so-called brain-drain initiative—is an intergovernmental organization dedicated to the nonproliferation of weapons and technologies of mass destruction. It achieves its objectives by funding peaceful scientific and technical research by former weapons scientists in Russia and the Commonwealth of Independent States (CIS) countries.[23] ISTC activities should be considered in conjunction with Nuclear Cities and Closed Cities initiatives outlined below.

UK contributions to the ISTC are made via the EU. Under the UK government's £83.8 million FSU Nuclear Legacy Programme budget, £3 million has been allocated to ISTC activities for 2001 through 2004, and a collaborative program of activities is being developed with the assistance of recently appointed project managers (PE International).

### Russia: Closed Nuclear Cities Initiative (Proposed)

The Closed Nuclear Cities Initiative (CNCI), another so-called brain-drain initiative, aims to prevent the transfer of nuclear weapons expertise from Russia's established nuclear research and development programs to "rogue states" or "states of concern." Short-term goals include the provision of nonweapons employment to a specified number of Russian nuclear weapons scientists and technicians. In the medium term, the project will seek re-deployment/retraining of a specified number of Russian weapons scientists to nonweapons projects/employment with a commercial focus.

The UK has appointed PE International as project managers. As a result, efforts to identify specific areas and projects for UK support have intensified. The project manager is both working up a long-term commercialization strategy and, in collaboration with ISTC Moscow, seeking to identify specific projects that might reliably achieve the project's short-term goal described above. The principal risk in the CNCI is possible failure to foster sufficient commercial engagement in the cities, because of operating difficulties. The UK government also requires assurances that recipients of UK-sponsored contracts will be UK companies.

### Russia: European Nuclear Cities Initiative (Proposed)

The European Nuclear Cities Initiative (ENCI) would amount to an intergovernmental discussion forum, aimed at the scientists and technicians of the Russian nuclear cities.[24] By summer 2002, the UK government was close to becoming a member of the forum. The initiative has negligible budgetary implications.

---

23. See <http://www.ntsc.kz/projects/istc.htm>.
24. See <http://lxmi.mi.infn.it/~landnet/ENCI/Scheda.htm>.

### Ukraine: Chernobyl Shelter Project (Current)

The aim of this EBRD-managed project is to repair and replace the sarcophagus over the Unit 4 reactor that exploded in 1986, thus preventing further radioactive contamination of the environment.[25] The present position is that all the major design phases of the project are now complete—including, critically, the design of the new shelter—and tendering for the construction work has begun. Tenders for major construction elements of projects were released late 2001, with lead contractors being selected mid-2002. Construction work is expected to begin by mid/end-2003, with the project scheduled to be completed in 2008.

The initial cost estimate for the project for the period 1998 to 2005 amounted to approximately $758 million.[26] The UK's initial pledge (1998) was £10.2 million.[27] A second pledging conference in Berlin in July 2000 saw pledges totalling $720 million.[28]

Within the FSU Programme, the 2001–2004 budget for the Chernobyl Shelter Fund project stood at £16.59 million total for the three years, to be delivered in two tranches. The first pledge has now been paid in full. The second pledge is for £12.13 million, paid in three further annual tranches. The first tranche of £4.04 million has been paid. It is anticipated that there will be a £0.65 million surplus in the allocation for this program area.

The UK government perceives the following risks attached to the project. First, this will be a massive construction project requiring tight project management by EBRD contractors if cost and time overruns are to be minimized. Second, should the Ukrainian government seek to renegotiate the agreed design and/or reopen discussion of other issues, there is a risk of either delaying the start date or of increasing the scope of the project beyond current specification. Other issues include the Ukrainian regulatory/licensing processes and the management of radioactive waste from the site.

### Ukraine: International Chernobyl Center

The Chernobyl Center for Nuclear Safety, Radioactive Waste, and Radioecology (otherwise known as the ICC) was opened on April 26, 1996, as a scientific research base for Ukraine. The ICC is also intended in part to provide employment opportunities for scientists, specialists, and technicians.[29] DTI has funded "several projects supporting the ICC."[30]

---

25. Chernobyl Unit 4 exploded in 1986, sending radioactive pollution over vast areas of Europe. Unit 2 was closed in 1991. Under a 1995 Memorandum of Understanding signed between the G-7, the EU, and Ukraine, Unit 1 was closed in 1996 and Unit 3 on December 15, 2000.

26. See <http://europa.eu.int/comm/external_relations/nuclear_safety/cherno_shelter_1st_report/index.htm>.

27. DTI Press Release, P/98/634, August 6, 1998.

28. DTI, "Nuclear Safety in the Countries of Central and Eastern Europe and the Former Soviet Union."

29. See <http://www.chornobyl.org/>.

30. DTI Press Release, P/2000/846, December 14, 2000.

### Kazakhstan: Nuclear Materials Accountancy and Control, 1992 to Present

Relations with Kazakhstan also developed in late 1992, through cooperation with SKi. A seminar in April 1993 was attended by representatives from the Kazakh Atomic Energy Authority (KAEA) and Russia's Gosatomnadzor, MINATOM, and IPPE. The seminar concentrated on general safeguards issues and more specifically safeguards at uranium reprocessing plants and fast reactors. A second seminar took place in November 1993. Cooperation has focused on safeguards issues of a particular plant—the large ULBA Metallurgical at Ust-Kamenogorsk—with the object being for more direct operator-to-operator contact on safeguards issues. DTI also funded a supply of computers, software, and other equipment to KAEA.[31]

### Kazakhstan: Decommissioning of Aktau Fast Reactor (Proposed)

This is an IAEA-sponsored project seeking the safe and irreversible shutdown and decommissioning of the Aktau reactor, thereby reducing the threat of proliferation of fissile nuclear material and the risk of humanitarian and environmental damage. The United States is helping with the removal of fuel. The EU may offer help with more general decommissioning, although its present position is uncertain. Discussions continue within the IAEA, which sponsored a conference on Aktau decommissioning in March 2002, with UK officials participating. The Top Level Decommissioning Plan (TLDP) is in an advanced state of preparation (by Kazakhstan, with U.S. and EU assistance); a first draft has been seen by the IAEA, which expressed itself satisfied with the efforts now being made. The formal submission of the plan is not likely, however, before autumn 2002.

The DTI has confirmed with the IAEA that UK funding of $20,000 [**£20,000???**] will be available to finance the peer review of the TLDP. Work has also started on the identification of specific areas where the UK could fund assistance. The UK is, importantly, one of the few countries with a comparable fast reactor undergoing decommissioning (at Dounreay), and there has already been some transfer of expertise from the UK to Kazakhstan on this issue. It is intended that detailed discussions should commence as soon as possible in order to ensure the completion of the TLDP at the earliest opportunity. However, no firm commitments can be made on the provision of UK-funded design, technical, or engineering assistance at the reactor site until the TLDP has been peer reviewed. A further IAEA-sponsored conference will be convened as soon as this has been done. The major risk with this proposed project is that the international effort will proceed in an unplanned and undercoordinated manner, or might not be sustained at all.

31. Andrew et al., "UK Co-operation with the Russian Federation and Kazakhstan."

## Bilateral

### Russia: Supply of Secure Nuclear Weapons Containers and Transport, 1992–1994

A memorandum of understanding (MOU) was signed on November 10, 1992, between Russia and the UK for supply by the UK of 250 armored nuclear weapon supercontainers and 20 heavily armored nuclear weapon transport vehicles. These were given to Russia to assist safe and secure transport of nuclear warheads (made surplus under the START agreements) from sites in Belarus, Kazakhstan, and Ukraine to Russia. The estimated cost to the UK was £35 million (current 1994). The first batch of 48 supercontainers was delivered to Russia on May 8, 1994, with deliveries to be complete by end 1994. NATO was involved with coordination through its ad hoc group on nuclear weapons in the FSU.[32]

### Georgia: Reprocessing Fissile Material, 1998

In April 1998, the UK accepted a quantity of highly enriched uranium (HEU) and a further quantity of spent fuel (low-enriched uranium, or LEU) from a reactor outside Tbilisi, Georgia. The material was flown (by U.S. military aircraft) to RAF Kinloss on April 24, 1998, and then delivered to the UKAEA facility at Dounreay in Scotland for reprocessing. After initial uncertainty over the precise composition and value (for compensation) of the consignment (indicated by the ratio of HEU to LEU),[33] examination at Dounreay revealed the consignment to consist of

4.125 kg of unirradiated HEU (90 percent enriched)
0.6191 kg irradiated HEU
5.840 kg unirradiated LEU (10 percent enriched)
3.7449 kg irradiated LEU.[34]

The United States agreed to pay compensation to Georgia for the loss of fissile material and for the transport costs to Scotland—approximately $2 million. The UK's participation incurred negligible costs. The fissile material was "bought" by the UK for a token sum of $1. The costs of processing, reprocessing, and storing the material were partly defrayed by the production of reactor fuel and medical isotope targets. The net expense to the UK overall was approximately £60,000. "In purely financial terms, the receipt of the material has been of no significant effect."[35]

Up to this point, the UK had not been much involved in the G-8 program (agreed to in Moscow in 1996) to deal with fissile material from Russian nuclear

32. "Nuclear Weapons (Former Soviet Union)," *Hansard*, May 10, 1994. Program later recorded as having been completed: "Nuclear Weapons Transport," *Hansard*, April 23, 1996.

33. House of Commons Trade and Industry Select Committee (TISC) 9th Report, July 21, 1998, Part II: Georgian Nuclear Material, para. 8.

34. LEU is defined as being enriched to less than 20 percent in $U^{235}$. LEU is used in power reactors and is not relevant for nuclear weapons design (other than radiological "dirty bombs"). HEU is defined as being enriched to greater than 20 percent $U^{235}$. Weapons-grade uranium (WGU) is HEU enriched to greater than 90 percent $U^{235}$. See SIPRI, *Yearbook 1995*, p. 335.

35. TISC 9th Report, para. 30.

weapons. But in policy terms, the episode presented novel challenges and might have established a precedent. With the Windscale/THORP controversy in mind, UK government departments were anxious, perhaps, to avoid environmental protests and the charge that the UK was allowing itself to become a toxic material "dustbin" and therefore stressed that the Dounreay episode was a one-off.[366] But in a critical review of the episode, the House of Commons Trade and Industry Select Committee nevertheless saw that there could in future be a case for doing something similar, if proliferation security demanded it.[37]

### FSU: DTI Programme for Nuclear Safety Assistance, 1998–1999

In August 1998, DTI energy minister John Battle announced the provision of £2.7 million to help improve nuclear safety in the FSU:

> This will benefit those countries continuing to operate Soviet-designed reactors by concentrating the skills and experience of British companies on nuclear safety concerns, and help improve nuclear safeguards, material control and accounting, at key nuclear fuel-cycle facilities in Russia.[38]

Contracts agreed under the DTI Programme included

- WS Atkins plc contract to raise awareness of the Y2K (Millennium Bug) issue among nuclear power operators and nuclear regulatory authorities in the region;
- BNFL-Magnox Generation in cooperation with Rosenergoatom (Russian nuclear utility) to work on safety procedures, quality assurance, and operator-to-operator safety training;
- British Energy to work similarly with Ukrainian nuclear utility Energoatom;
- AEA Technology and NNC Ltd to work with Lithuania to assist the plant director and the nuclear regulatory authority running the two Chernobyl-type reactors at Ignalina on a £500,000 project (which contract followed a safety assessment funded by the EBRD Nuclear Safety Account, addressing fire protection, instrumentation, and control systems);
- £500,000 support for DTI-initiated projects to improve nuclear material control and accounting (see, for example, BNFL involvement in trilateral UK/U.S./Russian project at Russia's Mayak RT-1 reprocessing plant).

### Ukraine: Sale of Decommissioning Software

Ukraine purchased a license to use UKAEA Strategic Planning System (SPS) software in decommissioning plans of its power reactors (including those at Chernobyl).[39]

---

36. "End of a Nuclear Nightmare," *The Sunday Times* (London), April 26, 1998.
37. TISC 9th Report, para. 10.
38. DTI Press Release, P/98/634, August 6, 1998.
39. UKAEA, "Exporting our Expertise," *Annual Review 1999/2000*.

## FSU/CEE: Nuclear Safety Programme[40]

The Nuclear Safety Programme (NSP) is a small-scale, DTI-managed bilateral program of assistance to facilitate nuclear safety technology and skill transfers between UK civil nuclear industry and FSU and CEE countries and to assist in moves toward early closure of reactors.[41] The NSP seeks to deliver safety improvements through small-scale projects involving the transfer of technology, best practice, training of nuclear regulators and plant operators and management, and some very small-scale equipment supplies. There are specific objectives for the various projects supported under the program.

NSP 2001–2002 funds 31 projects in total, including projects in Armenia, Lithuania, Russia, and Ukraine (detailed below), as well as Bulgaria, Romania, and Slovenia. Projects under NSP 2001–2002 fell largely under five categories: (1) training and technical support; (2) analysis; (3) information exchange; (4) installation, service, and development of equipment and establishment of institutions; (5) liaisons and meetings.

### 1. Training and Technical Support

- **NSP Armenia 2001–2002.** BNFL Magnox Electric project to introduce a program of safety audits at Metsamor NPP, deliver training in safety issues and safety auditing, conduct training exchange visits for Metsamor NPP staff to UK, and arrange for BNFL staff to participate in safety activities at Metsamor.
- **NSP Lithuania 2001–2002.** Public Service Language Centre contracted since 1995 to provide English language training for Ignalina NPP staff.
  NNC contracted to continue providing support to VATESI and Lithuanian Technical Support Officers (TSOs), concentrating on safety analysis review of Ignalina Unit 2.
  Serco Assurance contracted to provide technical support to VATESI in monitoring progress of Ignalina NPP and training for VATESI's TSOs.
  Serco Assurance contracted to provide software and documentation support during the Ignalina 2 licensing process.
- **NSP Russia 2001–2002.** Serco Assurance project to provide technical support to GAN on methods for calculating probability of an accident on a facility such as a nuclear power plant.
- **NSP Ukraine 2001–2002.** BNFL Instruments recalibration and updating of its radiological monitoring equipment, and training of staff at Chernobyl NPP.
  RWE Nukem Ltd. contracted to train staff at Chernobyl NPP and elsewhere in decommissioning safety cases.

---

40. Department of Trade and Industry, "Nuclear Safety Programme 2001/2002 Projects," <www.dti.gov.uk/energy/nuclear/safety/nsp/index.shtml>.

41. DTI, "Nuclear Safety in the Countries of Central and Eastern Europe and the Former Soviet Union."

## 2. Documentation and Analysis

- **NSP Armenia 2001–2002.** WS Atkins contracted to investigate communications and monitoring equipment at Metsamor NPP and recommend any improvements to DTI. WS Atkins is also training the plant's crisis center team and investigating whether the crisis center requires any additional equipment.
- **NSP Russia 2001–2002.** Serco Assurance is currently in the last phase of a three-year project (in collaboration with the United States, Sweden, Finland) to produce an in-depth safety analysis for Unit 2 of Leningrad NPP.
- **NSP Ukraine 2001–2002.** British Energy is continuing with the latest phase of a six-year project with Ukrainian nuclear utility Energoatom to complete documentation required for their quality management system.

## 3. Information Exchange

- **NSP Lithuania 2001–2002.** BNFL Magnox Electric contracted to assist in preparation for decommissioning Ignalina Units 1 and 2. The object is to produce a project management handbook for pre-decommissioning projects. The contract builds on a study tour to Lithuania in January 2002 and an NSP 2000 project to assist transfer of UK decommissioning experience to Ignalina by presentations, discussions, and observer visits to UK NPPs.
  BNFL Magnox Electric contracted to organize a December 2001 workshop on the exchange of operational experience of graphite management issues. Participants came from the UK, Russia, Ukraine, and Lithuania.
- **NSP Russia 2001–2002.** BNFL Magnox Electric contracted to organize a workshop on sharing of operational experience in graphite management issues.
  BNFL Magnox Electric continues several years of work with Rosenergoatom (responsible for all Russian NPP except Leningrad). The aim is to improve nuclear safety through transfer of decommissioning skills, experience, and technology. It should result in the production of a project management handbook for Russian decommissioning projects.
  Serco Assurance contracted to exchange information on corrosion crack inspection qualification and certification.
  Mitsui Babcock Energy Ltd. project to improve quality and effectiveness of weld repairs in reactor piping.
- **NSP Ukraine 2001–2002.** BNFL Magnox Electric contracted to organize a workshop on sharing of operational experience in graphite management issues.
  British Energy contracted to assist Energoatom to improve nuclear safety and safety culture.

## 4. Equipment and Institutions

- **NSP Armenia 2001–2002.** BNFL Magnox Electric contracted to improve quality assurance (QA) at Metsamor NPP. BNFL is looking to develop a QA system compliant with best international practice.
  WS Atkins to continue two years of work with ANRA, helping to establish an

emergency response center in Armenia. The project covers purchase of equipment and training in use of mapping software.

- **NSP Lithuania 2001–2002**. NNC involvement in provision of a Leak before Break (LBB) detection system at Ignalina NPP. The LBB project is sponsored by the Swedish International Project, with NPP supporting the work with preparing technical specifications.
  WS Atkins contracted to provide further support to VATESI in emergency preparedness; final stage of a project to install and equip an emergency response center at VATESI's offices and provide training and technical assistance.
- **NSP Russia 2001–2002**. BNFL Magnox Electric contracted to help Rosenergoatom develop, test, and implement an operational safety self-assessment system to improve safety at NPPs.
  Invsat Ltd. contracted in 1999 (carried over to 2001–2002) to provide Leningrad NPP with communications equipment.
  Mitsui Babcock Energy Ltd. extension of 1999 contract to develop semi-automated ultrasonic inspection equipment, working with Russian Regulator (GAN).
- **NSP Ukraine 2001–2002**. BNFL Engineering donation of mobile chemical decontamination equipment to Chernobyl NPP to manage and minimize waste arising from decommissioning of Units 1–3.
  Serco Assurance contracted to assist Energoatom and National Regulatory Administration in setting up an inspection qualification infrastructure and establishing a formal qualification body.

## 5. Liaisons and Meetings

- **NSP Armenia 2001–2002**. Hayns Consulting funded to attend high-level meetings of those involved in work at Metsamor NPP and to liaise with the Armenian government, management at Metsamor NPP, and the Armenian Nuclear Regulatory Authority (ANRA).
- **NSP Lithuania 2001–2002**. Hayns Consulting funded to liaise with and participate in meetings of Lithuanian Nuclear Safety Advisory Committee.

The launch of the NSP 2002–2003 Programme (now a subprogram of the FSU Nuclear Legacy Programme) took place in December 2001. The first stage in the competition has resulted in 71 proposals being submitted with a value of £13.4 million, spread over a three-year period. By end March 2002, contracts totaling just over £3.0 million for 2002–2003 had been awarded or were planned. Further work is being undertaken in collaboration with the Nuclear Industries Inspectorate to identify support programs to the nuclear regulators in Bulgaria and Russia. Other activities are planned that will result in contracts for the total £3.5 million budget being allocated to projects in 2002–2003.

Work is also now under way to prepare for NSP 2003–2004 and beyond. The preference is likely to be for fewer, higher-value projects that focus more closely on the priorities of beneficiary countries. DTI has appointed BNFL to help with the

development of this new £5 million per annum program, and a series of workshops was held over summer and autumn 2002 with beneficiary countries to determine their priorities in terms of nuclear safety technical and regulatory advice and expertise. The intention is to put these requirements into a series of specifications and competitively tender the work through the *Official Journal of the European Communities*. The first of these new major projects is expected to be under way in 2003–2004.

## Quantitative Assessment of UK Chemical and Biological Projects

The 1999–2000 Cross-Cutting Review of nuclear safety issues in FSU also examined issues of chemical and biological/bacteriological materials and facilities in FSU, and in July 2000 allocated to the MOD an annual additional budget of up to £4 million for three years, 2001–2004, in parallel with the 2001–2004 FSU Nuclear Legacy Programme budget (see above).[42] Projects drawing on the 2001–2004 CBW fund will focus on high priority chemical demilitarization and cooperative biological nonproliferation projects.

The £12-million budget is included in the Defence Assistance Fund, and the project is managed by the Proliferation and Arms Control Secretariat (PACS) of the MOD. Oversight is provided by a committee, which is chaired by MOD and includes representatives of FCO and DTI. A full-time project manager was appointed in August 2000.

The UK government has given priority to chemical weapons destruction and has focused efforts on industrial infrastructure projects that would contribute to bringing the planned chemical weapons destruction facility at Shchuch'ye, in western Siberia, into operation at an early date. The Shchuch'ye facility will be the main destruction facility for Russian nerve agents munitions, where the Russian Munitions Agency plans to destroy more than 4 million artillery munitions from the Shchuch'ye and Kizner storage depots and possibly munitions from other sites. A UK-Russia bilateral agreement was signed on December 20, 2001, setting out the essential legal basis for the UK assistance program.[43] Signatories to the agreement were Geoff Hoon, UK secretary of state for defence, and Zinoviy Pak, director general of the Russian Munitions Agency. The Blair/Putin press conference in December 2001 noted the signing of this agreement. On March 25, 2002, an implementation agreement was signed by the UK MOD and the Russian Munitions Agency, providing for implementation of the UK's first project at Shchuch'ye.

In the early stages, UK contributions will help provide the water supply to the plant, essential for the operation of the destruction facility. Elements of the project will also assist in providing water for the local community. Through an arrangement with the U.S. Department of Defense, the UK used Parsons, the U.S. prime

42. HM Treasury, *Spending Review 2000: New Public Spending Plans 2001–2004*.

43. Ministry of Defence Press Release, 073/02, March 14, 2002. See also MOD Press Release, December 20, 2002.

contractor, to carry out this initial project, in order to allow an early start to work on site. The contract, worth some £2 million, was placed with Parsons on June 2, 2002. Work was scheduled for completion by late 2002, but is still ongoing. As will be the norm for UK-sponsored chemical destruction projects, the work is being carried out by a Russian subcontractor. Subsequent UK projects have not yet (as of October 2002) been confirmed and will be carried out by a contractor selected by separate tender action.

The EU also plans to contribute to the UK-managed project, with €2 million allocated on June 25, 2001, for infrastructure in support of the Shchuch'ye facility. This project is subject to agreement with the European Commission, expected in late 2002. The project will involve the provision of electricity supply equipment. Additionally, the European Commission has asked the UK to carry out an EU-funded project worth some €700,000 to provide consultancy support to the Russian Munitions Agency in order to improve presentation of the Russian CW destruction program and to facilitate coordination of international assistance. This work will be carried out primarily by the Defence Science and Technical Laboratory (DSTL), Porton Down. European Commission involvement stems from a request from member states to take this work forward under the EU's CFSP Joint Action of December 17, 1999, which established a European Union Co-operation Programme for Non-proliferation and Disarmament in the Russian Federation.[44]

Under an MOU signed in December 2001, Norway agreed to contribute NKr 9.2 million (about £700,000) through the UK-managed program to procure a transformer for an electricity substation to support the Shchuch'ye facility.[45] Under a second MOU, signed on March 14, 2002, Norway agreed to contribute a further NKr 9m (£700,000) to fund a second transformer at Shchuch'ye, again to be implemented through the UK program.

Both the EU and Norway followed this indirect approach to sponsorship of CW destruction in order to avoid the costs associated with setting up separate bilateral agreements with Russia. The UK government is willing to consider similar arrangements with other sponsors, making use of the UK-Russia Bilateral Agreement, provided the cooperation is cost effective. The UK MOD has invited tenders for further assistance projects at Shchuch'ye as part of a common tender process that also covers projects funded by the EU and Norway. UK MOD expected to appoint a contractor in late 2002 or early 2003.

DSTL Porton Down is also involved in two existing EU projects concerned with CW in Russia. The EU is providing assistance with Russian chemical demilitarization through two projects under the TACIS program. The first project, worth €3 million, involves the development of an environmental monitoring system for the area around the planned chemical weapon destruction facility at Gorny. This project includes the establishment of an analytical laboratory and monitoring facilities. The objective of the second project, worth €4 million, is to address the safety

44. 1999/878/CFSP: Council Joint Action of December 17, 1999, establishing a European Union Co-operation Programme for Non-proliferation and Disarmament in the Russian Federation, *Official Journal* L331, 23/12/1999, p. 11–16.

45. Ministry of Defence Press Release, 073/02, March 14, 2002.

and environment issues in preparation for the decontamination and destruction of a former CW production facility at Dzerzhinsk in the Nizhny Novgorod region of Russia. This has included establishing both a health monitoring strategy for workers involved in the destruction process and a CW analytical laboratory and pilot decontamination facility to test environmentally friendly detoxification technologies. Both projects are managed by a consortium of EU companies, which includes DSTL.

The aim of UK-funded biological nonproliferation projects is to reduce the risks of proliferation of scientists and expertise. Although UK-funded work had not started in earnest by summer 2002, the UK is, nevertheless, among several countries (including other EU states, Japan, South Korea, Norway, and the United States) that provide money to the ISTC, which in turn develops programs to employ former WMD scientists, including those in the biological field. However, by the end of 1998, only 9.8 percent of the total funds of the ISTC program ($18.5 million) had been approved for projects related to biotechnology.[46]

## UK Export Controls

The UK complies with a wide range of multilateral export control/oversight regimes. Recent initiatives include compliance with the international ban on the export of antipersonnel landmines and a ban on the export and transshipment of torture equipment. In pursuit of transparency in export control policy and decisionmaking, the UK government publishes an *Annual Report on Strategic Export Controls*.

### Legislative Basis

The UK national export licensing system for the export of arms and other strategic goods follows the Consolidated EU and National Arms Export Licensing Criteria.[47] The legislative basis for the UK national export control system is contained in the following acts and statutory instruments: Import and Export Control Act, 1990; Import, Export and Customs Powers (Defence) Act, 1939; Export of Goods (Control) Order (EGCO), 1994 (as amended); Dual-Use and Related Goods (Export Control) Regulations (DUEC), 1995.

In December 2000 the UK government announced its intention to introduce a new bill to replace the 1939 act and to improve the transparency of export controls. This draft bill was published for public consultation on March 29, 2001, and introduced to Parliament on June 26, 2001. The bill is generally understood to be in response to the 1996 report (the "Scott Report") on defense-related exports to Iraq and will replace the primary legislation contained in the 1939 and 1990 acts. The

46. SIPRI, *Yearbook 2000*, pp. 528–529.

47. See *Hansard*, Columns 199–203W, October 26, 2000. For further information and comment see Stockholm International Peace Research Institute (SIPRI), <http://projects.se/expcon/natexpcon/UK/uk.htm>. For a recent and detailed discussion of the UK export control regime see I. Davis, *The Regulation of Arms and Dual-Use Exports: Germany, Sweden and the UK* (New York: Oxford University Press/SIPRI, 2002), chapter 5.

UK government also sees the revised legislation as an opportunity to tighten controls on WMD. UK export control decisionmaking is also guided by two main control lists: the Military (or Munitions) List in Part III of Schedule I of EGCO and the Dual-Use Control Lists in DUEC and 1994/2000 EC Regulations. A third list—the Sensitive Country List—was formally withdrawn in 1998.[48]

## Consultation Process

DTI is the UK licensing authority, acting in consultation with FCO, MOD, and DFID, as described in 1997 by Prime Minister Blair:

> The Departments most involved in matters related to defence exports are the Ministry of Defence, the Department of Trade and Industry, the Foreign and Commonwealth Office and HM Customs and Excise. The Defence Export Services Organisation, in the MOD, provides British defence exporters with the strongest possible Government support, within the framework of our defence, security and foreign policies. Licenses to export controlled goods are issued by the President of the Board of Trade. All relevant individual license applications are circulated by DTI to other Government Departments with an interest. These will normally include the FCO, MOD and Department for International Development. The DTI is also the sponsoring Department for the defence industry itself. It works closely with industry on the whole range of issues relating to its effectiveness. The FCO plays an active role in promoting British industry overseas and advises on the foreign policy implications of defence exports. Finally, HM Customs and Excise are responsible for the enforcement of export controls.[49]

An interdepartmental Strategic Exports Working Party (SXWP), established in 1956 and reporting to the cabinet office, provides policy advice on strategically sensitive goods. The SXWP is chaired by MOD (Head of Defence Exports Services Secretariat).

## Licensing, Administration, and Enforcement

The licensing process requires end-user certification, including the obligation not to reexport. Licenses are not required for contract negotiation or pre-shipment activities unless classified information is involved. Some categories of export—such as government-to-government transfers or collaborative projects and instances where commercial companies acting on behalf of government can claim exemption on grounds of Crown Status—are exempt from licensing requirements. The secretary of state for trade and industry is empowered to revoke export licenses at any time and for any reason. DTI employs some 50 staff for export licensing. Approximately 15,000 licenses are approved annually. The UK's principal enforcement agency is HM Customs and Excise.

---

48. Davis, *The Regulation of Arms and Dual-Use Exports*, p. 129.
49. *Hansard*, Column 490, July 31, 1997.

# UK Lessons Learned

## UK/FSU Relations

There is a perceived requirement for FSU interlocutors better to understand and accommodate the UK's specific needs in terms of liability, taxation, and access. There is also a perceived need for it to be understood that UK aid is untied. From the UK perspective, untied aid is best accepted promptly and efficiently, without the need for excessive bureaucracy.

## FSU Responsiveness and Skill Base

Generally, there is a need to build trust and develop good working relations with FSU organizations that still have only limited experience of working with Western governments and little knowledge of Western financial and project monitoring requirements. More specifically, considerable time can be taken to obtain necessary detailed information on potential projects before decisions can be made and contractors appointed. The nature of the projects the UK government is trying to establish in the FSU are technically complex and require a thorough project management structure before any work can start. There is a need to agree in advance on specific milestones, targets, and success measures for UK-funded projects. Because most FSU countries are not, however, familiar with UK project management requirements, FSU partners must first be taken through a rapid familiarization process.

## UK Government/Industry Relations

The UK nuclear industry has moved increasingly away from government control toward privatization. Privatization draws nuclear utilities into a new culture, one in which commercial imperatives and processes are dominant. This commercial culture is not self-evidently compatible with the traditional atmosphere of government-industry symbiosis. Difficulties can arise when, for political (rather than primarily commercial) reasons, the UK government seeks to promote closer contact between UK and foreign nuclear operators. Private firms are reluctant to engage in pro bono, government-sponsored, or low-profit work that can be undertaken by state-owned organizations, and as a result they are disinclined to participate in some government-led initiatives, whatever their political significance. As a result, the task of the UK government has increasingly become one of achieving political objectives by encouraging and facilitating the development of an appropriate commercial and regulatory environment, in which both political and commercial goals can be achieved simultaneously. (For an illustration of this problem, see ISTC Funding below.)

## Size of Projects

The scope and size of individual projects determines the effectiveness of the UK CTR program in a number of ways. First, UK government procurement rules require jobs to be tendered competitively. This involves a cost both to the organizations preparing tenders and to the government body assessing them. When

contracts are small, the margins available to organizations can be significantly eroded by bid costs. Also, delays in payment have been common, particularly on EU-funded projects, which further erode margins. The result is either an increasing reluctance to bid for small packages of work or the incorporation of costs in overheads, thereby reducing the amount of effective project work done for the money spent. The DTI action in appointing call-off contractors is a step toward addressing this issue. Second, there is often a need to proceed in a step-by-step fashion, with an initial study leading to a design or a proposal, which leads in turn to practical implementation. However, money can be wasted if the funding of the first steps is not accompanied by a plan or willingness to address the full scope of the work, or if continuity between funding bodies is wanting. For example:

- The BNFL involvement in the Mayak safeguarding project resulted in a proposal on how a system could be operated at Mayak. The cost of the proposal (between £0.5 million and £1 million) was deemed too large for the UK budget, and an approach to the EU was suggested. In the end, uncertainty over political ownership of the work meant that funding was not provided.
- Members of the Industrial Group (SKB, BNFL) worked to put in place a package from Norway, Sweden, and the EU to provide funding for a study into a store for spent nuclear fuel taken from submarines docked around the Kola peninsula. Agreement was reached with the UK government to fund a detailed design project. However no commitment could be given to funding the construction of the store. At the Contact Expert Group, the United States put forward an alternative proposal that the design and construction would be funded from its CTR budget. MINATOM chose this proposal rather than the UK offer. In practice the U.S. offer has subsequently been rescinded, with the result that the project is on hold.

## ISTC Funding

The UK nuclear industry has participated (with reluctance, albeit graciously) in ISTC activities. ISTC projects require peer review by a Western industrial sponsor. This process can involve industry in several weeks of work, which is not funded by ISTC. Despite the usual (and marginal) benefits of making new contacts and maintaining networks, industry is becoming more reluctant to undertake such onerous and loss-making work. The possibility of ISTC governments introducing incentives for industry to participate should, therefore, be examined. UK nonnuclear ISTC projects are also proceeding.

## Value of Research and Analysis

During the 1990s, West European nuclear operators and their governments placed great emphasis on scoping studies and research into nuclear safety questions in Russia, the CIS, and CEE. A proportion of that research was necessary and valuable, forming the baseline for subsequent activities. But some might argue that the problems have been overanalyzed and that the research subindustry that has been created has diverted funds and, more important, initiative and imagination from the target nuclear utilities. As a result, these utilities have been slow in taking their

own steps toward improving nuclear safety. Just 10 years after the Chernobyl 4 incident, the European Nuclear Council (representing all European nuclear operators) pointed out the benefits of a more straightforward, practical approach to questions of nuclear safety:

> Most of the funds provided by Western organisations have been used to assess the safety of plants and to define the desirable improvements. A good deal of this work was done in association with Russian institutes. This has provided a base from which coherent and justified "safety projects" can be defined for each plant which would be agreed by experts from both the West and the East. Some of these improvements have already been implemented, mainly by the Eastern European operators themselves. However, the European nuclear industry is most concerned that, without further physical changes, another serious incident could happen. It would therefore want to see immediate practical improvements made to start to bring reactors up to the high levels of safety seen in reactor operations in other regions of the world. It is felt that the risk of serious accident could be reduced by even as much as a factor of 10 with the investment of a relatively modest sum of money, provided that the money is spent in a focused and practical way.…
>
> It is the considered opinion of the leaders of the European nuclear industry that making cash available to identified station managers in a controlled way under specific practical guidelines, but without other restrictions, offers the best way of making immediate, significant improvements in safety on existing reactors.[50]

## Nuclear Industrial Liability

Effective legal agreements are vital to the success of nuclear projects involving UK commercial contractors, but they can take a considerable time to negotiate in the absence of a legal infrastructure/framework. The UK nuclear industry has been especially concerned about exposure to liability for nuclear incidents and accidents while engaged in CTR-type projects in the FSU and CEE. Ukraine acceded to the 1963 Vienna Convention on Civil Liability for Nuclear Damage on September 20, 1996 (entered into force December 20, 1996). The Russian Federation signed the Convention May 8, 1996, but full accession remained under discussion as late as 2002.[51] Russia's nonparticipation in the convention limits severely the prospects for nuclear accident cover and therefore reduces dramatically the UK nuclear industry's enthusiasm to engage in operator-to-operator projects in Russia. By summer 2002, Russia was seeking to create the legislative base for the Multinational Nuclear Environment Program in the Russian Federation (MNEPR). In advance of the MNEPR, by July 2002, the UK government was seeking to negotiate a bilateral supplementary agreement with the Russian government (MFA and MINATOM) on the question of nuclear liability. If interim bilateral negotiations are successful, the UK government and nuclear industry will be in a position to make a greater contribu-

50. Press Release, European Nuclear Council 3rd Meeting, February 23–24, 1996.

51. For the latest status on the Vienna Convention, see <http://www.iaea.org/worldatom/Documents/Legal/>.

tion to Russian nuclear safety projects without awaiting the completion of MNEPR preparations.

## Industry-Industry Coordination in the European Union

Even after the collectivizing influence of Chernobyl, from the mid-1980s through the 1990s, there is still a case for improved coordination among EU nuclear operators and safety specialists in their involvement in CTR-type projects. Competitive bidding for EU contracts necessarily results in duplication of effort and therefore wasting of scarce resources, a situation that can only be resolved by better coordination. That said, Western nuclear utilities are commercially driven, competitive organizations and would be wary—on commercial, industrial, and financial grounds—of being required to cooperate with rivals in a joint bidding process.

## EU Contract Procurement Process

Conformity with EU contract procurement rules (whereby "large" contracts must be advertised EU-wide) slows the process whereby aid and expertise are funded by the UK government and can lengthen the UK's response time.

## Grant Aid versus Commercialism in the Russian Nuclear Sector

Grant aid has an important place in UK CTR policy and practice, particularly for start-up initiatives. However, grant aid might not always be the most appropriate approach, particularly when front-loading for capital construction is required. For the longer term, it is increasingly being argued—particularly within the UK nuclear industry—that the most appropriate CTR goal for the UK should be nothing short of developing Russia as a full market economy, with the Russian nuclear sector being encouraged to emulate as closely and as soon as possible the more commercialized practices and procedures seen in the West. From this commercial perspective, the best and quickest way to achieve effective and durable materials management and proliferation control processes would be for Russian utilities and related industries to become commercially competent, autonomous, and self-sustaining. With this in mind, rather than continue with a traditional donor-leader role, it is argued that Western governments should move away from a grant-aid approach toward more focused support to encourage commercial autonomy and self-sustaining businesses. Examples of this approach might be support for capital projects, either as investment or loan guarantees; further support to UK industry in building links with Russian industry; direct investment in research; reimbursement of one-off, first-of-a-kind costs implicit in new ventures; committing resources to facilitate the intergovernmental treaties or agreements necessary for trade to take place; and pursuing amendments to EU legislation or operating rules in areas such as quotas. From the UK government perspective, however, there is perceived at present to be a risk that such commercially oriented approaches would abandon legitimate verification and auditing processes and might simply fund corruption and embezzlement.

# UK Future Priorities

## UK Nuclear Policy Priorities

- Operational safety
- Security
- Mitigation of nuclear legacy

## UK Nuclear Management Priority: Industrial Project Manager Scheme

During summer 2002, DTI moved toward a new scheme for the organization and management of industry-led projects. Three project areas will be designated, each of which will be managed by a recognized UK nuclear industry. The three project areas and designated project managers are as follows:

- Northwest Russia projects (Andreeva Bay, Murmansk): RWE Nukem
- Closed cities/ brain drain projects: PE International
- Safety programs: BNFL

This initiative has been broadly welcomed by the UK nuclear industry, largely as a means for facilitating a more commercial approach in project development and sponsorship.

## UK Chemical and Biological Priorities

- High-priority chemical demilitarization
- Support for Shchuch'ye destruction facility
- Cooperative biological nonproliferation projects
- Reduce risks of proliferation of biological scientists and expertise

# UK Comparative Advantages

## Industrial-Technological

As both a nuclear-weapon state and a nuclear-power generator, the UK government has decades of experience with all aspects of nuclear technology, including

- Reactor development, management and closure
- Fuel-cycle management
- Materials accountancy
- Waste disposal
- Security of sites and transport
- Weaponization

- National nuclear regulation
- Conformity to IAEA standards and safeguards
- Liaison with civil and military nuclear research communities
- Liaison with civil society and NGOs on nuclear matters
- Compliance with international treaty obligations

The UK government has a long-standing relationship with the UK civil nuclear industry. This relationship has left the UK government with an awareness of the nature and difficulties of the civil nuclear industry as well as a sensitivity to indications of stress in the relationship. The UK government's relationship with industry makes all the more convincing its advocacy of operator-to-operator contact as the favored modus operandi for knowledge and technology transfer.

The UK has in the past had offensive chemical and biological weapons (CBW) programs and maintains its expertise in chemical and biological defense. The UK is fully compliant with international CBW agreements and is also a leading, technically expert participant in the relevant international fora. For all these reasons, the UK is one of few states that could provide a full-scope policy/industrial model for the management of CBW legacies.

## Technological: Commercial Observation Satellites

With the demise of the former Soviet Union, Russia is not launching as many defense-related satellites as it did in the past, presumably because of economic considerations. It is also possible (probably) that CIS countries no longer have access to information previously supplied by Russian defense observation satellites. The verification of arms control, disarmament, and nonproliferation agreements remains vital for international security and stability. In the past, defense satellites have played a vital verification role. However, as the scope of information provided by such satellites diminishes, and as access to such information becomes more restricted, other sources must be considered.

The quality of data from commercial observation satellites has improved more than 130-fold since 1972, when the first such spacecraft was launched by the United States. The latest U.S. commercial satellite—QuickBird—launched on October 18, 2001, has a resolution of 0.61m. By comparison, the resolution of a military reconnaissance satellite is estimated to be about 0.10m, a difference of only a factor of five. What is more, a number of states (France, India, Israel, and Japan) are launching and operating their own commercial remote-sensing satellites, with high resolution. This combination of availability with precision suggests that commercial observation satellites could be a valuable resource for CTR-type activities, a central aim of which is to strengthen the norm of nonproliferation of WMD in the CIS. This is to be achieved by providing resources to facilitate implementation of, *inter alia*, the Strategic Arms Reduction Treaties (START), the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the associated regime, and agreement on the Prohibition on the Development, Production, Stockpiling and Use of Chemical Weapons and their Destruction (CWC).

Although there can be no substitute for direct, physical on-site inspections, commercial satellite imagery has come a long way in terms of its quality and can complement on-site verification and inspection. If used in conjunction with several open sources of information, satellite imagery could be used to confirm other open source data and to map the deployment of WMDs. Three specific and important opportunities arise. One is to use open source satellite imagery to map out and confirm WMD facilities and, on that basis, to consult concerned states directly or through their open declarations. Another opportunity is to use satellite imagery to check the efficiency and effect of WMD destruction and site clean-up programs. The final possibility is to use satellite imagery to monitor and verify the cut-off of further production of materials required for new WMD development and production. With the further development of satellite imagery capabilities, the UK could be in a strong position to make a unique and valuable contribution. UK government interest in commercial satellite imagery has so far resulted in DTI/UKAEA support for work carried out by Professor Bhupendra Jasani at King's College London on behalf of the IAEA. By July 2002, Professor Jasani had also prepared a preliminary report on CWC for the FCO.

### Political/Diplomatic

In addition to these industrial and technical advantages and strengths, the UK is also in a strong position politically and diplomatically, with various levels of contact with all countries involved in nuclear, biological, and chemical disposal projects. These contacts include diplomatic missions in all of the FSU countries, a bilateral outreach defense assistance program for the nations of Central and Eastern Europe, and Department for International Development aid programs for states within Central Asia and Eastern Europe. The UK is closely involved in the Organization for the Prohibition of Chemical Weapons (OPCW) and plays a prominent part in both NATO and the EU; the impending expansion of the latter organizations into Eastern Europe will further strengthen ties between the UK and the relevant states.

## UK Policy Environment

### Decisionmaking Process

The FSU Nuclear Legacy Programme is overseen by an Interdepartmental Advisory Committee (IAC) chaired by a senior DTI official. The committee is attended by permanent representatives from DTI, MOD, FCO. Other interested departments attend on an ad hoc basis. As of summer 2002, there are also representatives from DFID, DETR, the Treasury, and the cabinet office. Representatives from key embassies in FSU countries also attend, notably from Moscow and Kiev.

The Interdepartmental Advisory Committee chair is the head of the Nuclear Industries Directorate at the DTI. The head of the Committee Secretariat is a DTI official.

Projects concerning the chemical demilitarization of Russia, and biological nonproliferation, are managed by the Proliferation and Arms Control Secretariat

(PACS) of the MOD. Oversight is provided by a committee, which is chaired by MOD and includes representatives of FCO and DTI. A full-time project manager was appointed in August 2000.

### Budgeting Process

The UK government spending review process allocates funding for programs (and departmental running costs) on a three-year cycle. The Spending Review 2002 has just been completed. Prime Minister Blair's public commitment to spend some $750 million over the next 10 years will be factored into future spending review processes.

The various departmental budgets have recently been combined under the FSU Nuclear Legacy Programme budget. The IAC's responsibilities include approval of the high-level allocation of funding within the program and all major items of expenditure, monitoring likely future demands on the program and ensuring that the necessary funding can be met, and monitoring progress on all work supported by the program. As such, the committee represents the most significant level of decisionmaking and budget allocation within the UK's nuclear program.

For smaller proposals related to nuclear safety assistance, to be conducted on a bilateral basis, the DTI-managed Nuclear Safety Programme encourages submission of new ideas or possible projects, provided that they conform to certain criteria. Written proposals submitted to the NSP are vetted in a two-stage process.[52]

The £12-million budget allocated to the chemical demilitarization of Russia and biological nonproliferation is included in the Defence Assistance Fund and is managed by the Proliferation and Arms Control Secretariat (PACS) of the MOD.

The UK government considers itself open to innovative suggestions. On the nuclear side, the new FSU Nuclear Legacy Programme is using innovative program management activities to channel grant aid to key priority areas and is actively using these methods to identify the particular needs of beneficiary countries. Considerable effort is also being placed on establishing multilateral projects to focus available aid on high-priority projects—for example, safe storage of spent nuclear fuel from decommissioned nuclear submarines.

## Conclusion: Prospects for UK Policy

A conference at King's College London on October 2, 2002, examined the prospects for UK involvement in future CTR-type projects. Practical matters of liability and access continue to be a major concern. Third-party liability agreements need to be constructed with particular care to avoid the prospect of UK government and commercial organizations being subjected to massive liability claims. Delays in reaching an agreement with Russian authorities on third-party liability have proved to be the main obstacle to progress in nuclear CTR-type projects. As for access, private contractors complain of their inability to gain access to various defense sites and information without extortionate charges. Taxes levied on imported equipment

52. See <http://www.dti.gov.uk/nid/nuclearsafetyprogramme/contact.htm>.

have also resulted in equipment being held in Russian customs for lengthy periods. The UK budget for CTR-type work was also discussed at length. The UK's cross-departmental FSU Nuclear Legacy Programme budget is set at £83.8 million for 2001–2004, with a similar figure expected for the following three years. Following the Kananaskis G-8 summit in September 2002, Prime Minister Tony Blair pledged up to U.S.$750 million for CTR-like projects over 10 years. However, the precise nature of this commitment cannot be ascertained until a firm legal basis for cooperation has been agreed between the UK and Russian governments. Looking further ahead, the Kananaskis agreement of "10 plus 10 over 10"—$10 billion from the United States, $10 billion from the remaining G-6 (Russia is not expected to produce any funding), over 10 years—means that the UK contribution is less than one-sixth of the required total. There is likely, therefore, to be further pressure on the UK in the future to increase funding.

CHAPTER 14

# United States

*Joel Wit* and *Ian Woodcroft*
Center for Strategic and International Studies

## Introduction

Over the course of nearly a decade, the United States has spent approximately $7 billion on a wide range of cooperative threat reduction (CTR) programs in Russia, Ukraine, Kazakhstan, Belarus, and other former Soviet states. These programs currently include more than 100 different initiatives ranging from assistance in the retirement of Soviet-era missiles under the bilateral strategic arms control agreements to help in establishing more effective export control systems. As a result of U.S. efforts, significant progress has been made, particularly in controlling a possible "brain drain," in securing and accounting for nuclear materials, and in dismantling strategic delivery systems. However, much work remains to be done over the next decade.

This chapter will examine (1) U.S. perceptions of the threat posed by former soviet weapons of mass destruction (WMD), (2) a brief history of the U.S. response, (3) the current status of the U.S. budget and specific cooperative threat reduction programs, and (4) key factors likely to affect the future direction of the U.S. program.

## The Threat

For the last few decades of the Cold War, a critical U.S. national security objective was to reduce the threat posed by WMD, especially nuclear weapons, by negotiating limitations and reductions in Soviet strategic nuclear capabilities. With the end of the Cold War and the collapse of the Soviet Union, a new challenge emerged, generated by the prospect of political and economic chaos in the former Soviet states, including Russia. The deteriorating condition of the former Soviet military led to the sale of equipment for currency and bartering for food. The same was true for the scientific community and facilities where weapons of mass destruction were manufactured. While the threat of a nuclear exchange and annihilation declined, the chance that weapons of mass destruction or their ingredients might be acquired by a third party, either states or terrorist groups, increased, because now these

groups had a chance to buy or steal what they previously would have had to produce on their own.

The potential threat is enormous. It includes

- 20,000 nuclear warheads still existing in Russia today at approximately 123 nuclear weapons storage sites;[1]
- More than 1,350 metric tons of highly enriched uranium (HEU) and weapons-grade plutonium, of which about 700 tons is in nuclear weapons and the rest in a variety of other forms. The materials are scattered over more than 50 sites in hundreds of buildings under control of several agencies and many institutions;[2]
- The world's largest network of nuclear production facilities and numerous non-nuclear component plants;
- Three nuclear weapons laboratories, dozens of specialized defense institutes throughout the Soviet Union, two very large nuclear test sites, and civilian research and nuclear power activities. The complex, which employs nearly 1 million people, represents an extensive network of intellectual assets;
- An extensive biological weapons infrastructure that includes 50 institutes and employs 60,000 people;
- 40,000 tons of mostly Soviet-made chemical weapons declared under the Chemical Weapons Convention, including nerve gases and skin-burning blister compounds.[3]

One recent U.S. study of cooperative threat reduction called the former Soviet arsenal "a goldmine for would-be proliferators the world over." Since the collapse of the Soviet Union, there have been numerous reported instances of attempts to buy or steal materials from the former soviet WMD complex as well as to recruit scientists. For example, according to a recent CIA report, in 1999 Bulgarian authorities seized four grams of weapons-grade uranium that had probably come from Russia. Although still unconfirmed, according to MINATOM, the Russian agency responsible for nuclear installations, a theft of material sufficient to produce an atomic bomb occurred in 1998 from an unnamed enterprise in Chelybinsk Oblast. According to one U.S. government official, scientists of the newly independent states (NIS) have been approached not only by states of proliferation concern such as Iran and Iraq, but also China, India, and others.

---

1. Matthew G. McKinzie, Thomas B. Cochran, Robert S. Norris, and William M. Arkin, *The U.S. Nuclear War Plan: A Time For Change* (New York: Natural Resources Defense Council, June 2001), p. 89.

2. Jon B. Wolfsthal, "Controlling Nuclear Materials in Russia," in Robert J. Einhorn and Michèle A. Flournoy, project directors, *Protecting against the Spread of Nuclear, Biological, and Chemical Weapons*, Volume 2: *The Challenges* (Washington, D.C.: CSIS, 2003).

3. Peter Eisler, "Plan to Destroy Russian Weapons Nears Collapse," *USA Today*, October 1, 2002, p. 1.

## The U.S. Response

The U.S. response to instability and collapse in the former Soviet Union was triggered by the 1991 coup attempt against Mikhail Gorbachev, which convinced congressional leaders like Senator Sam Nunn (D-Ga.) that the United States must take an active role in assisting the Soviet Union with control of its huge WMD stockpiles. Senator Nunn and Senator Richard Lugar (R-Ind.), with the cooperation of Les Aspin, then chairman of the House Armed Services Committee, built bipartisan congressional support for using a small amount of Department of Defense (DOD) funds, up to $400 million annually,[4] to assist the Soviet Union and its successors in destroying nuclear, chemical, biological, and other unconventional weapons, through safely transporting, storing, disabling, and safeguarding such weapons and by establishing verifiable safeguards against proliferation.

Although the assistance package, known as the Nunn-Lugar Program, passed the Senate and House with overwhelming support, building a bipartisan coalition required strict conditions on the use of funds. First, these funds had to be reprogrammed from existing DOD budget accounts at the discretion of the secretary of defense and with the prior approval of four congressional committees. Second, wherever feasible, funds were to be used for the purchase of U.S. technology and know-how. Third, the president was required to certify annually that each recipient country would invest a substantial amount of resources in dismantlement, forgo any military modernization exceeding legitimate defense requirements, ensure against any use of components of destroyed nuclear warheads in new ones, facilitate U.S. verification, comply with all relevant arms control agreements, and observe internationally recognized human rights including protection of minorities.

The Nunn-Lugar initiative was transformed under the Clinton administration from a novel but low-priority program within the Department of Defense to a key policy tool for addressing national security concerns. It became by far the largest U.S. assistance program in the former Soviet Union. The program also expanded to place increasing emphasis on programs run by other government agencies, particularly the Department of Energy. The Expanded Threat Reduction Initiative (ETRI) was launched in January 1999 to heighten attention to nuclear, chemical, and biological proliferation risks in the NIS following the 1998 Russian financial crisis.[5] The initiative did not create any new programs but was intended to highlight and expand budgets for programs.

When it came into office in 2001, the Bush administration was of two minds on cooperative threat reduction. On the one hand, candidate Bush had made positive statements about continuing the nuclear cooperative security agenda, most notably in a November 1999 foreign policy address that singled out the Nunn-Lugar programs as a greater priority than the START process. He promised to substantially

4. John M. Shields and William C. Potter, eds., *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program* (Cambridge, Mass.: MIT Press, 1997), p. 44.

5. The White House Office of the Press Secretary, "Fact Sheet: The President's International Affairs Budget," August 16, 1999, <http://ftp.fedworld.gov/pub/w-house/0818-1.txt> (accessed October 7, 2002).

increase U.S. assistance to dismantle Russian weapons. On the other hand, Bush attacked the Clinton-Gore administration for its activist policy toward Russia and seemed to want to deal with the potential challenge posed by WMD. After all, the core source of this problem was political and economic instability.

Some members of Congress were interested in a tougher political line toward Russia. There were a number of factors fueling this sentiment, including Republican control of the Senate and House; widespread reports of Russian corruption; and the fact that many believed Russia's transfers of conventional weapons, missiles, and nuclear technology promoted proliferation among U.S. opponents. In addition, Russia was still overtly gathering intelligence on the United States, and Moscow opposed many key U.S. interests and pursued a brutal war in Chechnya. Skeptics were still willing to provide necessary funds, but they imposed new reporting requirements and erected new barriers that restricted the use of funding. However, cooperative threat reduction programs were exempted from other onerous hurdles often placed on economic aid to Russia.

Bush administration skepticism was reflected in its April 2001 funding proposal submitted to Congress. This budget proposal intended to reduce Department of Energy (DOE) Defense Nuclear Nonproliferation funding by $100 million from the then current level of about $875 million.[6] The bulk of the proposed cuts would have come from nuclear nonproliferation efforts in Russia, which would have decreased from just over $300 million to about $200 million in fiscal year 2002. John Gordon, the undersecretary for nuclear security in DOE, stated, "It should be apparent and obvious that we will have to curtail efforts in several areas and potentially lose momentum in some."[7]

The proposed cut sparked considerable concern in Congress, particularly coming on the heels of bipartisan reports such as the Cutler-Baker report, which concluded that a large-scale funding increase was needed to cope with potential threats.[8] In March, the administration launched a review of U.S. programs after its plans were strongly criticized on the Hill, although early reports indicated it was studying downsizing or even terminating key programs. The House-Senate conference budget resolution approved by both Houses in early May, while mirroring the president's request and failing to restore cuts, called on the administration to restore $100 million in funding to DOE programs.[9]

The events of September 11, 2001, led to a renewed focus on the role of cooperative threat reduction in dealing with potential threats against the United States. It became even more apparent that not only state proliferators but also well-organized

---

6. Michael Jasinski, "U.S. Debate Nonproliferation Assistance to Russia: Overview of Recent Developments (with updates)," April 9, 2001, <cns.miis.edu/research/nisasst/overview.htm> (accessed October 7, 2002).

7. William Hoehn, "Analysis of the Bush Administration's Fiscal Year 2002 Budget Requests for U.S.–Former Soviet Union Nuclear Security: Department of Energy Programs," April 2001, <www.ransac.org> (accessed October 7, 2002).

8. William Baker and Lloyd Cutler, "A Report Card on the Department of Energy's Nonproliferation Programs with Russia," January 10, 2001, <www.ceip.org/files/projects/npp/pdf/DOERussiaTaskForceReport011001.pdf> (accessed November 27, 2001).

9. Hoehn, "Analysis of the Bush Administration's Fiscal Year 2003 Budget Requests."

global terrorist groups might try to illicitly acquire weapons of mass destruction or materials. There was also evidence that Al Qaeda was seeking nuclear, chemical, and biological weapons, including trying to purchase nuclear material from the former Soviet Union for use in explosive devices. Senator Richard Lugar called for a global cooperative threat reduction effort in early 2002 to address this threat.[10]

Nevertheless, though the administration requested $40 billion in emergency supplemental funds for disaster recovery, homeland security, military support, and related antiterrorism efforts, no additional funds were requested for cooperative security efforts in Russia.[11] Despite this, Congress allocated just over $200 million for nonproliferation efforts as an emergency supplemental, including $120 million for material protection, control, and accounting (MPC&A), $15 million for programs to prevent a brain drain from Russia, and $10 million for improving safety and security of Soviet-era nuclear power reactors and facilities.[12]

On December 27, 2001, the White House unveiled the result of its review of U.S. cooperative threat reduction programs, concluding that most of the programs work well, are focused on priority tasks, and are managed well. President Bush signed funding bills in late December and January that boosted funding for threat reduction. Although the DOE and State Department programs received funding increases, the Defense Department request of $403 million represented a modest reduction from 2001 levels of $443 million.[13] Moreover, the Defense Authorization Act requires the president to submit by June 15 a plan to cover all relevant federal agencies for securing, downsizing, and disposing of Russia's nuclear weapons, fissile material, and expertise.

Russia's concerns over the threat of terrorist action have also been heightened as a result of Moscow's campaign in Chechnya. According to a recent CIA report, Russia has recognized the need for security improvements and, with outside assistance, has taken steps to reduce the risk of theft.[14] On its own initiative in 1999, 2000, and 2001, Russian authorities ordered increased security at nuclear facilities. In November 2000, the government instructed MINATOM and other agencies to implement additional measures to step up physical security of nuclear installations, including modernizing security systems. Since September 2001, Russian officials, including President Putin have conducted a public campaign to provide assurance that terrorists have not acquired nuclear weapons.[15]

---

10. Richard Lugar, "Lugar Introduces Nunn-Lugar Expansion," March 18, 2002, <http://lugar.senate.gov/031802.html> (accessed October 7, 2002).

11. Michelle Mittelstadt, "Senate Begins Debate on Border Security Bill," *Dallas Morning News*, April 13, 2002.

12. Hoehn, "Analysis of the Bush Administration's Fiscal Year 2003 Budget Requests."

13. Steve LaMontage, "Summary of Major U.S. Nonproliferation Programs—FY02," 2002, <www.clw.org/control/nonprolifprograms.pdf> (accessed October 7, 2002).

14. National Intelligence Council, "Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces," February 2002, <http://www.cia.gov/nic/pubs/other_products/icarussiansecurity.htm> (accessed October 7, 2002).

15. NIS Nuclear Trafficking Library, "February 2002 NIC Report on Security of Russian Nuclear Weapons and Materials," February 2002, <www.nti.org/db/nistraff/2002/20020140.htm> (accessed October 7, 2002).

## Budget and Programs

The Bush administration's fiscal year 2003 budget request represents the highest level ever requested for cooperative threat reduction programs in a single year, with the majority of the increase targeted toward Department of Energy programs. It includes

- $417 million for DOD CTR program, a slight increase from FY 2002 level of $403 million but still below the $443 million allocated for FY 2001 by Clinton. DOD's funding for dealing with strategic offensive weapons is declining as that mission is winding down. Funding for nonproliferation-related programs, particularly dealing with biological and chemical threats, is increasing.
- An approximately $1.1 billion request for DOE programs, which represents an increase of about 20 percent over the FY 2002 appropriation, with the subtotal of nonproliferation programs with Russia increasing from $636 million to $738 million. Funding for Russian activities includes $384 million for fissile material disposition, up $82 million from FY 2002, and $235 million for MPC&A.
- A request for $103 million for three State Department programs focused mainly on preventing a brain drain, approximately the same amount received in 2002.

U.S. cooperative threat reduction programs are part of a "defense in depth" against the dangers of proliferation whose objectives include (1) avoiding a nuclear exchange through fostering the implementation of strategic arms reduction agreements and other measures; (2) preventing the theft or diversion of WMD or materials; (3) preventing the leakage of WMD know-how; (4) downsizing WMD inventories and production capacity; and (5) preventing WMD accidents and environmental disasters.

The U.S. cooperative threat reduction programs consists of almost 100 different initiatives under the control of the Departments of Defense, Energy, and State. The interagency process was essentially the same during the previous administration. Policy issues are considered by four groups in descending order of importance: the Principals and Deputies Committees, consisting of cabinet and subcabinet officials; the Proliferation, Counterproliferation and Homeland Defense Policy Coordinating Committee (PCC), consisting of assistant secretaries; and the sub-PCC, which includes working-level officials. The National Security Council, specifically the Homeland Defense and Counterproliferation Office, is in charge of the interagency process. When budgetary and other financial issues are considered, officials from the interagency groups dealing with economic matters are merged into the existing process.

Unlike during the Clinton administration, where the high-level Gore-Chernomyrdin Commission dealt with cooperative threat reduction, there are currently no regular, senior-level U.S.-Russian meetings on cooperative threat reduction. The deputy secretary of state, however, does meet with his Russian counterpart on counterterrorism cooperation. Those sessions sometimes address cooperative threat reduction issues.

# U.S. CTR Initiatives

## Launchers

The accelerated elimination of strategic offensive launchers to levels established by the Strategic Arms Reduction Talks (START) has been a primary mission of the Department of Defense's cooperative threat reduction program since it was first established in 1991. Since then, the United States has been engaged in the elimination of heavy bombers, intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and nuclear-powered ballistic missile submarines (SSBNs). This mission also extends to the elimination and conversion of toxic missile fuel. The program has provided Russia with equipment and machinery as well as U.S. assistance in managing dismantlement efforts at Russian facilities in accordance with existing arms control agreements.

The strategic offensive arms elimination program has scored some notable achievements. It has assisted Belarus, Kazakhstan, and Ukraine in eliminating their Soviet nuclear legacy. Belarus, Kazakhstan, and Ukraine are now nuclear weapons free. In Kazakhstan, the U.S. program resulted in the denuclearization of what might have been the world's third-largest nuclear state. In addition to returning nuclear weapons and missiles to Russia, 147 silos and associated structures were eliminated, 7 heavy bombers dismantled (40 returned to Russia), and 194 nuclear test tunnels sealed.[16] As a result, Kazakhstan is in compliance with its START I, Lisbon Protocol, and Nuclear Non-Proliferation Treaty obligations.

The Belarus program has been somewhat less successful owing to political developments in Minsk. Although Belarus returned its ICBMs and nuclear warheads to Russia, in 1997 assistance for the elimination of 81 SS-25 launch sites was suspended because of increasing human rights violations by President Lukashenka's government. Equipment provided by the United States was withdrawn and dismantlement work stopped. In addition to the launcher positions, Belarus was also left with 1,000 metric tons of liquid rocket fuel and 9,000 metric tons of oxidizer that were to be eliminated with cooperative threat reduction funding.[17]

Remaining programs in Russia and Ukraine have also made significant progress over the past decade. As of early 2002, U.S. programs in Ukraine had resulted in the elimination of 111 ICBMs, 181 silos and associated structures, 15 heavy bombers, and the storage of almost 4,000 metric tons of rocket fuel.[18] The program has been even more successful in Russia, eliminating 317 ICBMs, 42 heavy bombers, 69 ICBM silos, 20 nuclear-powered ballistic submarines and 252 sea-launched ballistic missile launchers and 251 missiles.[19]

---

16. Jon B. Wolfsthal et al., eds., *Nuclear Status Report: Nuclear Weapons, Fissile Materials, and Export Controls in the Former Soviet Union* (Washington, D.C.: Carnegie Endowment for International Peace, and Monterey, Calif.: Monterey Institute of International Studies, 2001), p. 51.

17. Ibid., p. 53.

18. Ibid., p. 52. For figures on silos and silo structures and bomber elimination/destruction, see Defense Threat Reduction Agency (DTRA), "CTR Scorecard," July 18, 2002, <www.dtra.mil/ctr/ctr_score.html> (accessed August 15, 2002).

19. DTRA, "CTR Scorecard."

Still, a great deal of work remains to be done. Slated for elimination are almost 1,000 additional ICBMs, over 400 additional missile silos, 28 submarines, 291 sea-launched ballistic missiles, and 368 more launchers.[20] The destruction of missiles has been particularly slow because of delays in the disposal of missile fuel.

Key ongoing programs in Russia and Ukraine include

- **Land-based missiles and launchers**: DOD has provided cranes, earth-moving equipment, cutting and industrial tools, and scrap-metal handling equipment to achieve its objectives. The initial delivery of this equipment took place between September 1994 and October 1995 with additional deliveries completed in late 1999. The United States anticipates destroying approximately 1,025 missiles by the end of 2007 out of a total inventory of 1,473 missiles.[21] The United States also plans to destroy an additional 170 missile silos and 208 mobile missile launchers in the same time frame.[22] That still leaves substantial numbers of both slated for destruction but still in the Russian arsenal.
- **SLBM/SSBN elimination:** DOD plans to complete the elimination of SSBNs and associated launchers and missiles by 2007. Both the submarine/launcher and missile programs have been especially active in recent years with 26 submarines placed on contract for dismantlement from fiscal year 1992 to 2001 and an additional 15 submarines to be placed on dismantlement contract by 2007.[23] The number of missiles to be destroyed from fiscal year 2000 to 2004 will jump from 147 to 463.[24] When completed, the program will have eliminated 41 nuclear-powered ballistic missile submarines and 612 launchers as well as some 581 liquid-propellant SLBM and 80 solid-propellant missiles.[25] Up until fiscal 2002, U.S. expenditures totaled approximately $825 million for the elimination of submarines/launchers and almost $100 million for missile elimination. The estimated cost of both these programs to completion (from fiscal year 2003 to 2006) is approximately $90 million.[26]
- **Heavy bomber/ALCM elimination**: Forty-two heavy bombers have been destroyed according to START elimination procedures using equipment and logistics support provided by DOD. That equipment included cranes, metal-cutting tools, and scrap-metal handling equipment delivered from 1994 to 1995. Total program cost is expected to reach approximately $10 million, almost all of which was spent during the last half of the 1990s. The program is expected to continue through September 2006.[27] DOD also assisted Ukraine in the elimination of 1,068 air-launched cruise missiles (ALCMs) covered by

20. Ibid.
21. Ibid.
22. Ibid.
23. Wolfsthal, *Nuclear Status Report*, p. 50.
24. Mark A. Baker, project manager, "CTR Program SSBN Dismantlement Project" (slide presentation of the Defense Threat Reduction Agency, Washington, D.C., 2002).
25. Ibid.
26. Ibid.
27. Wolfsthal, *Nuclear Status Report*, p. 49.

the START I agreement. The project was completed at the end of 2002.[28] Six hundred of the ALCMs were transferred to Russia along with their associated bombers.

- **Missile fuel elimination:** DOD's program has two components. First, it is assisting Russia in the construction of a facility to remove solid propellant from 916 Russian ICBMs and SLBM missile motors.[29] However, construction of the site has been delayed by a Russian decision to relocate the installation from Perm to the city of Votkinsk because of local opposition. Still, DOD expects the facility to begin activities during the second half of fiscal year 2003. The total cost of this project is expected to reach $84.2 million.[30] The second DOD program, to break down liquid propellant into commercial chemicals, began work in late 1999 on the elimination of 153,000 metric tons of liquid fuel at two commissioned facilities at Krasnoyarsk with a third facility expected to begin operations in summer 2001.[31] DOD is providing Russia with three liquid-propellant disposal systems as well as other items such as 125 flatbed railcars and 670 tank containers. This program is expected to cost $148 million.[32] Some reports indicate that the liquid-fuel storage problem has reached critical levels with facilities almost overflowing.[33]

Although DOD projects seem to be making good progress in achieving their objectives, they have experienced some problems. First, secrecy has complicated a number of projects related to the elimination of strategic delivery vehicles, such as ICBM silo destruction where the United States can only provide equipment to Russian personnel and not actually visit the silo sites. This impedes U.S. efforts to ensure that assistance provided under the DOD program is not being diverted for other purposes. Second, the need to create an elimination infrastructure that will ensure environmentally safe destruction of missiles and fuel has created program delays. Further, the Soviet Union created a massive infrastructure for building weapons but gave little thought to their elimination, which means that a comprehensive dismantlement infrastructure now has to be created. Moreover, officials now have to cope with more vocal local populations and politicians who may or may not want these facilities located near them. This has been a problem for both eliminating liquid-fuel missiles and the construction of a plant to eliminate solid-fuel motors.

---

28. Ibid., p. 53.

29. DTRA, "Cooperative Threat Reduction: Solid Propellant Disposition Facility," March 1, 2001, <www.dtra.mil/ctr/project/projrus/ctr_solid_prop.html> (accessed July 10, 2002).

30. DOD, *Cooperative Threat Reduction Multi-Year Program Plan Fiscal Year 2001* (Washington, D.C.: U.S. Department of Defense, January 2000), p. 11.

31. Wolfsthal, *Nuclear Status Report*, p. 49.

32. DOD, *Cooperative Threat Reduction Multi-Year Program Plan Fiscal Year 2001*, p. 17.

33. Ibid., p. 12.

# Weapons Protection, Control, Accounting, and Elimination

## Nuclear

Both the Department of Defense and Department of Energy fund programs designed to reduce the threat of unsecured Russian nuclear weapons through encouraging nuclear warhead dismantlement and enhanced security in their storage and transport. Warheads controlled by the 12th Main Directorate of the Ministry of Defense are located at more than 60 storage sites plus dozens of strategic deployment locations and more than 160 storage bunkers.[34] Naval nuclear weapons, located at 42 sites and containing approximately 4,000 warheads, are controlled separately, although they will be turned over to the 12th Main Directorate in 2003.[35] In the past year, terrorists have conducted at least two reconnaissance missions at Russian nuclear warhead storage facilities.

U.S. nuclear programs date back to 1992 and have focused on three specific areas. First, the initial focus was on the withdrawal of nuclear weapons from Belarus, Kazakhstan, and Ukraine to Russia. Given the high volume of "nuclear traffic," the danger of accidents, and the threat of hijacking, the program emphasized the protection of warheads in transit as well as emergency services in case of accident. Although the transfer from non-Russia sites was completed in 1996, Russia has continued to transfer weapons to safe storage sites and dismantlement facilities at a rate of about 6 to 7 shipments per month.[36] DOD has continued to provide security and safety assistance in this area.

Second, programs dealing with the security of stored nuclear weapons in Russia have been developed to deal with the potential threat of military personnel who, as a result of economic hardship, might be tempted to divert or sell weapons.

Finally, the United States has had a continuing interest since 1994 in ensuring the "transparency and irreversibility" of warhead dismantlement. Although joint official efforts to consider steps designed to achieve these objectives collapsed in the fall of 1995, lab-to-lab contacts have continued on a transparency regime.

The main DOD program focuses on storage site enhancements at a cost of $572 million through fiscal year 2005.[37] This program is designed to improve the security of nuclear weapons at as many as 123 storage sites run by the 12th Directorate.[38] The major component is the "quick fix" project that seeks to provide Russia with 50 km. of sensor fencing, 350 sensor alarms, and 200 microwave systems.[39] Shipments began in 1997, initially focusing on 50 sites. In 1998, the Ministry of Defense requested 73 additional sets for air force and navy storage structures as well as for the strategic rocket forces.[40] Shipment of the additional equipment began in fiscal

34. McKinzie et al., *The U.S. Nuclear War Plan*, p. 89.

35. Wolfsthal, "Controlling Nuclear Materials in Russia."

36. Ian Woodcroft, "Nuclear Weapons Dismantlement Assistance in Russia," in Einhorn and Flournoy, *Protecting against the Spread of Nuclear, Biological, and Chemical Weapons*, Volume 2.

37. DOD, *Cooperative Threat Reduction Multi-Year Program Plan Fiscal Year 2001*, pp. 20–22.

38. Ibid.

39. Ibid.

year 2000. Those packages are now being installed after considerable delay, although DOD is still experiencing problems confirming their use. The very locations of the sites remain secret. More comprehensive security upgrades await a resolution of this problem.

In addition, the storage site enhancement program funds a Security Enhancement and Training Center to assist the Ministry of Defense with the design of security systems and with assessing site vulnerability using software designed by DOE.

DOE programs that focus on upgrading the security of Russian naval warheads have made greater progress, in part because of a good relationship developed with the navy while working on other issues. DOE expects to complete its "rapid upgrade" program at all 42 Russian Navy nuclear warhead storage sites in fiscal year 2003. Those upgrades consist of a baseline inventory, locks, delay blocks, steel cages, and hardened windows. DOE is also installing "comprehensive upgrades" such as detection systems, closed-circuit television monitoring, and computerized accounting systems in addition to the rapid upgrades. As of fiscal year 2003, this comprehensive upgrade has been installed at 24 sites where 60 percent of the warheads are stored. The comprehensive upgrade will be installed at 7 additional storage sites covering another 20 percent of the 4,000 warheads in fiscal year 2003. This program should be completed in 2006, two years earlier than had previously been projected.[41]

DOD programs to help ensure transport security include railcar maintenance and security and 2 transportation safety enhancements. The department has provided Russia with 115 modification kits to update railcars and plans to conduct further maintenance on 104 additional cars over the next five years. DOD also plans to extend the service life of the existing fleet or to procure replacement railcars. For example, DOD completed the manufacture of 15 nuclear weapons guard cars in fiscal year 2001.[42] The overall objective is to facilitate the movement of increasing numbers of warheads, reaching 1,000 to 1,500 per year from fiscal year 2002 to 2005.[43] Total cost of these programs through fiscal year 2005 is expected to reach about $80 million.[44]

Russian officials have continued to stress the importance of warhead dismantlement. In spite of the collapse of official discussions on warhead dismantlement and transparency, lab-to-lab contacts have made useful progress in breaking down the operational hurdles to strategic agreement and have led to new possibilities in exploring warhead dismantlement cooperation. There have been more than 40 lab-to-lab warhead dismantlement transparency contracts signed with Russian nuclear laboratories. Among the successes of these programs, the All Russian Scientific

40. Ibid.

41. NNSA, "National Nuclear Security Administration Budget for 2003," 2002, <www.cfo.doe.gov/budget/03budget/content/DEFNN/Nuclnonp.pdf> (accessed October 7, 2002).

42. DTRA, "FY 2002 Amended Budget Submission: Former Soviet Union Threat Reduction Appropriation," June 2001, p. 24.

43. Thomas E. Keunning, Jr., "Cooperative Threat Reduction Program" (slide presentation for DTRA given at Carnegie Endowment for International Peace, Washington, D.C., April 5, 2002).

44. DOD, *Cooperative Threat Reduction Multi-Year Program Plan Fiscal Year 2001*, p. 22–24.

Research Institute of Technical Physics at Chelyabinsk-70 demonstrated in March 1999 a hypothetical model of a potential Russian dismantlement facility to assess and evaluate various transparency technologies throughout the dismantlement process. Increased project support and funding will be necessary for technical development to move from testing and demonstration.

## Chemical/Biological Weapons

The Department of Defense is the U.S. government focal point for dealing with the former Soviet Union's chemical weapons (CW) and biological weapons (BW) stockpile. DOD's programs are designed to provide assistance for the safe, secure, and ecologically sound destruction of the former Soviet weapons stockpile and production infrastructure; and to prevent the proliferation of the former Soviet biological weapons scientific and technology base through assistance to projects such as collaborative research, enhanced safety and security measures at biological research institutes, and the consolidation and dismantlement of infrastructure associated with BW production or research. In the aftermath of September 11, 2001, and amid new concerns about BW proliferation, DOD officials have testified to Congress that stopping bioterrorism is a new top priority for the cooperative threat reduction program.

The former Soviet Union has the largest inventory of chemical weapons in the world—declared by Moscow to consist of some 40,000 tons of mustard, nerve, lewisite, and other agents at seven major storage sites. This stockpile is slated for elimination under the Chemical Weapons Convention. The cooperative threat reduction program has supported dismantlement in Russia since 1992 and has worked with the Russian State Institute of Organic Chemistry and Technology on demilitarization. Demilitarization is estimated to cost from $6 billion to $10 billion, cheaper than the U.S. program, which is now estimated at $24 billion.[45] Despite the lower cost, this price will still be difficult for Russia to pay.

The centerpiece of the U.S. program has been the development and design of a pilot nerve agent destruction facility at the Shchuch'ye CW depot. This facility houses more than 5,450 metric tons of nerve agents weaponized in nearly 2 million artillery projectiles (40 percent of the entire Russian inventory), 718 bulk-filled FROG and SCUD missile warheads, and 42 bomblet SS-21 missile warheads. The eventual cost is estimated to be almost $900 million.[46]

The Shchuch'ye project has been plagued by problems. Congress deleted funding in both fiscal year 2000 and 2001, although site preparation and other work has begun using remaining funds from previous years. Congressional concerns were reflected in six certifications that the U.S. secretary of defense is required to make before funding can be obligated: that Russia accurately disclose its chemical weapons stockpile; that it demonstrate an annual commitment of at least $25 million to CW elimination; that it develop a plan to destroy its stockpile of nerve agents; that

45. Paul Walker, "Russian Chemical Weapons Demilitarization: Successes and Challenges," in Einhorn and Flournoy, *Protecting against the Spread of Nuclear, Biological, and Chemical Weapons*, Volume 2.

46. Ibid.

it enact a law that would provide for their elimination at a single site; and that it agree to destroy CW production facilities at Volgograd and Novocheboksark.[47] The secretary must also certify that the international community has demonstrated a commitment to help fund the project. With the completion of the Senate and House conference on the National Defense Authorization Bill for fiscal year 2003, the president has now been given a three-year waiver on these requirements, freeing up money for CW destruction as well as other CTR and Freedom Support Act threat reduction activities.

DOD is also funding other CW-related projects, such as assisting Russia in the demilitarization of a handful of CW production facilities at a total project cost of $52 million. Fifteen buildings at the Volgograd production facility have been demilitarized, and work should be completed in 2002. One building has been demilitarized at the Novocheboksarsk production facility. Twenty million dollars has also been devoted to upgrading chemical-weapons storage security at the Shchuch'ye and Kizner sites that contain 11,000 metric tons of CW. Much of the CW is concentrated in artillery shells that, because of easy transportability, present a proliferation concern.

In 1999, the United States signed an agreement with Uzbekistan to provide $6 million in CTR funds to dismantle the Chemical Research Institute in Nukus. That project should be completed in summer 2002.[48]

Although the Soviet Union signed the 1972 Biological and Toxin Weapons Convention, it covertly developed the world's largest offensive biological weapons program, relying both on military and nonmilitary scientific institutes. Much of the program's infrastructure is located in Russia. According to a 2000 General Accounting Office (GAO) report, the program's assets are both "dangerous and vulnerable to misuse."[49] They include as many as 15,000 underpaid scientists, specialized facilities and equipment, and large collections of dangerous biological pathogens. Since 1997, Iran and other countries have stepped up their efforts to acquire biological weapons expertise and materials from former Soviet biological weapons institutes.

The United States is pursuing a broad array of programs to cope with the NIS biological weapons threat, including collaborative research activities to reduce the incentives for personnel to work with hostile states and groups as well as to increase openness to the West; dismantlement of BW-related facilities; and upgrading security, safety, and transparency at BW-related sites.

From fiscal years 1994 to 1999, the United States spent about $20 million, primarily from the Departments of Defense, State, and Energy, to fund collaborative research projects. Program benefits include grants for more than 2,200 former Soviet biological weapons personnel, of whom more than 745 were senior scientists, and U.S. access to more than 30 of about 50 nonmilitary institutes.[50]

---

47. For changing certification requirements refer to yearly U.S. Government Defense Appropriation and Freedom Support Act legislation.

48. DTRA, "FY 2003 Budget Estimates: Former Soviet Union Threat Reduction Appropriation," February 2002, p. 25.

49. U.S. General Accounting Office (GAO), *Biological Weapons: Effort to Reduce Former Soviet Threat Offers Benefits, Poses New Risks* (Washington, D.C.: GAO, April 2000), p. 5.

50. Ibid.

For fiscal years 2000 through 2004, the United States plans to spend about $220 million to expand its efforts in this area, including a Defense-State plan to provide about $36 million for collaborative research that will help improve U.S. defenses against biological weapons threats. As of 2002, four of the collaborative biodefense projects have been completed, and 13 are ongoing. New projects throughout the former Soviet Union are nearing approval.

Other ongoing projects include dismantlement of biological weapons infrastructure and equipment at Vector and Oblensk with planning for work at three additional sites; elimination of the offensive BW production infrastructure at Stepnogorsk; destruction of buried residual pathogenic material at Voz Island; four ongoing projects to ensure the secure and safe storage and handling of biological pathogens; and enhancement of safety and security for national strain collections at two institutes in Almaty and Otar.

Some concerns remain. First, although Russia has generally allowed the United States access to nonmilitary institutes that have received assistance, it has not allowed the United States to inspect military institutes run by the Ministry of Defense. Second, collaborative projects on biodefense risk sustaining Russian scientific skills to develop offensive biological weapons. However, a long-term transition from working on military programs to civilian applications through commercial opportunities exist in these institutions, through expanding smaller and very specific research and development projects that remain insufficient in supporting a larger microbiology and biotechnology industry.

## Materials Protection, Control, Accounting, and Elimination

The Department of Energy estimates that there is approximately 603 metric tons of weapons-attractive material in Russia, enough for about 41,000 nuclear devices.[51] The United States has four major programs run by the Departments of Energy and Defense designed to deal with this immense and dangerous stockpile.

### Materials Protection, Control, and Accounting

Although the original Nunn-Lugar program focused on securing nuclear weapons, not materials, this program was initiated in 1993 and was originally funded through DOD's cooperative threat reduction effort, although implemented by the DOE. In addition, DOE started its own lab-to-lab program based on a collaborative approach to meet the same objective: to upgrade the physical security and accountancy procedures appropriate to the level of attractiveness of the nuclear material and threat. The two programs were merged in 1997 under the control of DOE, in part because DOE's lab-to-lab concentration on collaborative efforts proved more effective than DOD's more formal government-to-government program. DOE works with MINATOM as well as the Russian Navy on MPC&A projects.

51. NNSA, "National Nuclear Security Administration Budget for 2003."

Funding for the MPC&A program has rapidly expanded over the past decade. From fiscal year 1993 to1996 the program received $67 million in Russia.[52] In fiscal year 1999, it received $140 million.[53] The Clinton administration requested and was granted $145 million in fiscal year 2000 and nearly $150 million the next year.[54] The administration also requested an additional $100 million for a new initiative, the Long Term Nonproliferation Program for Russia, $70 million of which would have been used to strengthen security and accounting for existing civil plutonium stockpiles.[55]

The Bush administration sharply reduced planned funding for MPC&A in its fiscal year 2002 budget request. Although DOE had planned to request more than $200 million, the new administration's budget reduced the program to about $138 million.[56] As a result of congressional action, the final version of the bill passed in early November restored funding to its fiscal year 2001 level. Subsequently, in supplementals to the budget passed in the wake of September 11, 2001, $120 million was added to the program and $235 million requested for fiscal year 2003, an increase of $63 million over the previous year.[57]

The MPC&A program has made substantial progress in upgrading security and accounting systems, although more work remains to be done.

- Non-MINATOM civilian sites, which account for 6 percent of the nuclear material, were once considered the highest proliferation risk because of lax security. By the end of fiscal year 2002, DOE will have installed comprehensive upgrades covering 60 percent of this material and rapid upgrades covering almost all of it.
- Sites under MINATOM's control account for more than four-fifths of the nuclear material in Russia. Because progress has been slowed by access disputes, comprehensive upgrades will cover only 6 percent while rapid upgrades will cover 31 percent by the end of fiscal year 2002. In fiscal year 2003, DOE plans to complete rapid upgrades on an additional 9 percent of the MINATOM material and comprehensive ones on an additional 6 percent.
- DOE operations at Navy facilities, covering 10 percent of the material, have been the most successful. All navy material will be covered by both rapid and comprehensive upgrades by the end of fiscal year 2003.

Overall, DOE will have completed comprehensive upgrades on 26 percent of the more than 600 metric tons of material by the end of fiscal year 2003.[58]

---

52. Nuclear Threat Initiative (NTI), "Russia: DOE MPC&A Program," <www.nti.org/db/nisprofs/russia/forasst/doe/mpca.htm> (accessed January 10, 2002).

53. Ibid.

54. William Hoehn, "The Clinton Administration's Fiscal Year 2001 Budget Requests For Nuclear Security Cooperation with Russia," March 2000, <www.ransac.org/new-web-site/related/congress/status/FY01-budget.html> (accessed January 21, 2002).

55. Ibid.

56. Hoehn, "Analysis of the Bush Administration's Fiscal Year 2002 Budget Requests."

57. RANSAC, "Anticipated FY 2003 Budget Request for Department of Energy Cooperative Nuclear Security Programs in Russia," January 9, 2002, <www.ransac.org/new-web-site/whatsnew/fy03budget.html> (accessed January 20, 2002).

58. NNSA, "National Nuclear Security Administration Budget for 2003."

## Mayak Storage Facility

The Department of Defense and MINATOM signed an agreement in 1992 to cooperate on the design and construction of a large-scale fissile material storage facility in Mayak to securely store plutonium and HEU from dismantled nuclear weapons. Although the original plans called for the construction of a two-wing facility, each capable of holding 25,000 fissile material containers and 66 metric tons of materials, the project has undergone a series of modifications.[59] Because of Russian financial constraints, plans call for completing only the initial wing of the facility. Moreover, the U.S. Congress has attached certain conditions before deciding to fund the second wing, including a certification by the secretary of defense that additional capacity is necessary and a detailed cost estimate and certification of a transparency agreement to provide confidence that stored material is from nuclear weapons.

A transparency agreement is also being negotiated with MINATOM. The talks have made progress on measures to confirm that the facility would safely store nuclear materials and not allow their removal for military or defense purposes. U.S. inspectors will be allowed to visit the facility up to six times per year to access Mayak's computer-based accounting logs and to pick out storage tubes at random for verification. Less progress has been made on reaching a bilateral agreement to verify that material stored at Mayak actually derives from nuclear weapons. Work is also proceeding on a "trilateral initiative" with the International Atomic Energy Agency (IAEA), after former president Yeltsin's 1996 proposal to put Mayak under IAEA safeguards.[60] Important progress was made in 1999 and announced at the IAEA General Conference.

Work began on the initial wing of Mayak in 1996, and construction should be completed in 2002. Russia plans to begin loading later in the year or in early 2003. Total cost of the facility is expected to be about $380 million.[61]

## Plutonium Disposition

The United States has two programs designed to dispose of exiting stockpiles of plutonium, as well as to shut down plutonium production reactors. In 1995, President Clinton designated 50 tons of plutonium (Pu) as excess, and President Yeltsin declared that 50 tons of Russian Pu would be made excess through the nuclear disarmament process. These amounts represent significant portions of plutonium stocks in both countries and would be enough to produce tens of thousands of weapons. In June 2000, the two countries reached an agreement on a framework for each to dispose of 34 metric tons of plutonium as opposed to the plutonium both sides had declared excess. This was at Russia's insistence, since 16 of the 50 tons declared by the United States was not weapons-grade material. The agreement pro-

59. DOD, *Cooperative Threat Reduction Multi-Year Program Plan Fiscal Year 2001*, p. 24–28.

60. U.S. Government, "Press Statement: Trilateral Initiative on Verifying Excess Weapon Origin Fissile Materials," November 1996, <www.fas.org/nuke/control/usiaea/docs/st961108.html> (accessed October 10, 2002).

61. DOD, *Cooperative Threat Reduction Multi-Year Program Plan Fiscal Year 2001*, p. 25.

vides for each country to seek to begin operation of facilities for disposal of 2 metric tons per year beginning in 2007.[62]

Although there are technical constraints on how much material can be disposed of yearly, the lack of Russian financing has been a significant obstacle. The United States has already agreed to provide Russia with $200 million in assistance, but the estimated total cost of the plutonium disposition program is $1.7 billion. International assistance will evidently be needed. The G-8 summit in 2000 called on the international community to develop such a plan by the next summit meeting in 2001, but that deadline was not met and no firm plans for financing exist.

The Bush administration's review of the plutonium disposition program determined that it could be made more effective and less costly by relying primarily on the irradiation of mixed oxide (MOX) fuel to dispose of surplus plutonium. The estimated cost over the next 20 years is about $3.8 billion, a saving of nearly $2 billion over the previous plan. The time necessary to dispose of the plutonium will also be shortened by three years. Funding requested for Russia in fiscal year 2003 is $98 million, an increase of approximately 40 percent from the previous year's budget.[63] DOE has been cooperating with Russia to lay the groundwork for its disposition program, including technology development in the areas of plutonium conversion and irradiation of MOX fuel in fast and thermal reactors.

The second major U.S. effort is designed to end Russian plutonium production for both military and civilian purposes. There are three remaining weapons-grade plutonium production reactors at two sites in Russia churning out a combined total of 1.5 metric tons per year.[64] These reactors also provide energy to surrounding towns, so if they are shut down, other energy sources must be built. The program's initial focus on converting the cores of the reactors to use an alternative fuel has been changed to shutting them down after providing alternate fossil-fueled generating capacity. Although conversion was projected for completion by 2000, work has been transferred from DOD to DOE, reflecting the shift in focus. The fiscal year 2003 budget request of $49 million is intended to fund a five-year accelerated program to provide replacement heat and electric capacity at the two reactor locations.[65]

## HEU Purchase and Transparency

In February 1993, the United States and Russia signed an HEU purchase agreement providing for the purchase of 500 metric tons of HEU from dismantled Russian nuclear weapons over a 20-year period, to be turned into low-enriched uranium (LEU) for use in nuclear reactors in the United States—enough HEU to make approximately 20,000 nuclear devices.[66] Under the terms of the agreement, conver-

62. Edwin S. Lyman, "The Future of Immobilization under the U.S.-Russian Plutonium Disposition Agreement," (paper presented at the 42nd Annual Meeting of the Institute of Nuclear Materials Management, Indian Wells, Calif.), July 18, 2001), pp. 1–4.

63. NNSA, "National Nuclear Security Administration Budget for 2003."

64. Anatoli S. Diakov, "The Cessation of Production of Weapons-Grade Plutonium in Russia," *Science & Global Security*, vol. 5 (1994), <www.princeton.edu/~globsec/publications/pdf/5_1diakov.pdf> (accessed October 2, 2002).

65. NNSA, "National Nuclear Security Administration Budget for 2003."

sion of the HEU components is performed in Russia's closed nuclear cities. The estimated commercial value of the material is $12 billion.

The HEU Transparency Implementation Program (TIP) puts in place measures designed to permit the United States to have confidence that three nuclear nonproliferation goals of the purchase agreement are achieved: that the HEU is in fact extracted from dismantled nuclear weapons; that the same HEU is oxidized and down blended to LEU; and that the LEU delivered to the United States is fabricated into fuel for commercial nuclear power reactors. The program also requires the United States to support comparable monitoring activities by Russia at certain U.S. facilities.

HEU processing in Russia is conducted at four MINATOM facilities located in Ozersk, Seversk, Zelnogorsk, and Novouralsk, all involved in the HEU transparency program. Transparency monitoring procedures and operations have been implemented and measuring equipment installed at these facilities. The United States maintains a permanent monitoring office at one site and plans to complete negotiations in fiscal year 2003 for another office at Seversk, where two-thirds of the total HEU is processed. In addition, the United States is allowed up to 24 special monitoring visits to the four facilities every year, which are used, in part, to install and maintain monitoring equipment.[67] Through the end of 2001, more than 6,400 monitoring days were spent at the four facilities.[68]

The LEU is then shipped to the United States Enrichment Corporation (USEC) in Ohio for sale and shipment to U.S. commercial reactor fuel fabrication facilities. From initial delivery in 1995 to September 2002, a total of about 150 metric tons of HEU were converted to LEU, enough material for approximately 6,000 warheads.[69] The current rate of conversion is 30 metric tons yearly.[70]

MINATOM has been provided with a total of $2.5 billion through 2001 for the HEU and is expected to receive $475 million for each additional 30 metric tons converted to LEU.[71] Funding requested for the transparency program in fiscal year 2003 is $17 million, approximately a 20 percent increase over the previous fiscal year.[72]

## Brain Drain

The U.S. Departments of State and Energy have three programs designed to prevent the brain drain of former Soviet scientists to potential proliferators. The Department of State manages U.S. participation in the multilateral International Science Centers located in Russia and Ukraine. The Department of Energy runs two pro-

66. United States Enrichment Corporation (USEC), "US-Russian Megatons to Megawatts Program: Turning Nuclear Warheads into Electricity," September 2002, <www.usec.com/v2001_02/HTML/Megatons_status.asp> (accessed October 7, 2002).
67. NNSA, "National Nuclear Security Administration Budget for 2003."
68. Ibid.
69. USEC, "US-Russian Megatons to Megawatts Program."
70. NNSA, "National Nuclear Security Administration Budget for 2003."
71. Ibid.
72. Ibid.

grams, the Initiative for Proliferation Prevention (IPP) and the Nuclear Cities Initiative (NCI). These programs are now the two components of DOE's Russian Transition Initiative.

## International Science Centers

Located in Russia (International Science and Technology Center or ISTC) and Ukraine (Science and Technology Center in Ukraine or STCU), the centers are designed to prevent the spread of expertise on weapons of mass destruction and missile technology by providing civilian employment opportunities to former weapons scientists and engineers. This is accomplished by (1) providing scientists the opportunity to redirect their talents to peaceful activities; (2) supporting basic and applied research and technology development; (3) contributing to the transition to market-based economies; (4) fostering the integration of scientists into the global scientific community; and (5) contributing to solving national and international technical problems. Interested facilities and scientists submit project proposals that are then subject to review and submitted to the governing boards of each center for a final decision.

The ISTC in Moscow was founded in 1992 and the STCU three years later. In addition to the United States, donors include the European Union (EU), Japan, Norway, Canada, and the Republic of Korea. Both centers have sought to ensure the full participation of other NIS states. Branches have been established in Almaty, Kazakhstan; Minsk, Belarus; Yereven, Armenia; and Tbilisi, Georgia. The STCU has field offices in the Ukrainian cities of Dnipropetrovsk, Kharkiv, and Lviv.

As of November 2000, total government funding over the lifetime of these organizations was close to $400 million, of which a little less than half came from the United States. The ISTC had approved 1,156 projects with a value of $315 million, engaging more than 30,000 NIS scientists and engineers at more than 400 institutions.[73] As of 2000, the STCU had approved more than 290 projects with a total value of approximately $46 million, engaging more than 6,700 NIS scientists.[74]

A key component of the International Science Center program, launched in 1997, has been the partner programs to provide opportunities for private industry, scientific institutions, and other government or nongovernment organizations to fund research at NIS institutions. Private industry benefits from the established scientific expertise associated with the centers as well as their tax-exempt status. The private sector's involvement serves several top priorities: the long-term conversion of former weapons technologies, the integration of NIS science and technology centers into the international civilian markets, and the reduction of science center dependence on government funding. As of the end of 2000, the International Science Centers had 98 partner organizations and 76 partner projects representing $24.1 million in funding. Total partner program contributions since the program began have exceeded $41 million.[75]

---

73. International Science and Technology Center (ISTC), *Annual Report 2000: Summary of ISTC Project Funding,* 2000, p. 30.

74. Science and Technology Center in Ukraine (SCTU), *Annual Report 2000: Five Years Successfully Working in Ukraine,* 2000, p. 15.

Although the International Science Center's initial emphasis was on the nuclear sector, it has recently made a more concerted effort to reach out to biological scientists. From 1994 to 1998, roughly 13 percent of ISTC funding was devoted to biology projects. In 1999, the United States increased funding by $10 million, bringing the total devoted to projects in biotechnology and life science to about $41 million. The bulk of the recent increase in U.S. fiscal year 2002 funding for the science centers will be devoted to converting one or two selected bio-production facilities into institutions that might provide drugs and pharmaceuticals to Russia or the international community. This effort is part of a growing emphasis on the long-term sustainability of U.S. cooperative threat reduction programs through a permanent transition to commercial viability.

The International Science Centers programs have strong support within the Bush administration and on Capitol Hill, particularly from Senators Lugar and Ted Stevens (R-Alaska). State Department officials believe that the program could benefit from a sustained commitment of $100 million over the next five years, which would enable them to both expand the reach of the centers and to focus more on ensuring the long-term sustainability of their efforts.[76]

## Department of Energy Programs

The Department of Energy currently funds two programs designed to stem the brain drain. The Initiative for Proliferation Prevention, or IPP, begun in 1994 as a cooperative arrangement among U.S. and former soviet laboratories and others, sought to channel first-rate technological capacities into nonmilitary endeavors. The objective has been to commercialize those projects through its industry arm, the U.S. Industry Coalition, and to establish self-sustaining entities ensuring an exit strategy for the United States. The program has received more than $200 million in funding for a variety of technology projects in the nuclear, biological, and chemical weapons sectors as well as missile technology.[77]

IPP has been the target of frequent attacks and inconsistent funding. A GAO report in February 1999 was critical on a number of counts,[78] from administrative lapses in management of the program to too much money being spent in the United States and not enough in Russia. Many of the projects were found to have little or no chance of becoming commercially viable. Finally, GAO was concerned that IPP had not fully considered the military applications of projects to ensure that useful defense-related information was not unintentionally transferred.

Still, as of June 2000, the program had approved 511 projects that engaged more than 8,000 NIS scientists, engineers, and other staff at more than 170 institutes.[79] Almost three-quarters of the projects were nuclear related and the rest biological

75. ISTC, "Annual Report 2000," p. 14.

76. Unofficial State Department source.

77. NTI, "Russia: Initiatives For Proliferation Prevention," October 1, 2002, <www.nti.org/db/nisprofs/russia/forasst/doe/ipp.htm> (accessed October 7, 2002).

78. GAO Report to the Chairman, Committee on Foreign Relations, U.S. Senate, "Nuclear Nonproliferation: Concerns with DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists," February 1999, <www.nti.org/db/nisprofs/russia/fulltext/gaorpts/gaoipp.pdf> (accessed October 6, 2002).

and chemical. Since inception, 13 IPP projects have been commercialized; 5 of these projects have attracted more than $60 million in venture capital. The expenditure of $90 million in IPP funding has attracted $125 million in private sector matches.[80] Despite its flaws, IPP has visibly helped deal with the proliferation threat. Receiving strong backing in Congress by such patrons as Senator Pete Domenici (R-N.Mex.) and with more than 100 U.S. companies involved in the commercialization of IPP projects in Russia, the program is continually expanding. It is estimated that the number of sustainable jobs created by IPP will rise to approximately 2,000 by 2004. This is essential given the fact that between 30,000 and 50,000 sustainable jobs need to be created for weapons specialists in Russia's closed nuclear cities alone.[81]

The DOE's Nuclear Cities Initiative, or NCI, was established in 1998 through a government-to-government agreement reached by Secretary of Energy Bill Richardson and Minister Yevgeny Adamov of MINATOM. The purpose is to create sustainable job opportunities for weapons scientists and to help accelerate the downsizing of the nuclear weapons complex. The program focuses on Russia's closed nuclear cities, 10 of which form the core of the complex, and where Russian officials estimate they need to create 30,000 to 50,000 jobs over the next few years.[82] NCI has been carried out in conjunction with other government programs and nongovernmental organizations with experience in community building. Since its inception, NCI has received more than $60 million in funding.[83]

Other U.S. programs have reinforced NCI's efforts. Thirty-eight projects funded by IPP are located in the closed cities, although efforts have been slowed by disagreements with Russia over how those funds should be dispersed. Also, the International Science Centers have spent about $40 million on scientific research projects in which weapons institutes in Sarov, Snezhinsk, and Zheleznogorsk have participated.

From 1999 until the end of 2001, MINATOM spent approximately $140 million, of which $90 million was devoted to conversion. It is not known to what extent these programs involved leading weapons scientists, although the GAO reports that 6,000 new jobs have been created. MINATOM's efforts have met with limited success. Some sites have been very aggressive in developing international contacts or finding a niche in the Russian economy. Others have done little, waiting for the Russian government to bail them out.

Since its inception, however, NCI has suffered from a number of problems. First, given security sensitivities, Russia insisted on restricting activities only to the

---

79. NTI, "Russia: Initiatives for Proliferation Prevention (IPP)," <www.nti.org/db/nisprofs/russia/forasst/doe/ipp.htm> (accessed October 10, 2002).

80. Los Alamos National Laboratories, "Initiatives for Proliferation Prevention," <http://ipp.lanl.gov/> (accessed October 4, 2002).

81. Victor Alessi, "The Brain Drain Problem," in Einhorn and Flournoy, *Protecting against the Spread of Nuclear, Biological, and Chemical Weapons*, Volume 2.

82. Kenneth N. Luongo, "Don't Let Furor from Cox Report Undermine U.S.-Russian Cooperation," *Arms Control Today* (April/May 1999), <http://www.armscontrol.org/act/1999_04-05/klam99.asp> (accessed October 1, 2002).

83. NTI, "Russia: Nuclear Cities Initiative," October 1, 2002, <www.nti.org/db/nisprofs/russia/forasst/doe/closcity.htm> (accessed October 7, 2002).

"open" parts of closed cities—outside the fences of nuclear installations. Second, DOE and MINATOM have had different priorities: DOE seemed more interested in spending funds at U.S. laboratories, while MINATOM wanted the United States to demonstrate that money actually flowed into the cities before granting broad access to the cities. Third, persuading commercial partners to invest in the closed cities is difficult given their remote locations, problems with access, and lack of business experience. Finally, the 1999 GAO report found that half of the projects were not designed to create jobs for weapons scientists but instead focused on activities such as the delivery of medical equipment. Moreover, most of the scientists receiving program funds continued to work on WMD. Only eight projects—one-third of those reviewed by GAO—were designed to develop sustainable commercial ventures. After the fiscal year 2000 budget request was cut in half, DOE refocused its efforts on three closed cities—Sarov, Snezhinsk, and Zheleznogorsk.

Nevertheless, the program has made some progress. NCI reports it has created approximately 370 jobs in the closed cities.[84] Its main accomplishment has been the Sarov Open Computing Center that may employ up to 500 people and achieve self-sufficiency by 2005. The NCI has also reduced the Avangard nuclear weapons assembly plant at Sarov by 500,000 square feet, including making available for commercial applications another 50,000 square feet of production floor space. Part of that space will be used to employ up to 1,000 workers in the production of kidney-dialysis machines. Russia has publicly committed to end weapons work at the facility by 2003 and to allow operations at an additional site, Zarechnyy, if efforts at Avangard prove successful.

As a result of domestic criticism in the United States, the IPP and NCI have been combined into a new program entitled Russian Transition Initiatives. The fiscal year 2003 budget request for this program is $39 million, a significant decrease from the previous year's funding that is largely explained by a $10 million emergency supplemental given to the program in late 2001 to accelerate work in the nuclear cities.[85] DOE plans to emphasize acceleration of technology efforts that have clear applications for dealing with terrorism, continued reduction of the Avangard nuclear facility, and projects to establish commercial ventures.

Although domestic support for brain drain programs has been mixed, U.S. efforts have achieved some important results. There continue to be reports of individual cases of leakage to third countries, but the ISTC and STCU have been particularly successful in providing employment for tens of thousands of scientists and engineers. And though it is difficult to prove the lack of a brain drain is a direct result of these efforts, the programs have given NIS scientists a realistic means to convert their skills to civilian uses.

---

84. GAO Report to Congressional Requesters, "Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenges," <http://www.nti.org/db/nisprofs/russia/fulltext/gaorpts/gaonci.pdf> (accessed October 1, 2002).

85. William Hoehn, "Update on Congressional Activity Affecting U.S.-Russian Cooperative Nonproliferation Programs," July 26, 2002, <www.ransac.org> (accessed October 7, 2002).

# Export Controls

U.S. export control assistance to the NIS seeks to help build institutions, infrastructure, and legislation to help prevent weapons proliferation. With initial funding from the Department of Defense, the Departments of Commerce, State, Energy, and Treasury (Customs Service) provided $39 million through 1996 for these activities. Funding responsibility then shifted to the State Department through its Nonproliferation, Antiterrorism, Demining and Related Programs (NADR) and the Nonproliferation and Disarmament Fund (NDF). Funds are provided to the Department of Commerce, which implements a portion of the U.S. export control assistance program. The Department of Energy runs a separate effort, which also receives State Department funding, focusing on nuclear export control.

## State Department Export Control Program

The State Department's program has a budget of $37.5 million in fiscal year 2002 and concentrates on funding as well as coordinating U.S. assistance.[86] The NADR program focuses on long-term projects, such as export control regime building. The NDF program is designed to fund projects to meet more short-term, emerging needs that established mechanisms do not address. The State Department funds programs administered by other agencies after their proposals are examined in a multistage review process. Most of the Department of Commerce programs are funded by the NDF.

The State Department requested $36 million for export control assistance in fiscal year 2003. The emergency terrorism supplemental provides an additional $4 million to the department's export control activities. Of this amount, $17.4 million is to be spent on export control activities in Russia and the NIS. Recent activities and initiatives have included conferences involving countries in export control dialogue and the State Department–sponsored expanded interagency program known as Export Control and Related Border Security Program (EXBS). This program has provided interagency funding to projects run within the Departments of State, Defense, and Treasury (Customs Service) designed to provide assistance to government agencies involved in border security and investigations relating to the prevention of the proliferation of weapons of mass destruction.

## Department of Energy Nuclear Export Control Program

DOE's program is a cooperative effort with Russia to combat the illicit trafficking of nuclear material and nuclear-related equipment across Russia's borders. DOE works closely with the Russian State Customs Committee, through an agreement signed in 1998, on a variety of activities including installation of detection technologies on the southern borders of Russia. In the fiscal year 2003 budget, the program was transferred from DOE's Nonproliferation and National Security Program to the MPC&A program.

---

86. Hoehn, "Analysis of the Bush Administration's Fiscal Year 2003 Budget Requests."

Funding has rapidly expanded over the past two years from $7 million in fiscal year 2001 to the fiscal year 2003 request of $30 million. Recent activities include the installation of radiation detection equipment at 21 strategic transit and border sites (20 in Russia and 1 in Ukraine); initial surveys of border sites in Kazakhstan; and the provision of introductory nuclear material and recognition training for 24 Ukrainian border enforcement officials in conjunction with the Department of State and U.S. Customs Service.[87]

## Department of Commerce

The Department of Commerce provides support in areas such as legal foundations and regulatory development, licensing procedures and practices, preventive enforcement mechanisms, industry-government relations, and administration/system automation. The department's Bureau of Export Administration (BXA) has been collaborating with the Moscow-based Center on Export Controls, a nongovernmental organization with close ties to Russian government agencies, in holding workshops designed to improve industry-government relations in export control and Russian industry compliance with export control regulations. By the end of 2001, the center had carried out nearly 40 regional export control workshops reaching more than 550 enterprises.[88] For fiscal year 2003, the Bush administration has increased assistance to the BXA's Enhancing Export Enforcement and Improving Efficiency of the Export Licensing System projects, designed to prevent the proliferation of weapons of mass destruction and improve licensing and regulatory experts, by $5.35 million and $1 million respectively.

U.S. export control assistance programs have helped lay the legal and institutional basis for controls of nuclear, missile, and dual-use exports in Russia, Ukraine, and Kazakhstan and, to a lesser extent, in Georgia and Belarus. They have significantly upgraded the qualifications of NIS customs officials and their equipment as well as accelerated Russia's efforts to install radiation equipment at its major border crossings. As a result, the probability that smuggled nuclear materials will be detected before they leave the NIS has increased.

Problems persist, however. First, enforcement of legislative and regulatory standards where they exist remains sporadic. Second, the legal and institutional infrastructure for effective controls has not yet been established in many of the NIS, especially in the "southern tier." Third, some of the most likely routes for trafficking in WMD technology, also in the "southern tier," remain relatively unguarded. Fourth, while the Department of Commerce has a strategic plan for its export assistance program, the U.S. government does not have a long-term vision, particularly on critical issues such as sustainability. Fifth, the effectiveness of export controls depends to some degree on the economic situation in Russia. As long as that situation remains difficult, firms will be tempted by offers from countries of proliferation concern. Finally, while U.S. agencies work together to accomplish objectives, competition, turf battles, overlap, and confusion are also common.

---

87. NNSA, "National Nuclear Security Administration Budget for 2003."

88. Igor Khripunov, "Export Control Assistance to Russia and Other FSU States," in Einhorn and Flournoy, *Protecting against the Spread of Nuclear, Biological, and Chemical Weapons*, Volume 2.

## Future Directions

Although the U.S. cooperative threat reduction program has made substantial progress, the events of September 11, 2001, underscored that the broad range of these programs must be given much greater emphasis in the future. Of particular concern is securing access to fissile materials, the essential ingredients of nuclear weapons. But the threat posed by nonnuclear WMD has also been highlighted by the anthrax attacks in the United States, as has the danger of unconventional terrorism and new threats including the dispersal of radiological contamination. Finally, there needs to be greater recognition that the threat of WMD proliferation is a global problem. It has been estimated, for example, that there are at least 2,772 kilograms of civilian HEU in research reactors in 43 countries, sometimes in quantities sufficient to make a bomb.

Some have argued that the post–September 11 objective must be a world in which every nuclear weapon and all weapons-usable material is secure and accounted for, all nuclear facilities and material transports secure from both insider and outsider threats, effective measures in place to interdict nuclear smuggling, and sufficient transparency in the international community to ensure these steps are in place.

Within this context there are clearly areas where U.S. efforts might be strengthened, including

- Drastic acceleration of U.S.-Russia cooperation in improving MPC&A efforts. Estimates are that anywhere from $300 million to $425 million per year should be spent on this program to cope with the widespread challenge in a timely fashion.
- An additional $40 million per year for export control programs in the NIS states to improve capabilities to detect nuclear materials at ports, airports, and border crossings.
- More funding for brain drain programs. Proposals for expanding these efforts range from an additional $25 million to $350 million per year. A CSIS report has even suggested that up to $5 billion be devoted to this problem over five or more years.[89]
- Increased funding to facilitate fissile material disposition and elimination as well as accelerating the blend-down of HEU to lower enrichment levels. Initiatives in these areas could require several hundred million dollars in additional funding. A large-scale fissile material buyout in Russia could run from $3.5 billion to $17 billion, spread over several years.

Three interrelated considerations are likely to condition the future of U.S. cooperative threat reduction programs—U.S.-Russia relations, the ability to secure funding, and sustainability.

---

89. Sam Nunn, project chair, and Robert E. Ebel, project director, *Managing the Global Nuclear Materials Threat: Policy Recommendations* (Washington, D.C.: CSIS, 2000), p. 15.

## U.S.-Russia Relations

A fundamental obstacle to greater cooperation has been that the United States and Russia continue to have different interests, despite the shared desire to prevent proliferation and achieve nuclear arms control. Moreover, substantial segments in both countries, including large fractions of their legislatures, remain suspicious of each other and are skeptical of WMD security cooperation.

Old disagreements continue to hamper progress. For example, continued Russian cooperation with Iran on the completion of the Bushehr reactors may have a spillover effect on cooperative threat reduction programs. To date, the United States has relied on cutting off cooperation with specific Russian institutes. But in 2000, the Clinton administration conditioned funding for a new Russian project for the development of proliferation-resistant fuel cycle on termination of nuclear cooperation with Bushehr. Ultimately, Congress decided not to fund the project because of Russia-Iran cooperation.

Exactly how this relationship will play out under the Bush administration is unclear. Whether the events of September 11 will foster a new, more cooperative U.S.-Russian relationship remains to be seen. On the one hand, greater U.S.-Russian cooperation in fighting terrorism could conceivably spill over into cooperative threat reduction programs. On the other hand, the unwillingness of the Bush administration to certify CTR projects in the first half of 2002 indicates mistrust owing to a lack of transparency between the two countries in threat reduction activities.

Simply put, there is a wide spectrum of possible relationships between the United States and Russia, each with its own implications for cooperative threat reduction. At one end is the "independent ally" model. Under this scenario, the relationship between the United States and Russia would have many common interests and few opposing security interests. Presumably, accelerated and broader efforts at cooperative threat reduction might become feasible. At the other end is a "reemerging adversary" relationship, with few common interests and many opposing security interests. Cooperative threat reduction would become more difficult. In the middle would be the status quo, "neither friend nor foe," characterized by stability with cooperative threat reduction and a mixture of common and opposing interests.

## Securing Funding

Since 1999, a number of studies by prominent experts have concluded that the United States should be spending significantly more money on cooperative threat reduction programs. For example, the Baker-Cutler Commission report in January 2001 recommended a budget of approximately $3 billion annually over the next 8 to 10 years to deal with the potential threat.[90]

A number of practical and political problems will have to be overcome, however. On a practical level, U.S. government programs still have money in their pipelines from previous years' appropriations that has yet to be spent. The slow

90. Baker and Cutler, "A Report Card on the Department of Energy's Nonproliferation Programs with Russia."

expenditure of funds often is the result of practical limitations. For example, one U.S. government official pointed out recently that there are only a limited number of bureaucrats in key Russian ministries such as MINATOM who handle cooperative threat reduction programs. Moreover, the occupants of these positions frequently change as experienced bureaucrats leave their jobs for more lucrative private sector positions. In short, drastic funding increases alone may not guarantee rapid progress.

More important, even in the wake of September 11, it may prove difficult to get the United States and other governments to foot a drastically increased bill for cooperative threat reduction. Certainly, there is greater recognition of the potential dangers as a result of the September 2001 attack, and work to deal with these threats has accelerated. The Bush budget proposal for fiscal year 2003 represented a reduction in some categories from the sums voted by Congress after September 11 but still represents a substantial increase from previous funding requests by the Clinton administration. Nevertheless, given the potential dangers, most experts agree that the stakes justify a much more significant investment.

Aside from forging greater political support for more government funding, it will therefore be increasingly important to identify innovative new methods of financing that include funding from nongovernment sources. For example, funding from the business community can both supplement government funding and reinforce efforts to create a sustainable approach to cooperative threat reduction. The growing involvement of commercial partners in U.S. brain drain programs such as the Science Centers and IPP can help create commercially viable entities that will be able to survive without government funding. Another funding proposal that has recently received attention is the "debt for security" swap. A certain portion of Russian debt would be forgiven in return for Russia agreeing to set aside funds for nuclear security.

Securing increased funding for cooperative threat reduction will also require laying out a long-term vision for that program. An important conclusion of the Baker-Cutler panel was that the U.S. government lacked a long-term strategic plan for dealing with WMD in Russia that articulated specific and measurable goals and objectives. It recommended that the president, in consultation with Congress and in cooperation with Russia, should formulate a plan to secure and/or neutralize during the next 8 to 10 years all nuclear weapons–usable material in Russia and to prevent the outflow of scientific expertise. Although the Bush administration has given the Department of Energy responsibility for formulating such a plan, whether it will succeed remains unclear. Aside from the substance, such a plan could prove useful in forging the necessary political support in Congress for greater funding.

## Sustainability/Exit Strategy

Another critical issue with regard to the future of cooperative threat reduction is the sustainability of U.S. and international efforts. Funding for cooperative threat reduction cannot maintain political support if it is open-ended. But to formulate a workable exit strategy requires some assurance that Russia will pick up where the international community leaves off and that it will maintain tight control of its WMD, materials, and scientists. That means not only a commitment of Russian

funding, probably on the order of millions of dollars, but also a commitment by the Russian bureaucracy and the political powers that be. In short, giving Russia a stake in maintaining and building on the results of the past decade will be crucial.

Part of the problem of sustainability is dealing with funding. An economically hard-pressed Russia is less likely to devote the funding necessary to sustain the momentum created by international support. On the other hand, a Russia that is making economic strides forward might have the resources to keep up the good work. The creation of commercially viable entities that become an integral part cooperative threat reduction programs, particularly those run by the International Science Centers, will be bolstered by an improving economy.

Much will also depend on helping to create the right national constituencies. Government institutions, such as MINATOM and the Ministry of Defense, will have to see cooperative threat reduction programs as an integral part of their missions and throw their bureaucratic weight behind budget requests. The United States can seek to foster this attitude by working cooperatively with Russian experts at every step of conceiving, designing, and implementing programs so they will see them as their own.

# About the Contributors

**Nobumasa Akiyama** is associate professor at the Hiroshima Peace Institute, Hiroshima City University, and adjunct research fellow at the Center for the Promotion of Disarmament and Non-Proliferation, Japan Institute of International Affairs, Tokyo. His research interests are nuclear disarmament and nonproliferation as well as conflict resolution and post-conflict peace-building, focusing on Japan's role in these fields.

**Tsutomu Arai** is currently director of the nonproliferation division at Japan's Ministry of Foreign Affairs. He was, among other positions, senior research fellow and director of planning at the Center for the Promotion of Disarmament and Non-Proliferation, Japan Institute of International Affairs, Tokyo. He has also served as an alternate representative of the Japanese delegation to the Organization for the Prohibition of Chemical Weapons and senior assistant for arms control and disarmament affairs.

**Klaus Arnhold**, retired colonel (GS) of the German Armed Forces, spent most of his career on assignments on arms control, disarmament, and other national security subjects in Germany and abroad. He took part in this project as a senior research fellow of the Stiftung Wissenschaft und Politik, Berlin.

**Paul Cornish** has been director of the Centre for Defence Studies, King's College London, since September 2002. He has served in the British army; the Foreign and Commonwealth Office; Chatham House; the Defence Studies Department of King's College London; and the Centre of International Studies of the University of Cambridge. His research focuses on international arms trade, European security, and the ethics of the use of armed force.

**Paolo Cotta-Ramusino** is secretary general of the Pugwash Conferences on Science and World Affairs. He is professor of mathematical physics at the University of Milan and is affiliated with the Italian National Institute of Nuclear Physics and the Landau Network–Centro Volta. He is a cofounder of the Italian Union of Scientists for Disarmament, formed in 1983.

**Isabelle Facon** is a research fellow at the Fondation pour la Recherche Stratégique, Paris, where her research and publications focus on Russian security, defense, and foreign policies. She teaches at the Collège Interarmées de Défense, Ecole polytechnique, and various universities. Formerly she was a senior associate at Saint Antony's College in Oxford.

**John B. Hay** is a senior fellow at the Centre for Security and Defence Studies at the Norman Paterson School of International Affairs, Carleton University, Ottawa. A

former journalist, he is also a consultant in foreign policy and international affairs and has written extensively on these matters.

**Kathrin Höhl,** Abitur 1990, was a practicing nurse until 1999. In 2002 she received her master's degree in German studies and international relations at Johann-Wolfgang-Goethe-University, Frankfurt. She is currently a Ph.D. candidate and holds a scholarship at the Peace Research Institute Frankfurt, where her research focuses on chemical weapons and arms control and disarmament.

**Antonino Lantieri** holds a degree in chemical engineering from the University of Palermo. Currently he works in ENEA (Italy's Agency for New Technologies, Energy, and Environment), Advanced Physics Technologies Department, where he is responsible for the project on nonproliferation, disarmament, and military nuclear reconversion.

**Tor Larsson** is the retired director of research at the Swedish National Defense Research Institute, which provides technical advice on disarmament matters to Sweden's Foreign Ministry. On behalf of the ministry he was responsible for Sweden's contributions to the programs of the International Science and Technology Center and of the Science and Technology Center in Ukraine during 1995–1999.

**Jenifer Mackby** is a fellow in the International Security Program at CSIS. She previously was secretary of the negotiations on the Nuclear Test Ban Treaty in Geneva, Switzerland, in 1996 and worked on its verification at the preparatory commission in Vienna, Austria. She has written for the *New York Times* and *Newsweek*.

**Morten Bremer Mærli** is a researcher at the Norwegian Institute of International Affairs, Oslo, where he works on nuclear nonproliferation and prevention of nuclear terrorism. He is a physicist by training with both practical and research experience in nuclear safety and security in northwest Russia. He has been a technical consultant to the Norwegian Ministry of Foreign Affairs and a visiting scholar at Stanford University and Sandia National Laboratories.

**Cécile Maisonneuve** is an associate fellow at the Fondation pour la Recherche Stratégique, Paris. She works as a clerk in the departments of the Assemblée Nationale. She graduated from the École Normale Supérieure and the Institute for Political Studies (Paris). She has a master's degree in history from the University of Paris IV (Sorbonne).

**Maurizio Martellini** is secretary general of Landau Network–Centro Volta and professor at the University of Insubria, Como. He is an analyst of global security issues and internationalization of science and technology as a tool of multilateral cooperative diplomacy. He is also adviser to the Italian Ministry of Foreign Affairs.

**Harald Müller** is director of the Peace Research Institute Frankfurt (PRIF) and professor of international relations at Frankfurt University. He was a delegate to the Nuclear Non-Proliferation Treaty review conferences of 1995–2000 and a member

of the governmental Defense Review Commission of 1999–2000. Currently, he serves on the UN secretary general's Advisory Board on Disarmament Matters.

**Annette Schaper** holds a Ph.D. in experimental physics and is senior research associate at the Peace Research Institute Frankfurt. She is a part-time member of the German delegation to the Comprehensive Test Ban Treaty negotiations and at the Nuclear Non-Proliferation Treaty review conference. Her research focuses on nuclear arms control and disarmament, particularly transparency issues and nuclear terrorism.

**Burkard Schmitt** holds a doctorate in contemporary history from the University of Erlangen and a master's degree from the University of Bordeaux. Since January 2002 he has been assistant director of the European Union Institute for Security Studies in Paris. Previously, he was a research fellow at the Western European Union Institute for Security Studies and an independent journalist and consultant.

**Bruno Tertrais** is a senior research fellow for strategic studies at the Fondation pour la Recherche Stratégique, Paris. His previous positions include director of the Civilian Affairs Committee of the NATO Assembly, visiting fellow at the Rand Corporation, and special assistant to the director of strategic affairs at the French Ministry of Defense.

**Marianne van Leeuwen** is deputy director of studies at the Netherlands Institute of International Relations "Clingendael" in The Hague, Netherlands. A historian by training, she specializes in international terrorism and issues concerning the international nonproliferation regime.

**Joel Wit** is a senior fellow at CSIS working on Northeast Asian security, arms control, and weapons proliferation issues. He served for 15 years in the Department of State, most notably as coordinator for the 1994 U.S.–North Korea Agreed Framework. He holds a master's degree in international security studies.

**Ian A. Woodcroft** is a researcher in the CSIS International Security Program, specializing in issues related to weapons of mass destruction in the former Soviet Union. He has also researched nuclear force modernization in the United States and scenarios for Korea's future. He holds a degree in politics from Portsmouth University, England.