

Part I: Executive Summary | 1

The collapse of the Soviet Union has led both to freedom and to the construction of democratic institutions for many of its former citizens. However, in many of the new republics that have emerged from the former Soviet Union (FSU; see figure 1), the collapse of the center has also led to economic deterioration and political chaos. In most, if not all of them, central political and administrative authority have markedly weakened. Part of this weakening is a devolution of power to democratic institutions on local and regional levels and could be considered a healthy development. But this reduction in central authority has also led to the buildup of local fiefdoms, as individuals and local authorities seek to assure their own futures. Other manifestations of this phenomenon have been increased disorder and crime, including corruption at all levels of government.

The outlook for many of these new nations is uncertain. Any instability in this large area of the world is regarded with apprehension, not only by neighbors, but also by nations that are continents and oceans removed. A major reason for this long-distance concern is the presence in the territory of the former Soviet Union of tens of thousands of nuclear weapons and hundreds of tonnes of nuclear material suitable for nuclear weapon manufacture. Another concern is the resident expertise in nuclear, chemical, and biological weapons and missile systems. Severe economic disruptions in the FSU and the decrease in central authority of many of the new governments increase the chances that weapons of mass destruction, their components, or related expertise could be transferred to foreign parties. **Such transfers would greatly aggravate the threat that proliferation of these capabilities al-**

"All the nuclear inheritor states have difficulties in managing nuclear materials and nuclear weapon-related components on their territories. "

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ready poses to U.S. interests and to international peace and security.¹

This study examines the implications of the current situation in the FSU for the proliferation of weapons of mass destruction and their delivery systems. It **concentrates on the nuclear component of this broad issue**, which has thus far been foremost in the views of most western observers. However, it also addresses threats that the Soviet Union breakup has posed to the chemical and biological weapon nonproliferation regimes.

FINDINGS AND POLICY OPTIONS

The following is a set of general findings and policy options regarding proliferation and the FSU. All points are discussed in detail in the body of the report. In addition, there are further findings and options specific to each of the four nuclear inheritor republics of the Soviet Union (e.g., those with strategic nuclear weapons on their territories when the Soviet Union ceased to exist) that may be found in the chapters on each of these nations (Belarus, Kazakhstan, Russia, and Ukraine).

The situation in the FSU has been fluid since the disintegration of the Soviet Union. **The analysis in this study, including findings and options, is current as of July 1994.** Major political or economic changes since that date could render some of the analysis obsolete. While this caveat holds in any analysis of current international politics, events in the former Soviet Union have moved particularly rapidly in the past three years and are likely to continue to do so.

■ Nonproliferation Policies and Agreements

FINDING: *From the perspective of adherence to international arms control agreements, the positions of the four nuclear inheritor states of the FSU have much improved since mid-1992. This shift constitutes a major*

success in strengthening the international nuclear nonproliferation regime.

In the first months following the end of the Soviet Union, Russia was the only one of the states with Soviet nuclear weapons on its territory that had agreed to ratify both the Nuclear Non-Proliferation Treaty (NPT) and the START I arms reduction agreement. Its START ratification was (and still is) contingent on ratification of both agreements by the other three. Since then, due in part to major efforts by two U.S. administrations, all four inheritor states have ratified START I, and all but Ukraine have acceded to the NPT. Ukraine is believed likely to accede to the NPT shortly and, in any case, has agreed to return all strategic nuclear weapons on its territory to Russia within seven years. According to many statements from officials from both Russia and other FSU republics that are apparently accepted by the U.S. government, all tactical nuclear weapons had already been returned to Russia from the other republics of the FSU by mid-1992. These agreements and actions have removed a major threat to achievement of a long-term extension to the NPT at that treaty's Extension Conference in 1995, and are an important gain for the international nuclear nonproliferation regime.

FINDING: *The recent agreement by the United States and Russia to verify mutually their nuclear weapon dismantlement will strengthen the nuclear nonproliferation regime by instituting an international arrangement to protect and monitor the nuclear material from the weapons.*

Under the so-called Nunn-Lugar program, the United States is providing assistance to the FSU for dismantling Soviet nuclear weapons and reducing the threat that these and other Soviet weapons of mass destruction pose to the United States and the rest of the world. In implementing this program, the United States must decide what de-

¹ See U.S. Congress, Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, OTA-ISC-559 (Washington, DC: U.S. Government Printing Office, August 1993), an earlier publication of this OTA study, for a description of the dangers that the proliferation of weapons of mass destruction pose to the United States and the world.

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gree of assurance it needs that such dismantlement is indeed being conducted. Monitoring nuclear weapon dismantlement could be carried out in several ways:

1. through bilateral inspections at the facilities where nuclear material from weapons is blended and stored;
2. through inspection by the International Atomic Energy Agency (IAEA) at blending and storage facilities;
3. through bilateral inspection at the dismantlement facilities themselves, in addition to the blending and storage facilities, and;
4. through inspection by the IAEA at blending, storage, and dismantlement facilities.

At present, the first of these options has been agreed to, and discussions are now underway regarding the second and third. In earlier informal discussions, Russian officials refused to consider verification of dismantlement in the absence of U.S. willingness to permit reciprocal verification of its own dismantlement activities. The United States government had previously resisted such verification for reasons of secrecy, but has recently become more flexible. As a result, the United States and Russia have agreed to institute mutual verification procedures at each other's facilities. The two countries have so far agreed only to permit monitoring of their storage areas, which in the United States include parts of the Pantex facility near Amarillo, Texas, where weapons are dismantled and nuclear components stored. However, it has not yet been settled whether there will be inspections at the actual buildings where dismantlement takes place. Even if only storage sites are inspected, procedures may still need to be implemented to protect classified weapon design information on each side.

Since only U.S. and Russian inspectors would be involved, there maybe somewhat less concern about protecting weapon-related information than there would be if other nationals participated. Both the United States and Russia have sophisticated nuclear arsenals and would not likely gain significant advantage from whatever information on weapons might be revealed despite the confi-

dentiality measures. Moreover, implementation agreements and inspection protocols should be easier to negotiate bilaterally than they would be if three or more parties were involved, which would be the case if the IAEA were to participate. The negative aspect of a bilateral arrangement between the United States and Russia is that it excludes the rest of the world. In particular, it excludes the three other declared weapon states—the United Kingdom, France, and China—that have direct interests in nuclear disarmament, and that may need to be involved in future nuclear arms reduction agreements.

Involving the IAEA in these inspections would give the world community an active role and stake in the disarmament process, setting an important precedent for future nuclear disarmament. Indeed, the U.S. government has committed itself unilaterally to submit to IAEA monitoring of nuclear material from weapons determined to be in “excess” of U.S. military requirements. The multilateral approach, however, has several disadvantages. First, inspectors from many countries, including possible would-be proliferants, would be routinely touring nuclear weapon facilities. Even basic weapon information would have to be protected during the process by which material inputs and outputs were to be quantitatively verified. This may be technically possible, but-even if the actual dismantlement process were not under international observation-IAEA involvement would probably cause ongoing concerns about the possible leakage of nuclear design information to non-nuclear-weapon states.

■ Blocking Access to Nuclear Weapons and Materials

FINDING: *All the nuclear inheritor states have difficulties in managing nuclear materials and nuclear weapon-related components on their territories.*

These difficulties range from inadequate means of controlling, accounting for, and protecting the nuclear material on their territories (including a lack of international safeguards providing for external audits and technical verification of the na-

tional systems of accounting for the material) to inadequate border controls, customs, and export controls. These difficulties also extend to controls over dual-use items: objects having innocent, commercial applications but that also have uses related to nuclear weapons.

FINDING: *External aid is vital to bringing control over such materials and goods up to international/ standards in the shortest possible time.*

Belarus, Kazakhstan, and Ukraine do not have adequate export control systems or national systems to control nuclear materials. Neither do they have nuclear safeguards agreements in place with the International Atomic Energy Agency (IAEA). For example, one or two years will be needed to put a national nuclear material accounting and control system in place in Kazakhstan and to implement a nuclear safeguards agreement with the IAEA, according to current estimates. Even in Russia, improvements in nuclear safeguards and export controls are essential. The sooner international safeguards are in place, the sooner one window for diversion will be closed.

OPTION: *The United States could expedite its assistance for improving material control and accountability and export control to all the nuclear inheritor states in an effort to close quickly any windows of opportunity that may now exist to divert nuclear material/ or information.*

The process of dismantling thousands of nuclear weapons in the United States and in Russia, as outlined in the parallel initiatives of Presidents Gorbachev and Bush in 1991, is still in its early stages in both countries. In 1991, the United States also began a large-scale aid program referred to as the Nunn-Lugar or Cooperative Threat Reduction program. Through this program, four hundred million dollars have been provided in each of fiscal years 1992, 1993, and 1994 to assist Russia and the other nuclear inheritor states in the dismantlement of nuclear and chemical weapons and to fund related projects. In addition to weapon dismantlement, these funds may also be used to

convert defense facilities to non-military use, as well as to help prevent proliferation of weapons of mass destruction through means such as developing export control systems, improving nuclear safeguards, and preventing the diffusion of related expertise from the FSU. **As of March 22, 1994, about \$75 million have been proposed for obligations to improve nuclear safeguards and to develop export control systems. However, less than one million dollars have actually been obligated for these purposes and even less actually spent.**

■ The “Brain Drain”

OPTION: *Any assistance that the United States and the West could provide to assure a minimal living standard for weapon scientists and custodians of nuclear weapons in the FSU would help protect those weapons and their nuclear material from unauthorized uses. Moreover, spending some U.S. Nunn-Lugar funds on contractors in Russia and the other inheritor states, as well as speeding implementation of U.S. assistance, could help dispel hostility towards the United States and help dissuade weapon scientists and engineers from contributing to the development of weapons of mass destruction by other states,*

More efficient delivery of U.S. and Western assistance could work to counter the impression, now prevalent among Russian scientists and politicians, that the U.S. program is mainly aimed at aiding U.S. industry and at disarming the Russian military. Such an impression, which has been strengthened by the slow progress made thus far in implementing the programs for U.S. assistance to the FSU, is not conducive to increased U. S.- Russian cooperation in nonproliferation and other areas. **Of the \$1.2 billion authorized in fiscal years 1992-1994, only \$117 million had been obligated as of March 22, 1994 (table 1).** Indeed, Congress refused to roll over \$208 million in fiscal year 1992 funds that had not been obligated by late 1993. In order to implement the projects planned for those funds, money was taken from the \$400 million appropriated in fiscal year 1994.

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TABLE 1: Proposed Funding Allocations of \$1.2 Billion Authorized in Cooperative Threat Reduction Program, as of March 1994 (\$ millions)

Country	Notifications to Congress	Obligations
Belarus	76.06	5.17
Kazakhstan	99.96	0.12
Russia	492.96	108.63
Ukraine	277.06	0.18
Total	946.04	114.10

SOURCE. U.S. Department of Defense, 1994.

Part of the delay in spending these funds had been due to difficulties in negotiating agreements with the FSU republics, but part of the problem was also the glacial rate at which the U.S. government approved projects and obligated and transferred funds. In addition to time-consuming review within the executive branch, Congress, represented by the Appropriations and Armed Services Committees in each house, must be notified by the Department of Defense (DOD) of the intent to obligate funds for each program. In practice, this means that individual programs may be blocked by objections from the Committees. Thus, in a sense, programs need to receive tacit approval from these committees before funds can be obligated.²

The Defense Department has announced its intent to obligate an additional \$420 million by the end of fiscal year 1994 and \$430 million by the end of fiscal year 1995, having reached agreement with the receiver nations for over \$900 million in future projects.³ These expenditures will come mostly from fiscal year 1993 and fiscal year 1994 funds. However, the successful expenditure of this

amount by that time will require that Congress and the executive branch proceed more expeditiously on this matter than they have in the past.

In addition to providing specific help for weapon dismantlement, U.S. assistance could also help stabilize the economic situation in the Russian nuclear weapon complex. There are indications that housing and other conditions for officers in charge of manning and protecting strategic nuclear weapons in the FSU are poor, as it reportedly is among many elements of the Russian military. Improving the living conditions for personnel with control over nuclear weapons and nuclear materials could significantly improve their morale and substantially increase security over the nuclear arsenal.⁴

Moreover, legislative restrictions on Nunn-Lugar spending that require the use of U.S. technology and experience “where feasible” could be relaxed, so that more than the current minimal level could be spent on local contractors in the FSU. Easing such restrictions could be done either in future legislation reauthorizing the Cooperative Threat Reduction Program, or by a less restrictive interpretation of the word “feasible” by the Department of Defense in the implementation of the program.

Another serious problem that Western assistance might ameliorate is the so-called “brain drain”: the possibility that technical personnel with expertise in weapons of mass destruction might emigrate to would-be proliferant countries or otherwise provide relevant material, expertise, technology, or information to unauthorized parties outside the FSU. Severe economic stresses in Russia and other republics of the FSU could tempt

² Nunn-Lugar funding obligations must be reported to Congress at least 15 days before such obligation takes place. This requirement has been in the authorizing legislation since fiscal year 1992. In the fiscal year 1994 Defense Authorization Act, section 1206 addresses the prior notice to Congress of obligation of funds and section 1208 defines the relevant committees.

³ Telefax from the Office Of the Assistant to the Secretary of Defense for Atomic Energy, Apr. 25, 1994.

⁴ A somewhat different perspective on aid strategies for stabilizing FSU republics may be found in “A New Strategy for United States Assistance to Russia and the Newly Independent States” (Washington, DC: The Fund for Democracy and Development, January 1994). While not focused on the nonproliferation issue, the report stresses providing housing and job training for military personnel and increasing the use of the private sector for distributing humanitarian aid. It also emphasizes accelerating implementation of Nunn-Lugar assistance and expanding technical exchanges.

such individuals to sell knowledge or material to which they have access. Aggravating this problem is the fact that funding for science in general, and for nuclear weapon institutions in particular, has become severely restricted in Russia. The two major nuclear weapon design laboratories, at Arzamas and Chelyabinsk, have had problems supplying their employees with minimal salaries, let alone the comfortable living standards that had been their due as honored and vital workers in the Soviet Union. As a result, scientific workers at these establishments have engaged in public demonstrations and protests. U.S. visitors to one of these sites report even a lack of basic medicines and anesthetics at hospitals. Although there is no evidence that deprivation has yet resulted in anyone emigrating beyond the FSU to perform weapon-related research, concern remains that such may occur if conditions continue to deteriorate.

The United States, along with allies in Western Europe and Japan, has set up an International Science and Technology Center (ISTC) in Russia for the FSU. A smaller, separate center (including Canadian participation as well) is planned for Ukraine. The goal of these centers is to provide non-military research opportunities for former Soviet scientists, in collaboration with colleagues from the West. These efforts have proceeded very slowly. The Ukraine Science and Technology Center is still blocked by political problems in Kiev. The ISTC, however, finally began operation in March 1994, broadening its original membership to include Kazakhstan, Belarus, Armenia, and Georgia.

OPTION: *The United States could consider the establishment of independent science and technology centers in Belarus and Kazakhstan.*

Both Belarus and Kazakhstan have acceded to the ISTC agreement, and the installation of ISTC branch offices in their respective capital cities is under review. However, no independent centers focused on weapon scientists in these two countries are now being considered. This somewhat offhand treatment might be viewed as making Belarus and Kazakhstan appear to be unimportant

nations with whom the United States will deal only through the former imperial power, Russia. The lack of a separate center is of concern especially in Kazakhstan, which contains the original Soviet nuclear test facility and which has become the new home of a large number of its weapon scientists and technicians. Kazakhstan also has former Soviet chemical and biological weapon facilities on its territory.

Separate science and technology centers could be established either under the auspices of recently signed science and technology umbrella agreements with the two countries, or under the Nunn-Lugar program. Such arrangements would have the effect of providing research possibilities for weapon and civilian scientists, furnishing them with much desired contacts with Western colleagues. They would also assist these countries in the development of a scientific and technical base, essential to economic recovery in a time of difficult transition. Both results are important to preventing proliferation, since they would help in stabilizing economic conditions and promoting political calm.

OPTION: *Expand the scope of the science and technology centers and laboratory-level collaborations and assure continuing funding for the Laboratory-Industry Partnership Program (LIPP). In addition, Institute procedures to speed up operations and render the collaborations more efficient.*

It is in the vital interests of the United States that former Soviet nuclear weapon scientists have some means other than selling nuclear secrets to provide minimal living standards for their families. The more effort expended on helping such scientists maintain both their professional activities-directed to peaceful research—and a decent standard of living, the better protected will be the information to which they have access. Furthermore, applying their skills to the production of commercially viable products could help stabilize the shaky economies of the FSU republics. Such stabilization, in turn, would improve the general prospects for an orderly society, vital for maintaining an effective nonproliferation regime in

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those nations. This last point argues for also involving scientists who are not weapon researchers in these assistance programs, as in fact is being done in the ISTC and other collaborative projects.

In addition to the ISTC, numerous laboratory-to-laboratory contacts and joint research projects have been organized between scientists at U.S. national laboratories and their colleagues in Russia and Ukraine. Some of these are aimed at basic research and others have the goal of developing commercially viable products, in collaboration with a third party: private industry in the United States. These activities, often initiated on a personal level, have resulted in a multimillion dollar effort that has provided support for a (still) relatively small number of former Soviet nuclear scientists and also provided them much desired contact with science and scientists in the West.

The Laboratory-Industrial Partnership Program (LIPP)—a formalized effort to fund industrial partnerships with scientists in the FSU—has been developed by the Department of Energy in cooperation with the Department of State. Funding at the level of \$35 million is currently specifically earmarked in the Foreign Operations Appropriations Act for fiscal year 1994. However, no funding beyond fiscal year 1994 has yet been assured. A more regularized funding arrangement than the current one could be instituted. One possibility would be to include LIPP and, possibly, other laboratory-to-laboratory projects as a line item in the Department of Energy appropriations.

Finally, joint projects with FSU scientists have been impeded in the past by difficulties in obtaining multiple-entry visas for FSU scientists to visit the United States and by frequent lack of timeliness by the Department of Energy in granting its

scientists' travel requests to the FSU. Expediting these processes would contribute to the efficiency of collaborative efforts between the United States and republics of the FSU.

■ The China Connection

A further problem connected with limited employment opportunities among weapon scientists in Russia is the apparent increase in military research collaboration between Russia and China. Many Russian experts are reported to be working on Chinese military projects in the nuclear and missile areas.⁵ Although China already has advanced nuclear weapon and rocket technology, the transfer of additional capability is not in the interest of the United States for two reasons. First, China could thereby pose a greater military threat to other nations in the region and even to the United States itself. Second, China might sell some of its newly acquired technology to third parties that do not currently possess nuclear or long-range rocket capability, possibly threatening regional and even global stability. On the other hand, if the United States were to press this issue, Russia might expect the United States to increase its assistance to make up for any resources that would be forgone if this alleged collaboration with China were discontinued.

OPTION: *The United States could make strong efforts to verify whether the reports of Russian/Chinese collaboration in nuclear weapon and missile research are true. If those reports are confirmed, the United States should consider taking up this issue in contacts with the Russian government, asking for assurances that nuclear weapon and rocket technology not be transferred to China,*

⁵ See John J. Fialka, "U.S. Fears China's Success in Skimming Cream of Weapons Experts from Russia," *The Wall Street Journal*, Oct. 14, 1993, p. 12, and T.M. Cheung, "China's Buying Spree," *Far Eastern Economic Review*, July 8, 1993, p. 24, in which a Russian Ministry of Defense official is cited as confirming that over 1,000 scientists and technicians have traveled to China on exchanges and 300 are permanently based there. In addition, the article refers to "scores" who have been recruited by the Chinese government. It is not clear how many of these are nuclear or missile scientists, however.

SUMMARY FINDING

Russia and Ukraine are large countries with immense and complex problems. The United States and other external forces have only limited abilities to affect the course of events in those countries or in the rest of the FSU. Nevertheless, the United States can take some actions to counter the threat that the breakup of the Soviet Union poses to international nonproliferation regimes. Many such actions have been and are being assiduously pursued by the U.S. government. However, further steps can be taken, as suggested in the options just presented as well as in further options presented in later chapters that are specific to each of the nuclear inheritor states.

ORGANIZATION OF THIS REPORT

This report analyzes proliferation issues associated with the breakup of the Soviet Union and presents options for dealing with them. Chapter 2 considers the threat posed by the breakup to

the multilateral nonproliferation treaty regimes and addresses the importance of buttressing those regimes. Chapter 3 examines perhaps the most acute concern: the need to block proliferants from acquiring nuclear weapons, weapon materials, or associated expertise and technology from former Soviet republics. Together, these chapters comprise Part 2.

Since the United States has no direct control over activities in the former Soviet Union that might contribute to proliferation, it can exert influence only through the incentives or disincentives it offers the people, institutions, and governments of the FSU'S newly independent states. Chapters 4 through 7 examine each of the four nuclear inheritor states in turn, discussing individual problems and analyzing solutions for each of them. These chapters, comprising Part 3 of the report, elaborate on the general findings and options summarized here and go on to develop country-specific findings and options.

Part II: Proliferation Threats and Responses

The Soviet Union ceased to exist at the end of 1991. The collapse of this monolithic political structure, able to impose its will on a large part of the world, was greeted with relief by many, both within and without its territory. However, in the wake of its demise, many doubts emerged about the stability of its successor political structures. In the newly independent states of the former Soviet Union (FSU), issues of border definition, rampant criminal activity, ethnic rights, and ethnically based domination have not been resolved and, in some cases, are even becoming more acute. Even more worrying to the rest of the world is the possibility that the residual chaotic situation in the FSU might lead to loss of responsible state control over:

- nuclear material;
- facilities used to produce nuclear material;
- expertise, information, and technology that could be used in the manufacture of nuclear weapons or other weapons of mass destruction, or, in the worst case;
- nuclear or other weapons of mass destruction, themselves.

Such lack of control could result in nations (and perhaps even subnational groups) outside the FSU achieving nuclear weapon capability. Alternatively, nuclear inheritor states (i.e., those with strategic nuclear weapons on their territory when the Soviet Union ceased to exist) within the FSU might retain control of their nuclear infrastructure, and may make deliberate efforts to ac-

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quire the ability to produce or use nuclear weapons themselves.¹ The net result in either case could be an increase in the number of nuclear weapon states, either within the borders of the FSU or beyond them.

Besides increasing the chances of nuclear proliferation, the Soviet Union's demise may also contribute to chemical and biological weapon proliferation. However, the increased proliferation risk attributable specifically to the collapse of the Soviet Union is somewhat less in the chemical and biological case than it is for nuclear proliferation. Nuclear weapons—and in particular, the enriched uranium or plutonium required to make them—are much harder to produce than chemical or biological weapons. Therefore, a proliferant state able to acquire nuclear weapons or weapon materials from the FSU would gain a tremendous head start for its own nuclear weapon program, whereas its acquisition of Soviet chemical and biological agents would provide comparatively less assist-

ance to its chemical or biological weapon program. Moreover, the necessary expertise and materials to produce chemical and biological weapon agents are available from many sources besides the FSU. Hence, any leakage of chemical or biological weapon technology from the FSU (except, possibly, in the area of weaponization) would not make such a dramatic difference in potential sources of supply.²

Russia's compliance with the Chemical Weapons Convention and the Biological Weapons Convention is, however, vital for the success of those treaties. **Accordingly, this report addresses possible effects of the breakup of the Soviet Union on chemical and biological nonproliferation.**

On balance, however, this report concentrates on *nuclear* proliferation issues. Of primary concern are Russia, Ukraine, Kazakhstan, and Belarus, the nuclear inheritor states of the Soviet Union that could serve as sources for nuclear weapons or weapon materials.³

¹The Soviet Union had been one of the five countries (along with the United States, the United Kingdom, France, and China) whose nuclear arsenals were recognized and permitted—at least in the near term—by the Non-Proliferation Treaty (NPT). Russia is considered by the world community to be the nuclear successor state of the Soviet Union, inheriting its nuclear arsenal and its status as a nuclear-weapon state under the NPT. The other former Soviet republics with strategic nuclear weapons on their territories—Belarus, Kazakhstan, and Ukraine—do not have control over or undisputed ownership of those weapons and are not recognized as nuclear weapon states. Together with Russia, these states are termed “nuclear inheritor states” in this report.

²This report does not address the relative threats posed by various weapons of mass destruction, but rather the effects on proliferation of the breakup of the Soviet Union. For a discussion of the relative effects and military significance of nuclear, chemical, and biological weapons, see U.S. Congress, Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, OTA-ISC-559 (Washington, DC: U.S. Government Printing Office, August 1993), especially ch. 2. For an analysis of the relative technical requirements to produce these weapons, see U.S. Congress, Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction*, OTA-BP-ISC-115 (Washington, DC: U.S. Government Printing Office, December 1993).

³This does not imply that no other republics are a cause for worry. Estonia and Lithuania, for example, have been conduits for many types of contraband. Armenia has large unsafeguarded nuclear power reactors (currently shut down) and considerable technical expertise. Many other republics have civilian nuclear power or research facilities or uranium mining and milling operations (e.g., Lithuania, Uzbekistan, Kyrgyzstan, Turkmenistan, Georgia), but none other than the four nuclear inheritor states is thought to possess nuclear weapons or means of producing the material essential for nuclear weapons (that is, highly enriched uranium or plutonium).