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# Ending the Threat of Nuclear Attack

James E. Goodby and Harold Feiveson

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The opinions expressed here are those of the authors and do not represent positions of the Center, its supporters, or Stanford University.

## Preface

The Center for International Security and Arms Control is pleased to publish this report on the next steps in nuclear disarmament. Although public attention has shifted from the danger of nuclear war to other threats to international security, a great deal needs to be done to end the threat of nuclear attack. The report, prepared by James Goodby, who has been the Payne Distinguished Lecturer at the Institute for International Studies at Stanford in 1996–97, and Hal Feiveson of Princeton University, charts the way forward. The report draws on work done by Goodby and Feiveson in collaboration with a study group based at the Brookings Institution; the other members of that group are Bruce Blair, Jonathan Dean, Steve Fetter, George Lewis, Janne Nolan, Ted Postol, and Frank von Hippel.

The Center for International Security and Arms Control is particularly grateful to former Secretary of State George P. Shultz, Jack Steele Parker Professor Emeritus in the Graduate School of Business and Distinguished Fellow at the Hoover Institution, and to former Secretary of Defense William J. Perry, Professor of Engineering–Economic Systems and Operations Research and Senior Fellow of the Institute for International Studies at Stanford, for their endorsement of this call for urgent attention to the nuclear threat.

DAVID HOLLOWAY  
CO-DIRECTOR, CISAC

## Foreword

Late last year, we noted the tenth anniversary of what was probably the most remarkable of all the meetings between an American president and his Soviet counterpart, the Reykjavik Summit of October 1986. History has shown that Reykjavik was a true turning point. Three major treaties between the United States and the Soviet Union were negotiated by the end of 1992; they resulted in substantially reduced levels of nuclear weapons. That happened as the Cold War was ending and, as the Russians say, it was no coincidence. A dramatic change in the relationship between the Soviet Union and the United States made it possible. A readiness, both in Washington and in Moscow, to open a new chapter in their relationship prepared the way.

The world has moved on. The Soviet Union no longer exists. But can we say that the world has been freed from the incessant and pervasive fear of nuclear devastation? Not yet, as this report will show. Persuading three newly independent states to eliminate the nuclear weapons they inherited in the collapse of the Soviet Union was a major achievement. Cooperating with Russia to tighten controls over fissile materials has made a real difference in terms of international security. But illicit trafficking in nuclear materials is still a potential problem and this has happened just as a more brutal form of terrorism, more willing to engage in mass murder, has made its appearance. This threat requires a wide spectrum of responses, but at the heart of it is the need for strict controls over nuclear weapons and fissile materials from the laboratory to the missile silo and every point in between.

The idea of a safer strategic environment involving progressively less reliance on nuclear weapons is still valid and must be pursued. Abolishing nuclear weapons is a feat beyond our present capacity to achieve, but we can go much further than we have to date in eliminating these weapons. The recent U.S.-Russian summit meeting in Helsinki made a start in that direction.

The American relationship with Russia is one among many that require careful tending. It is one of the few that can be said to be vital. We can reduce the salience of nuclear weapons in the Russian-American relationship and that would open the door to many opportunities now denied us.

We are confident that this report will stimulate discussion, which it is meant to do. There are judgments here that will be debated and should be. The stakes are very high. We need to be prudent, but we cannot assume that a policy of benign neglect will suffice to make the world a safer place in the nuclear age.

The experts who wrote this report were concerned that the American people may have lost sight of the interest we all have in continuing to reduce the risks of American and Russian nuclear weapons. Their judgment is that the next few years will prove to be a watershed. Either we will move on to deeper reductions in nuclear weapons or the downward trend we have seen in recent years will be halted and perhaps reversed.

Their vision is not confined to the American-Russian relationship. They see the possibility of a global nuclear arms race and growing nuclear dangers if we take the wrong road. The authors make a strong case for getting on with deeper cuts in nuclear weapons. Their message needs to be heard.

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May 1997

# Ending the Threat of Nuclear Attack

## Why It Is Urgent to Get On with Nuclear Warhead Reductions and Reduced Reliance on Rapid Launch of Ballistic Missiles

James E. Goodby and Harold Feiveson

### Introduction

Over the past decade, the United States and Russia have made dramatic progress in taming their nuclear weapons arsenals. In light of these achievements, many people seem to think that we are on a glide path to a nuclear-weapon-free world, or, in any event, to a world where nuclear weapons no longer pose much of a problem. This is a dangerous illusion.

It is an illusion, above all, because nuclear weapons remain an apocalyptic threat to civilization, and, more particularly, a realistic threat to the national existence of the United States—perhaps the only such threat. The United States and Russia continue to deploy thousands of nuclear warheads, with a substantial portion that could be launched in a matter of a few minutes. The United States and Russia also maintain thousands of non-strategic and stored nuclear warheads and both reserve the right to use nuclear weapons first, if necessary, even against conventional attack. These are all ingredients for miscalculation, accident, and escalation and for a renewed nuclear arms race, which could this time include China as well as the United States and Russia. In addition, political instability in Russia, resulting in weakened central government control and in economic deterioration in much of the nuclear complex, raises deep concerns regarding the safety and security of nuclear weapons and materials in Russia.

The only way to rid the world of the threat of nuclear weapons would be to eliminate the weapons themselves, as General Lee Butler and other retired military officers have recently

and eloquently argued.<sup>1</sup> Even were that to occur, the knowledge and technology required to build these weapons would continue to exist and stockpiles could be rebuilt rather quickly. It is clearly possible, however, far short of complete abolition, to drastically reduce the nuclear threat. To this end, we propose a series of concrete steps that would reduce the numbers of nuclear weapons in the arsenals of the nuclear weapon states one hundredfold from tens of thousands to hundreds, with most of the weapons placed in a status that would give ample warning if they were being readied for launch. At the end of the deep cuts program, taking account of the political changes which should proceed in parallel with this program, it should be possible for the international community to see more clearly what further steps should be considered.

## A Turning Point

The next four to five years may prove to be a turning point, leading either to successive cuts in nuclear arms or to an unraveling of the whole nuclear arms limitation and reduction regime. During this period, Russian leaders will have to decide whether and how to replace the current generation of nuclear weapons, which are nearing the end of their projected lifetimes; China and other states will be confronting similarly critical security choices. The crucial decisions will likely be made in the context of a politically charged environment.

By 2000, at least three new members probably will have been admitted to NATO. A second group of candidates for admission, including the Baltic states and Ukraine, might be pressing for a decision—a situation that Russian leaders already have declared is unacceptable to them. Russia could also be faced with the beginnings of a nationwide U.S. ballistic missile defense system. Under current policy, the Clinton administration, by the end of the century, will have developed systems allowing such a defense to be deployed within a few years of a decision to go ahead. So far as we are aware, the Helsinki Joint Statement concerning the intention of President Clinton and Yeltsin to uphold the ABM Treaty did not affect the Clinton administration's policy in that regard.

China also will have to decide how to respond to possible U.S. deployment of a national ballistic missile defense or to a theater defense which could be rapidly redeployed as a national defense, either of which could cause it to reevaluate the planned level and capabilities of its small strategic missile force. There might also be increased political tension if, with their succession process behind them, and with Hong Kong and Macao reincorporated into China, the Chinese leadership then turned up the heat to resolve the Taiwan issue. A political context of this nature could influence the decisions of an increasingly prosperous China regarding the future of its nuclear forces.

The next few years may also be a critical period for the nuclear non-proliferation regime. The first review conference of the Non-Proliferation Treaty (NPT) since it was extended will take place in 2000. Negotiations on fissile-material production cutoff and entry into force of the Comprehensive Test Ban Treaty also may be factors influencing the general nuclear restraint regime at that time.

How these fateful decisions affecting nuclear weapons will be made does not depend on the United States exclusively or even on the United States and Russia together. It is certain, however, that the United States and Russia would have very little influence on the decisions

of the other nuclear weapon states, and the “threshold” countries (Israel, India, and Pakistan) if their own talks on nuclear arms reductions were bogged down.

## The Interrupted Revolution in Nuclear Arms Control

In the period from 1986, shortly after the accession to power of Mikhail Gorbachev, to the end of 1992, the United States and Soviet Union (and, in the last stage, Russia) took a series of dramatic initiatives to reduce the dangers of nuclear war. The process was sparked by Gorbachev, who overturned many long-standing tenets of Soviet security policy, and began a process that led to nuclear force reductions as well as to the reunification of Germany and the withdrawal of Soviet forces from what had been the German Democratic Republic and, indeed, from all of Eastern Europe.

Gorbachev was matched in his radical break with the past by President Reagan. Their Reykjavik summit of 1986 stretched the envelope of the imaginable beyond anything that had gone before and set the stage for the arms reductions treaties to follow. During Reagan’s second term, the United States and Soviet Union negotiated the Intermediate Nuclear Forces (INF) Treaty and laid the basis for the START I Treaty to reduce strategic nuclear arms. In the INF Treaty, which was signed in December 1987 and entered into force in June 1988, the United States and Soviet Union agreed to eliminate all ground-launched missiles with ranges between five hundred and 5,500 kilometers, a process completed by 1991.

President Bush followed through on these initiatives by completing and signing the START I Treaty with Gorbachev in July 1991, and in May 1992 negotiating the Lisbon Protocol to START, which committed Belarus, Kazakstan, and Ukraine to eliminate the strategic nuclear weapons left within their territories after the breakup of the Soviet Union. The START I Treaty (including the Lisbon Protocol) entered into force in December 1994. Bush and Russian President Yeltsin signed the START II Treaty on January 3, 1993. As modified by the Clinton-Yeltsin agreement in March 1997, START II, through the deactivation of delivery systems scheduled for elimination under the treaty, will reduce U.S. and Russian deployed strategic nuclear warheads to roughly one-third of their 1990 levels by the end of 2003.

Bush and Gorbachev also took parallel actions in the fall of 1991 to remove non-strategic nuclear weapons from deployment. These actions, taken without benefit of any formal negotiated agreement, resulted in all Soviet short-range nuclear weapons being relocated to sites within Russia by June 1992, the removal to storage of all nuclear weapons from U.S. and Russian surface ships and attack submarines, and the elimination of many of the warheads withdrawn from deployment.

The United States and Russia also took significant steps to reduce the combat readiness of thousands of nuclear weapons. In the wake of the August 1991 Moscow coup, the U.S. Strategic Command, in order to encourage further dealerting of nuclear forces by Russia, took all strategic bombers off alert and unloaded their warheads for storage in nearby depots. It also took 450 Minuteman II missiles off alert by removing the launch keys from their underground control posts and installing safety pins in each missile to physically block the possibility of rocket motor ignition. Russia took similar steps, deactivating a substantial portion of its strategic land-based missile force and pledging to keep its bomber force at a



low level of readiness. The two governments implemented these measures in a matter of days.

This process of fast-paced negotiations and parallel actions regarding the number and the readiness of nuclear forces came to a halt in 1993. The reasons were several: Yeltsin's internal problems with the Congress of People's Deputies; Russian concerns about perceived inequities in START II; a strongly adverse reaction among the Russian political class to the proposed enlargement of NATO; and in the United States a Nuclear Posture Review that called for caution in proceeding to a next round of strategic arms reductions. Most of 1993–94 was devoted to saving the Lisbon Protocol so that START II could enter into force. Another important development of the 1993–96 period was the emergence of a variety of strategic nuclear issues as regular topics on the U.S.–Russian agenda: detargeting, safety of nuclear weapons, security of weapons and fissile material, and a series of problems connected with non-proliferation, to name a few. Progress in strengthening global norms also was recorded: a comprehensive test ban treaty; a chemical weapons convention; and the indefinite extension of the nuclear Non-Proliferation Treaty.

## The Helsinki Accords of March 21, 1997

Finally, in March 1997, the issue of strategic arms reductions was rejoined. Several decisions made at their Helsinki meeting by Presidents Yeltsin and Clinton have the potential for relaunching the stalled U.S.–Russian nuclear arms reductions talks, particularly since Russian objections to the START II Treaty should have been resolved in some key respects. The two presidents committed their governments to a follow-on START III agreement that would reduce the START II limit of 3,000–3,500 deployed warheads to 2,000–2,500 warheads by the end of 2007. The bombers, missile silos, and submarines scheduled for elimination by 2003 under START II would not have to be eliminated until December 31, 2007 if the U.S. Senate consents to this change in the START II Treaty. These changes will enable Russia to maintain parity with the United States while building fewer new strategic systems than would have been the case under the previous START II arrangements. The two presidents also agreed to address measures relating to the transparency of strategic nuclear warhead inventories and the destruction of strategic nuclear warheads. These measures, among other things, could help deal with Russia's concerns about uploading stored warheads.

The Helsinki parameters included measures that could prove to be important advances in stabilizing and reducing nuclear forces. One was an agreement to deactivate all systems already scheduled for elimination under START II by removing their warheads or taking other jointly agreed steps by December 31, 2003. Rapid implementation and a broader application would enhance the value of this measure. Another agreed avenue of exploration is in the area of long-range nuclear sea-launched cruise missiles and tactical nuclear systems. These ideas could be developed into significant new reduction or limitation agreements.

The Helsinki agreements are positive and hopeful but lack the sense of urgency that we think is needed to deal adequately with the dangers of the present situation. It should not be necessary to delay discussion of important issues like transparency of warhead and fissile material inventories and measures to provide mutual confidence in the process of warhead dismantlement. The present readiness-to-launch posture on both sides was unchanged by

Helsinki. Both sides will retain for at least a decade hundreds of warheads on ballistic missiles that could be launched in minutes. In some respects, the accords may complicate the process of bringing China into a strategic dialogue. The agreement on ballistic missile defenses permits the development of highly effective, mobile systems so long as they are not tested against strategic ballistic missiles and are not deployed against Russia's strategic missiles. In short, the Helsinki agreements may help to relaunch the process of negotiated reductions in offensive forces and may have resolved U.S.-Russian differences regarding ballistic missile defenses. The accords did not commit the two countries to a fundamental shift in reliance on nuclear weapons or reduce the risks posed by the present nuclear posture. These risks will remain for at least the next decade under the framework laid down by the Helsinki parameters.

But does it matter in the post-Cold War era that nuclear weapons are not fading away, if the deliberate use of nuclear weapons now seems so unthinkable? Unfortunately, the dangers of nuclear weapons remain real.

## The Dangers of the Present Situation

The principal immediate danger is that the United States and Russia both maintain the clear capability to mount a deliberate, sudden, and massive nuclear attack. The resulting fear of a Pearl Harbor type attack has led each country to maintain its ICBMs on hair-trigger, markedly increasing the possibilities of mistaken or unauthorized use of nuclear weapons. There are longer-term dangers as well. The whole nuclear arms control regime constructed by the United States and Russia over the last several years could unravel. This would undermine efforts to limit nuclear weapons in other countries and the legitimacy of the non-proliferation regime.

### Accidental, Unauthorized, and Inadvertent Nuclear Launch

The postures of U.S. and Russian nuclear forces and command systems continue to remain largely shaped by Cold War doctrines. Thousands of weapons in both arsenals still stand ready for launch with little or no warning to the other side. The United States could launch approximately 2,700 strategic warheads within minutes; Russia, approximately 2,100. Even after the full implementation of START I and START II, the United States would still be able to launch more than 1,600 warheads and Russia at least several hundred with little or no warning.

Indeed, both the U.S. and Russian command systems remain geared to launch strategic missiles en masse after a missile attack is detected but before the incoming missiles arrive. Their early warning and nuclear release procedures, which are regularly exercised, require a response time of about fifteen minutes, allowing only three or four minutes for assessing attack information, and another three or four minutes for top-level decision making. Russia evidently entered the early phases of the firing procedures in January 1995, when the launch of a Norwegian scientific rocket triggered a false warning that activated Yeltsin's nuclear suitcase and initiated an emergency telecommunications conference with his nuclear advisors.<sup>2</sup>

These postures permit a “launch under attack” and are maintained for at least three reasons: First, the nuclear war plans are dominated by a long list of “time-urgent” military targets, particularly nuclear forces and associated command and control posts. Second, intercontinental ballistic missiles (ICBMs) in fixed silos or in garrison and pier-side submarine ballistic missiles (SLBMs) are vulnerable, thus creating the impulse to fire them before they are destroyed by incoming warheads. Finally, the command, control, and communications networks are themselves vulnerable, increasing pressures to use nuclear weapons early while the command system is still intact. As a result, as long as the United States and Russia both have ready for launch within minutes many more nuclear weapons than truly required for deterrence, each will have to assume that its fixed nuclear forces and command, communication, and control systems are targeted and therefore in a “use-them-or-lose-them” situation, and they will continue to rely on rapid launch procedures. Deeper reductions will not solve this problem; it will be necessary to verifiably shift as many nuclear weapons as possible away from a rapid launch posture, especially those which are most vulnerable to attack—the silo-based ICBMs and ballistic-missile submarines in port.

The deterioration of Russia’s command and control network, including its network of warning satellites and missile-attack warning radars, some of which are located in other republics of the former Soviet Union, has made this issue more urgent. The danger of unauthorized actions by weapons commanders and custodians may be increasing; while the ability of the top of the nuclear chain of command in Moscow to counter such unauthorized actions appears to be eroding.<sup>3</sup> Paradoxically, the control of the central authorities over nuclear weapons may only further decline as Russia places increased reliance on its strategic submarine forces and mobile ICBMs. Safeguards are not as strong or reliable for those forces as they have been on strategic land-based rockets, which have been the foundation of Russia’s deterrent forces heretofore. The potential also exists for a sudden shift of allegiance in the top command that causes a breakdown at the very heart of the system, as happened during the 1991 coup.

### The Unraveling of Nuclear Arms Control

Despite the progress at the Helsinki Summit, Russian willingness to ratify START II and to implement it over the next decade remains uncertain. If the treaty is not implemented, it would mark a serious setback for arms reductions. It may not immediately seem so since, whether or not START II is ratified, Russia’s nuclear forces will likely decline over the next few years. But, the United States should not take solace in this. How Russian nuclear forces are drawn down has strategic consequences. Sometime after the turn of the century, Russia might again become capable and willing to rebuild its nuclear forces. The stated U.S. policy of hedging against such an eventuality by maintaining the capability to deploy a large strategic nuclear force could prove to be self-fulfilling. In the short term, the hedging policy jeopardizes START II and heightens risks of miscalculation and safety. In the longer run, it increases the chances of a renewed arms race between the United States and Russia if political relationships worsen.

A breakdown in the START process would be a tragedy. But the tragedy would be much more immediate if this also resulted in a breakdown in cooperative U.S.–Russian programs to secure and dispose of weapons and fissile material now at risk of theft, forcible seizure, and diversion in Russia. The dangers of diversions of nuclear weapons in Russia have been clearly recognized by the Russian government, and it has taken steps to establish security

over the weapons. It has consolidated tactical warheads and warheads removed from eliminated missiles and bombers, once dispersed over several hundred sites, into a much smaller number of sites, and it has begun to dismantle excess and obsolete warheads. Russia is carrying out warhead dismantling largely on its own, but U.S. cooperation on upgrading the security of warheads and materials is vital. The cooperative programs initiated include both “government-to-government” programs, in which technical and financial assistance is channeled to Russia through formal agreements between U.S. and Russian government agencies, and “lab-to-lab” programs where the cooperation is directly between U.S. national laboratories (Los Alamos, Brookhaven, Livermore, Sandia, Oak Ridge, and Argonne) and key Russian laboratories (including Arzamas-16, Chelyabinsk-70, Tomsk-7, the Kurchatov Institute, and others).

Overall, these programs are well on track. Western-style integrated material protection, control, and accounting (MPC&A) systems designed to control access to and closely monitor fissile materials are now being installed in virtually all the facilities where large inventories of weapons-usable materials are used for non-military purposes and in many of the other facilities where weapons-usable materials are stored, including weapons design institutes. Large quantities of excess weapon-grade uranium is also being blended down and sold by Russia to the United States; and, with assistance from the Nunn-Lugar program, a high security storage facility for excess plutonium recovered from weapons is under construction near Chelyabinsk-65. It may be possible to assist Russia in burning plutonium from dismantled warheads in existing reactors with no recycling of the plutonium in the resulting spent fuel.

Nevertheless, the situation in Russia with regard to security of nuclear weapons and materials remains uncertain. It is critical that the United States and Russia move steadily toward elimination of all tactical and strategic warheads removed from deployment, and to a transparency regime that would provide greater assurance to the international community that the nuclear weapons and materials are secure. These initiatives would be jeopardized by any breakdown in U.S.–Russian nuclear arms control. Behind all of the specific problems is the danger that an extremist government could emerge in Russia. The most effective answer to this danger is not hedging and large arsenals but drastic reductions in nuclear weapons.

#### Loosening of Constraints on Other Countries

At present, China has relatively few nuclear weapons compared with the United States and Russia. China is unlikely to be content with this disparity indefinitely, however. A worrisome sign is an apparent rise of interest among Chinese strategists in counterforce concepts introduced by the United States and Russia during the height of their Cold War confrontation, including the development of launch-on-warning capabilities.<sup>4</sup> China today does not have the operational capabilities to implement a counterforce strategy. But it is believed to have used its final nuclear tests during 1994–96 to develop more compact, lower-yield warheads, which could be used either to equip China’s existing missiles with multiple warheads or to make possible a transition from large ICBMs and IRBMs to smaller, single-warhead, solid-fuel, mobile missiles. And, although the resources which can be devoted to new weapons systems presently are limited in China, such constraints will weaken in the future. Whether a U.S.–Russian program of deep reductions and enhancing the viability of the ABM Treaty would be sufficient to get China to formally cap its forces at current levels is unclear, but such a program appears to be an essential precondition for China to do so, and,

more generally, for eventually drawing China into an arms reduction regime. As noted above, it is unclear whether U.S.–Russian understanding about theater missile defense systems will encourage China to move in this direction.

Countries other than China will also be affected by the pace of U.S.–Russian reductions. With the first post-extension conference of the NPT looming in 2000, it is already clear from statements by the non-aligned members of the Geneva Conference on Disarmament and from votes in the General Assembly that the non-nuclear weapon states will be increasingly insistent that the nuclear weapon states honor their NPT commitment to move toward elimination or near elimination of their nuclear weapons. Refusal by the United States or Russia, which have by far the largest nuclear arsenals, to undertake such obligations could undermine long-term international support for the non-proliferation regime and the moral and political authority of the United States and other nuclear weapon states in combating proliferation. In a worst-case scenario, inaction by the nuclear weapon states could ultimately lead to some withdrawals from the NPT and undermine efforts to block proliferation in countries like Iran, Iraq, and North Korea.

## A Strategy of Staged Reductions and Reduced Reliance on Rapid Launch

To develop momentum toward these intermediate objectives, the United States should now advance a three-stage disarmament program open to all nuclear weapon states, which would be rooted in the clear acceptance of all parties that the only role for nuclear weapons is to deter and, if necessary, to respond to the use of nuclear weapons by other countries. In many respects, the first stage we would propose is similar to that accepted by the United States and Russia at the Helsinki Summit. The United States and Russia would reaffirm their commitment to the Treaty on the Limitation of Anti-Ballistic Missile Systems (the ABM Treaty); reduce to 2,000 deployed strategic warheads each; and agree that warheads withdrawn from deployment (or a specified proportion) would be dismantled, and their fissile content transferred to monitored storage. We would go beyond the Helsinki guidelines by including a commitment to eliminate essentially all non-strategic nuclear weapons; stipulating that all missiles and launchers withdrawn from the operational forces would be destroyed; and, at the same time, providing that the United States and Russia should shift most of their strategic weapons away from a rapid launch posture.

In the second stage, a verified ceiling of 1,000 would be imposed on the total warheads (stored as well as deployed) held by each country; and Britain, France, and China would be brought into the nuclear arms control process. And in the third stage, the United States, West Europe, Russia, and China would each reduce their nuclear-weapons stockpiles to two hundred warheads or fewer, with most of these immobilized, primarily by separation of nuclear warheads from their delivery vehicles.

The timing of the three stages would have to take into account political factors as well as technical issues. Technically, each stage could probably be completed within about five years, a shorter time than the Helsinki parameters stipulate for a less far-reaching first stage. We recognize that the duration of each stage cannot yet be specified exactly, but we think it

is critical that the entire program objective—to reduce nuclear arsenals to very low numbers and to shift most of the nuclear forces remaining away from rapid launch procedures—be made clear at the outset of the reductions program. This is not abolition, but it amounts to long steps in that direction—the longest steps that can be realistically projected under current international conditions.

## The First Stage

The first stage of this program provides for reaffirmation of essentially all of the terms of the ABM Treaty, commitment to eliminate most or all non-strategic nuclear weapons, reduction of U.S. and Russian nuclear arsenals to 2,000 deployed warheads each, shifting most strategic nuclear weapons away from rapid launch procedures, and the institution of the first stages of a comprehensive verification system. Accomplishing this will require sustained and extraordinary leadership by the United States. If successful, it will represent a historic achievement. Each of the elements of the first stage involves contentious issues, however, and must be subject to detailed analysis.

### Limitations on Ballistic Missile Defenses

The continued adherence by the United States to the ABM Treaty might be controversial and politically difficult. Supporters of a limited national ballistic missile defense for the United States could point—as we have above—to the dangers of Russian ballistic missiles being launched against the country by accident. They also point to the prospect that, sometime in the future, countries such as North Korea or Iraq may be able to launch a few nuclear-armed ballistic missiles at the United States. However, the risk of accidental or unauthorized launch would be far more effectively and clearly addressed by a program of shifting most ballistic missiles away from rapid launch procedures including measures to remove nuclear warheads from the missiles, than by a ballistic-missile defense which could never be fully tested, which could be defeated by even a few ballistic missiles equipped with decoys or other countermeasures, and which could provoke Russia to move to even more dangerous hair-trigger operational practices than it undertakes today.

The acquisition of ICBMs by countries such as Iraq is, at worst, remote in time. (A November 1995 National Intelligence Estimate concluded that there is little chance of a third-world ICBM threat to the contiguous forty-eight United States developing in the next fifteen years.)<sup>5</sup> In any event, missile launch by a rogue state would provide immediate evidence of origin of attack for retaliation against the attacker, and would therefore be strongly deterred by the threat of retaliation.

Of course, no one can state for certain that the United States will never face a limited missile attack; and, were the costs and risks acceptable, any responsible political leader would welcome a national defense—if an effective one were available. However, despite technical advances, the same arguments about the ease of countermeasures which doomed previous proposals for ballistic missile defense systems are still valid. Under current circumstances, even an initially thin defense designed to provide coverage to all U.S. territory could threaten the entire structure of U.S.–Russian nuclear arms control.

Under the current terms of the ABM Treaty, the United States can legally deploy a missile defense system containing up to one hundred interceptors, as long as all the components (interceptors, launchers, and radars) are fixed, ground-based, and deployed at a single site. Because of the curvature of the earth, however, such a system could not detect missiles aimed at more than one coast of the United States, and would consequently not provide coverage for even the forty-eight contiguous states. This problem could be dealt with by providing over-the-horizon tracking with early-warning radars along the U.S. periphery and/or with space-based sensors such as the proposed U.S. Space-based Tracking System. These additions would violate the ABM Treaty, which explicitly prohibits national missile defenses, and would require that the ABM Treaty be amended to allow such a defense. Some advocates believe that this could be negotiated with Russia if the system remained “light,” employing only a small number of interceptors.

Although a system relying on exoatmospheric intercept might be overwhelmed by the use of simple decoys, the history of the reactions of the United States and the former Soviet Union to each other’s BMD plans indicates that planners in a country facing another country’s BMD system will tend to assume that it might work against a “ragged” launch of a relatively small number of retaliatory missiles. For this reason, Russian planners would be cautious about reducing their offensive forces in the presence of even a very light U.S. national defense—especially if it could rapidly be converted into a thick defense. Indeed, the Russian government has warned repeatedly that Russian ratification of START II will require a continuing commitment to the ABM Treaty, and this commitment was reaffirmed by Presidents Yeltsin and Clinton at Helsinki in March 1997.

Overall, it seems highly probable that the deployment of a national ballistic missile defense system by the United States early in the next century would interfere with implementation of START II and START III, which will not be completed until the end of 2007. And other states that rely on ballistic missiles as a central component of their deterrent forces may not be willing to draw down these forces to low levels in the face of missile defense deployments by potential adversaries.

#### Reduction to 2,000 Deployed Warheads

The first stage of our deployed warhead reduction proposals is similar to that which the Helsinki parameters foreshadow. In our scheme, the United States and Russia would reduce to a total of 2,000 operational warheads by the year 2005 instead of 2007. For the United States, such a reduction could be achieved, for example, by reducing the number of Minuteman III ICBMs from five hundred under START II to three hundred, by further downloading the Trident II SLBMs from five to four warheads each, and by reducing the number of ballistic missile submarines from the projected START II level of fourteen to ten. At the 2,000-warhead level, Russia would be expected to retain some silo-based single-warhead ICBMs, several hundred mobile ICBMs, a reduced submarine force, and possibly a small force of strategic bombers.

## Reduced Reliance on Rapid Launch

It is critical also that, early in the first stage, the United States and Russia take action to reduce the dangers inherent in their current rapid-launch postures. The deactivation measures described in the Helsinki parameters would be an effective method of accomplishing this, but we foresee a broader application of the method than that laid down in the Clinton-Yeltsin agreement.

In both countries, strategic bombers are already kept at a low level of combat readiness and without nuclear payload. Additional steps to increase the time and visibility necessary for their regeneration should be taken. The bunkers in which the nuclear warheads are stored could be subject to continuous monitoring to verify that the warheads remain inside, and the bombers could be subject to challenge inspection to verify that they contain no nuclear weapons. A still higher hurdle to realerting could be effected if the warheads were relocated away from the bomber bases to a relatively small number of airstrips which would be subjected to monitoring. The bombers, which would not be allowed to visit these airstrips in non-crisis situations, would then have to fly to them to retrieve their nuclear weapons, a process which, given flight and loading times, would require many hours to a few days and could be readily observed. The regeneration times could be made longer still if the nuclear warheads were stored away from airstrips.

Silo-based ICBMs could be deactivated using methods agreed in the Helsinki parameters. Warheads could be removed from the missiles and stored separately at monitored sites, paralleling the procedures now followed for bombers. Since it would probably take many months to rearm all the missiles, the warheads could be made survivable in a crisis by loading them into secure truck transports.

In the case of mobile ICBMs in garrison, the warheads or aerodynamic missile shrouds (nose cones) could be removed from the missiles and placed in storage some distance away without creating a major new vulnerability. Both the de-mated missiles and the warheads could be subject to bilateral monitoring. In case of alert, the warheads could be loaded into trucks to rendezvous with the missiles for remating in concealed locations. Similarly, submarines located at dockside for prolonged periods could be dealerted by removing their warheads, or guidance and control modules, or their shrouds.

The dealerting of ballistic missile submarines at sea and of mobile missiles in the field would be complicated to do in a way that could be readily verified without jeopardizing the ability of these systems to survive a surprise first strike. It may be necessary, therefore, at least in the first stages of the deep cuts program, for the United States and Russia to keep some portion of ballistic missile submarines at sea and mobile ICBMs dispersed.

## Elimination of Non-strategic Nuclear Weapons

In addition to the nuclear weapons deployed on delivery vehicles capable of intercontinental ranges, the United States and Russia also possess non-strategic nuclear weapons such as nuclear bombs for tactical bombers and warheads for sea-launched cruise missiles (SLCMs). Many weapons of these types were eliminated by the U.S. and Soviet initiatives of 1991, but many remain. If deep reductions are to have any significance, they must include these remaining non-strategic as well as strategic weapons. The Helsinki parameters announced that these weapons will be addressed as separate issues in the context of START III, through the device of confidence-building and transparency measures.



The rapid decline in numbers of non-strategic weapons in the last decade reflects in part the perceived lack of missions for these weapons. Do they still have any meaningful roles to play in the post-Cold War world? From the U.S. perspective, they provide no unique capabilities. A strategic bomber such as the B-2 is capable of delivering nuclear bombs as well as or better than a tactical bomber, and anything a nuclear SLCM can do, a nuclear air-launched cruise missile (ALCM) can do just as well. Also, U.S. tactical nuclear weapons are no longer needed to deter conventional attacks on Western Europe (or on other U.S. allies).

Russia may find it more difficult to give up non-strategic nuclear weapons entirely, and the United States may insist on keeping a hundred or so warheads deployed in NATO for symbolic reasons. It may be necessary, therefore, to agree on a low limit, or to include non-strategic weapons in a combined strategic plus non-strategic warheads limit.

### Establishment of a Comprehensive Warhead Verification System

The key to verification will be to focus on nuclear warheads directly, not only on their delivery vehicles as is the case with the START agreements, until the Helsinki parameters of March 1997. Once past the initial confidence-building phase of activities in this area, the United States and Russia would exchange declarations of the numbers and locations of all their nuclear warheads and identify each warhead by a unique serial number. These declarations and ensuing reductions would be accompanied by exchanges of documents and production records, measures to confirm that warheads are being dismantled and their fissile materials placed in monitored storage, and additional measures such as challenge inspections. Since in all likelihood it would take several years to secure confidence that all non-deployed warheads are accounted for, it seems probable that in the first stage of the disarmament process, the United States and Russia would wish to maintain large reserves of warheads. For these reasons, the first stage stipulates a warhead ceiling on operational warheads, not on total warheads, including spares and reserves. However, these initiatives to establish a warhead verification system would create a framework for a sustained program of deep reductions in non-deployed as well as deployed nuclear warheads at later stages.

### Second Stage—Reductions to 1,000 Warheads Total

The second stage of reductions, which, technically, could be achievable five years after completing the first stage, could set a verified ceiling of 1,000 each on total warheads—stored as well as deployed—held by the United States and Russia. All U.S. and Russian warheads not included in the allowed ceiling of total warheads would be dismantled under bilateral monitoring arrangements, and the recovered fissile materials placed in internationally monitored storage until used for energy purposes or otherwise disposed of permanently.

Although reductions by the United States and Russia to the 1,000-warhead level—roughly the combined total of warheads in the arsenals of China, France, and the United Kingdom today—does not require the full participation of the other nuclear weapon states, they should be deep enough to bring these states into the process. China, Britain, and France would be expected at least to freeze their operating deployments at or near current levels and to exchange data on their nuclear forces. These countries, and also the threshold states,

would also be expected by this point to participate in an international agreement to stop all production of fissile material for weapons.

The reductions to 1,000 warheads by the United States and Russia could be carried out in a variety of ways. The United States could, for example, eliminate the remainder of its ICBM force, and rely then on a submarine-based force consisting of ten submarines, each carrying sixteen four-warhead Trident II missiles, for a total of 640 warheads, and a small bomber force, perhaps just its twenty B-2s, with all remaining B-52s either eliminated or converted to a conventional role.

For the first time, Russia would have some real flexibility in choosing how to structure its forces. Russia, for example, might opt to abandon the strategic bomber leg of its triad—a direction in which it seems headed already. Russia's strategic forces could then be divided between approximately six hundred warheads deployed on eight ballistic missile submarines—perhaps four Delta-4 and four new submarines and four hundred warheads on single-warhead mobile ICBMs.

British and French nuclear forces would presumably be deployed as today predominantly on four ballistic missile submarines for each country—although France may continue to deploy some air-delivered weapons. Much less is known about current Chinese nuclear forces and about future Chinese plans for their forces. According to one estimate, China currently possesses roughly 250 nuclear warheads deliverable by ballistic missile or aircraft which are mostly of intermediate range. China may also possess battlefield nuclear weapons, such as artillery shells, warheads for short-range rockets, and demolition munitions.

### Third Stage—Reductions to 200 Warheads

In the third stage of reductions, which, technically, could be achievable by the 2015–2020 time frame, the United States, Russia, China—and Britain and France in combination—could each reduce their nuclear weapons stockpiles to a level of two hundred warheads or fewer, with most of these deactivated. The 200-warhead level would still allow nuclear force structures large and diverse enough to assure high survivability. After partial dealtering, each force could have as few as ten warheads deployed, a number capable of inflicting catastrophic damage but not capable of destroying the stored warheads of another weapon state, nor of destroying civilization.

For the United States, one possibility would be to divide nuclear warheads between SLBMs and bombers. The eight remaining Trident submarines could each carry three 4-warhead Trident missiles or twelve small single-warhead missiles per submarine, for a total of ninety-six warheads. The bomber force could remain at twenty B-2s with five warheads each (on a reconfigured rotary launcher) for a total of one hundred warheads. Russia could similarly deploy eight ballistic missile submarines with twelve warheads each, for a total of ninety-six warheads; eighty warheads could be deployed on mobile single-warhead missiles; and the remaining twenty-four could be bombs assigned to a small force of tactical bombers.

If Britain and France agreed at this stage to a combined limit of two hundred warheads, the resulting West European nuclear force would be equal to that of the United States, Russia, or China. Such a combined limit is not essential to a deep cuts program, but would be helpful in reducing the disparity between the forces of Russia and the combined forces of its former Western adversaries. Assuming that both Britain and France continued to operate

four ballistic missile submarines each, with sixteen warheads per submarine, each country would have sixty-four warheads, for a combined-force total of 128 warheads. If necessary, Britain and France could each keep two of their submarines at sea at all times, which would provide them with a highly survivable deterrent. Their remaining seventy-two permitted warheads could be deployed on air-to-ground missiles. Alternatively, all of the warheads could be deployed on submarines with twenty-four warheads per submarine.

It is very difficult to predict how China might choose to structure its forces under a 200-warhead limit. However, it seems likely that China would try to preserve a diverse force based on mobile or cave-based missiles, SLBMs, and air-delivered weapons.

Most of the nuclear weapons in these third-stage arsenals would be deactivated so that they could not be used without warning. The deactivation could be effected in various ways, but in most cases, as already discussed above, would be accomplished by separating the nuclear warheads from their launchers and placing both in storage on the territory of the owner state under monitoring by the five weapon states or wider international monitoring. Agreed “rules of the road” would govern how these deactivated forces could be regenerated. In general, warheads and delivery systems could be withdrawn from storage and assembly sites by owner governments only in extraordinary situations and would have to be done with notification to other parties to the deep-cuts regime.

As in the earlier stages, some portion of the 200-warhead force of each country would be based in a survivable manner—for example, in ballistic missile submarines at sea. This force could be large enough to retaliate devastatingly against a surprise attack, but not large enough to destroy other weapon states or their residual arsenals in a surprise attack of its own. The size of this portion of the force, which would have to be negotiated by the parties, might be on the order of ten to twenty warheads.

## Conclusion

The United States and Russia, and eventually the other nuclear weapon states, could build momentum toward a world where the numbers and military significance of nuclear weapons of all countries are steadily and drastically reduced. It is not yet possible to describe in detail the final stages of this road, particularly the far-reaching changes that would have to be made in the international system to allow complete abolition. But it is possible to map a road which would go far enough to achieve several critical intermediate objectives: the elimination of fears of large-scale surprise nuclear attacks, the near elimination of risks of accidental and unauthorized uses of nuclear weapons, the drastic reduction of the possibility of the use of nuclear weapons in regional conflicts, the elimination of large stockpiles of warheads and materials that could be stolen by black-marketeer or terrorist groups, and the creation of arrangements that will forestall renewed buildups and nuclear-weapons proliferation. Finally, the reductions achieved would be to low enough levels to encourage and accompany parallel political changes in the relations of all the nuclear weapon states.

## Notes

<sup>1</sup> General Lee Butler, National Press Club Remarks, December 4, 1996, Washington, D.C.; Statement on Nuclear Weapons by International Generals and Admirals, December 5, 1996, Washington, D.C.

<sup>2</sup> Bruce Blair, *Global Zero Alert for Nuclear Forces* (Washington, D.C.: The Brookings Institution, 1996).

<sup>3</sup> These problems as well as the danger of nuclear smuggling are assessed in detail in *Loose Nukes, Nuclear Smuggling, and the Fissile-Material Problem in Russia and the NIS*, Hearings before the Subcommittee on European Affairs, Senate Committee on Foreign Relations, 104 Cong. 1 sess. (GPO, 1995).

<sup>4</sup> Alastair Iain Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security* 20, no. 3 (Winter 1995/96): 5-42.

<sup>5</sup> Although this NIE was criticized by some congressional missile defense advocates as being politicized, a congressionally mandated independent review panel "found no evidence of politicization and is completely satisfied that the analysts' views were based on the evidence before them and their substantive analysis." Moreover, the review panel, headed by former Director of Central Intelligence Robert M. Gates, concluded that the authors of the NIE could have made an even stronger case for their findings than they actually did.

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