

WHY WE NEED TO ELIMINATE NUCLEAR WEAPONS—AND HOW TO DO IT

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Long relegated to the fringes of policy discussions, nuclear disarmament has moved to center stage in the past few years. The continuing deterioration of the nonproliferation regime, the sudden emergence of North Korea as a nuclear-weapon state and of Iran as a potential weapon state, concerns about the stability of another new nuclear power, Pakistan, and revelations about nuclear weapon programs in Libya, Syria, and possibly Burma have all raised great concerns. Given the vulnerability of the great powers to terrorist bombings—made clear by the attacks on Moscow in 1999, New York and Washington in 2001, Madrid in 2004, and London in 2005—the prospect of a proliferation cascade and the rising danger of nuclear terrorism have made clear the risks of a business-as-usual approach to nuclear issues. Relying on the severely strained nonproliferation regime and its perennial backstop, ad hoc diplomacy, no longer seems responsible.

The alternative of multilateral nuclear disarmament is an idea as old as the bomb itself, but it has rarely been espoused seriously by the great powers—and then mainly as a rhetorical tool to encourage political support for related but less ambitious initiatives. Recent well-publicized conversions of national security leaders to the disarmament cause, however, to say nothing of a new, more serious tone in pronouncements on the subject by many governments, including those of the nuclear-weapon states, suggest that support is growing for the notion that the only permanent solution to nuclear dangers is an agreement that would eliminate all nuclear weapons, verifiably, from all nations.

Many remain to be convinced. Skeptics cite a variety of impediments to the achievement of a nuclear-weapon-free-world, and a few question the desirability of the goal itself. Some of the perceived obstacles are geopolitical and strategic in nature, stemming from the belief that nuclear weapons contribute significantly to the security of the states that own them. These concerns, and how they might be

overcome, have been explored in a series of monographs published by the Stimson Center in 2009.*

Other apparent obstacles to nuclear disarmament are technical in nature, such as concerns about how an agreement would be governed, verified, monitored, and enforced, and how nations could be assured that nuclear materials utilized for civilian purposes would not be diverted for use in weapons. These questions are addressed in this book. The chapters that follow discuss difficult issues and propose solutions to them, some of which would require major changes in traditional state practices and therefore raise uncertainties. But the choice is not between a secure status quo and an uncertain disarmed world. On the contrary, it is between the current world of rising nuclear dangers and an international system that has become more secure by divesting itself of all nuclear weapons. This book demonstrates how the transition from today's dangerous world to this more secure system can be navigated without creating new instabilities in world politics, dangers from cheaters or reckless governments, or opportunities for potential proliferators or terrorists. Most importantly, the chapters of this book illustrate that the problems cited by skeptics are not overwhelming. They constitute practical issues whose solutions are well within the means of governments, if they choose to address them.

This chapter discusses the pressing need for nuclear disarmament and the opportunity currently offered by the international situation and the resulting global movement for progress toward disarmament. It then outlines the major steps that would have to be accomplished to eliminate nuclear weapons, the timeline on which they might be completed, and the key decisions facing the world's governments and populations. One decision pathway, requiring significant changes in national policies, leads to renewed global cooperation on nuclear issues, the containment of proliferation, reduced risks of nuclear war and terrorism, and eventually the elimination of all nuclear dangers. Alternatively, the community of nations can follow more familiar pathways, behaving toward nuclear weapons more or less as they have in the past, betting that despite continuing proliferation, nuclear weapons will remain unused—either by governments or by extremist organizations. The choice is clear.

DANGEROUS TRENDS

The twin risks of nuclear terrorism and nuclear proliferation are high on the list of threats confronting the world's major powers. The stakes are enormous: Depending on circumstances, a single nuclear weapon exploded by a terrorist

* The six-volume series *Unblocking the Road to Zero* (available at www.stimson.org/URZ) explores nuclear issues in the following countries: Brazil, China, France, India, Iran, Israel, Japan, North Korea, Pakistan, Russia, Turkey, the United Kingdom, and the United States.

organization in a major city could cause hundreds of thousands of immediate deaths and untold suffering to many others from injuries, radiation poisoning, and economic deprivation. All major powers are vulnerable to this danger; Beijing, Delhi, Moscow, Washington, and cities in Western Europe are all plausible targets.

The spread of nuclear weapons to additional countries poses even greater dangers. An exchange between warring nations involving tens of nuclear weapons would be catastrophic, likely killing millions in the near term and many more over a longer period of time. Nor would the effects be limited to the immediate battlefield. Over time, the consequences would spread as radioactive debris was carried into the atmosphere; the ill effects on the health of far-flung populations would endure for generations.

Despite the enormity of these risks, national leaders have been unwilling to take the necessary steps to deal with nuclear weapons. Other than occasional rhetorical flourishes, the community of nations pursues the same limited measures of arms control and nonproliferation today that it has for decades. Perhaps because nuclear weapons have existed for more than 60 years and have not been used in anger except for the two bombs detonated at the very onset of the nuclear age, most national leaders seem complacent about the world's ability to muddle through with the *mélange* of limited agreements and theories about deterrence that underlies current policies toward these weapons of mass destruction. In addition, perhaps, leaders prefer the known risks of the current situation to the unknown, but imagined, risks of a future without nuclear weapons. Psychologists teach us that people typically prefer known present risks to an uncertain future.¹

Yet in the absence of extraordinary efforts to contain and reverse proliferation, we face a deteriorating nuclear order. In addition to the five declared nuclear-weapon states that existed when the landmark Nuclear Non-Proliferation Treaty (NPT) was signed in 1968—China, France, Russia, the United Kingdom, and the United States—the world has now seen the emergence of four more nuclear-armed nations: India and Israel in the 1970s, Pakistan in the 1980s, and North Korea in the past few years, with Iran a possible 10th member of the club in a few years.

True, there have been some accomplishments, particularly South Africa's decision in 1979 to dismantle its nuclear arsenal, the Clinton administration's successful initiative to persuade Belarus, Kazakhstan, and Ukraine to return to Russia the nuclear weapons left on their soil following the breakup of the Soviet

Union, and the Bush administration's success in persuading Libya to give up its fledgling nuclear-weapon program in 2004.

On the whole, however, the trend has been negative. And the reactions to the latest two additions to the nuclear club are likely to be staggering. In East Asia, it is hard to believe that Japan and South Korea will remain non-weapon states indefinitely unless North Korea gives up its newfound weapon capabilities; both are technically capable of producing nuclear weapons relatively quickly. The situation in the Middle East is worse: a dozen states are already exploring civilian nuclear technologies—the first step toward a weapons capability—in response to the Iranian program.

In short, there could be a proliferation cascade within a few years as additional states in the Middle East and East Asia react to the new nuclear powers. As the dam breaks, additional countries are likely to re-evaluate their own situations. Countries that feel threatened by Russia—Poland, for example—could begin to explore nuclear options; Polish political leaders have suggested such a course in the past. Countries with advanced civilian nuclear technologies that have conducted weapon programs in the past, like Argentina and Brazil, also might decide to restart their weapon programs. Unless the international community takes forceful measures to reverse this rising tide, the 100th anniversary of the birth of nuclear weapons in 2045 could easily see a world of 30 or even more nuclear-weapon states. And with each new national center of weapons and weapon-grade nuclear materials, the risk that nuclear capabilities might wittingly or unwittingly pass into the hands of terrorists grows.

Some find these dire warnings overblown. After all, following France's and China's demonstrations of nuclear capabilities in the 1960s, experts predicted there could be as many as 20 to 30 nuclear-armed nations by the end of the century. But the past successes that kept this prediction from coming true were the result of concerted international actions, including the negotiation of the NPT and establishment of International Atomic Energy Agency (IAEA) safeguards on civilian nuclear materials, the creation of the Nuclear Suppliers' Group to control trade in nuclear materials and dual-use items, to say nothing of US security guarantees to certain key nations that chose to remain non-nuclear despite having nuclear-armed adversaries.

This web of constraints may no longer be able to contain the mounting pressures of its own contradictions, however. Rudimentary bomb designs are more than 60 years old and known throughout the world. Technologies to enrich uranium so that it can be used in nuclear weapons are making rapid advances and are also widely known. Concern about climate change and rising demands for energy are

expected to result in the spread of civilian nuclear technologies and materials to many countries. These trends mean a continuing increase in the number of states with the means of acquiring nuclear weapons. Many NPT signatories are growing dissatisfied with the arrangement, arguing that the nuclear-weapon states have not lived up to their treaty obligations. North Korea's so-far successful breakout from the NPT, and Iran's skillful manipulation of the international community as it builds an intrinsic weapons capability while remaining a member in good standing of the NPT, are both testament to the current nonproliferation regime's waning power.

Many pin their hopes for avoiding nuclear war on deterrence. The fear of nuclear devastation kept the US-Soviet Cold War from turning into a hot one, they maintain, and the United States was able to extend the protection of its nuclear deterrent to allies, thus enabling them to decide not to acquire nuclear weapons of their own. But apart from questions about the effectiveness of deterrence during the Cold War, a question discussed below, the analogy itself may not be appropriate. The United States and the Soviet Union waged a fierce ideological and political struggle. But unlike many of the nations acquiring nuclear weapons now and likely to do so in the future, they were not near neighbors locked in a generations-long history of enmity and bloodshed. If war broke out between such countries, the chance of deterring nuclear use would be very uncertain.

Nor can the United States extend the protection of its own deterrent to nations in the Middle East, the heart of proliferation concerns. The credibility of US extended deterrence even to long-standing allies in East Asia and Western Europe has often been questioned. Would the United States really be willing to sacrifice New York for Hamburg, Los Angeles for Tokyo? Given these intrinsic uncertainties about any similar US commitment to countries like Saudi Arabia, whose values and political and social systems seem so antithetical to its own, are overwhelming.

Indeed, the more one thinks about the likely cascade of nuclear proliferation to come, the more dangerous the situation appears. Scenarios resulting in the use of nuclear weapons by two nuclear-armed Korean states require little imagination. But let us think farther afield. Imagine a war in Lebanon between a nuclear-armed Israel on one side and Syria and Hezbollah on the other, aided by a nuclear-armed Iran. If victory were close at hand for one side, would the potential loser be more likely to capitulate or to resort to a nuclear strike? Even worse from a US perspective, imagine a scenario in which the current Pakistani government were overthrown by a radical Islamist movement allied with al-Qaeda that then acquired Pakistan's arsenal of as many as 200 nuclear weapons.

How long would it be before nuclear weapons were detonated in US cities? The world's leaders must take forceful actions to prevent such catastrophes.

WINDOW OF OPPORTUNITY

Even as the risks escalate, an opportunity is emerging to end the threat of nuclear devastation decisively. All nuclear-armed states face common dangers: all are concerned about proliferation and about terrorists seeking nuclear weapons. In realization of these shared dangers, for the first time in decades, mainstream political leaders and former officials have begun to advocate nuclear disarmament. This has created a remarkable opportunity to take the steps necessary to construct a world in which leaders and citizens no longer need fear a nuclear attack by either terrorists or enemy states.

During the 2008 US presidential campaign, for example, both major candidates supported the elimination of nuclear weapons—a rare moment of American bipartisanship in nuclear diplomacy. On July 16 of that year, then-Senator Barack Obama pledged that under his presidency America would seek “a world with no nuclear weapons.” In a speech in Denver in May, his rival, Senator John McCain, quoted the Republican hero Ronald Reagan, “our dream is to see the day when nuclear weapons are banned from the earth,” and announced that he shared that dream. Each candidate listed detailed measures that he would pursue to build momentum toward the ultimate goal.²

As president, Obama moved swiftly to reaffirm his campaign pledge. In Prague in April 2009, he made a major speech on the nuclear issue, emphasizing the goal of eliminating nuclear weapons from all nations:

So today, I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons. I'm not naive. This goal will not be reached quickly—perhaps not in my lifetime. It will take patience and persistence. But now we, too, must ignore the voices who tell us that the world cannot change. We have to insist, “Yes, we can.”³

The Obama administration has taken concrete measures toward this goal. Among them are the restart of negotiations with Russia to reduce the two nations' nuclear arsenals, the tentative breaking of a 10-year logjam in negotiations for a Fissile Materials Cutoff Treaty (FMCT), a productive preparatory meeting for the NPT Review Conference scheduled for May 2010, and preliminary efforts to prepare the US Senate for resubmittal of the Comprehensive Test Ban Treaty for ratification.

Russian President Dmitri Medvedev appears to agree with President Obama about the desirability of eliminating nuclear weapons. When the two met for the first time in London in April 2009, they issued a joint statement affirming their common goal:

As leaders of the two largest nuclear weapons states, we agreed to work together to fulfill our obligations under Article VI of the Treaty on Non-Proliferation of Nuclear Weapons (NPT) and demonstrate leadership in reducing the number of nuclear weapons in the world. We committed our two countries to achieving a nuclear free world, while recognizing that this long-term goal will require a new emphasis on arms control and conflict resolution measures, and their full implementation by all concerned nations.⁴

The former Russian president and current prime minister, Vladimir Putin, also has indicated support for nuclear elimination on several occasions over the past two years. For example, at a meeting on June 10, 2009, with then German Foreign Minister Frank-Walter Steinmeier, who also has endorsed nuclear disarmament, Putin said, “If those who made the atomic bomb and used it are ready to abandon it, along with—I hope—other nuclear powers that officially or unofficially possess it, we will of course welcome and facilitate this process in every possible way.”⁵

Many other governments have indicated their support for the elimination of nuclear weapons. The Japanese Diet reaffirmed its long-held support for this goal in a June 2009 resolution stating, “Japan, as the sole country to have suffered nuclear attacks, has the responsibility to take the lead in a campaign toward nuclear disarmament.”⁶ While not explicitly acknowledging its nuclear arsenal, the government of China has also stated that it “stands for the comprehensive prohibition and complete elimination of nuclear weapons.”⁷

The leadership of esteemed individuals has likewise greatly strengthened the disarmament movement. In Germany, former chancellor Helmut Schmidt, former president Richard von Weizsäcker, former foreign minister Hans-Dietrich Genscher, and former Social Democratic Party leader Egon Bahr wrote a piece analogous to that of the four American statesmen—Henry Kissinger, George Shultz, William Perry, and Sam Nunn—who restarted the debate on nuclear disarmament in the United States. A similar piece in the United Kingdom was signed by three former foreign secretaries—Douglas Hurd, Malcolm Rifkind, and David Owen—as well as by a former NATO secretary-general, George Robertson. India’s most well known strategist, K. Subrahmanyam, has written similarly, “India should attempt to regain its earlier reputation as a champion of a nuclear weapon free world.”⁸

In a sign of widespread global support, in December 2008, more than 100 leaders from 23 countries formed the group Global Zero to initiate a worldwide campaign to advocate that the nuclear-weapon states negotiate a treaty for the elimination of nuclear weapons with a firm deadline. In June 2009, the group issued an Action Plan under which the goal could be accomplished by 2025.⁹

Thanks in large part to the activism of these experienced leaders, to say nothing of the political support for nuclear disarmament now being expressed by Presidents Obama and Medvedev and the leaders of many other nations, there is a greater opportunity for governments to embrace complete nuclear disarmament than has ever existed before. The challenge is to translate this enthusiastic rhetoric and vision into the practical steps necessary to move decisively toward elimination of all nuclear weapons from all nations within a reasonable period of time.

This window of opportunity will not remain open indefinitely. If the disturbing trends mentioned previously continue, the addition of new nuclear-weapon states and the continuing production of nuclear weapons by some existing nuclear nations will erode worldwide support for nuclear disarmament. Governments have only a limited time to unblock the road to disarmament. There are a number of promising ways they can do that.

DISARMAMENT WITHIN THE INTERNATIONAL SYSTEM

A multinational agreement to eliminate nuclear weapons would be unprecedented in vision, scope, and the stakes involved. Achieving such a goal would require an important shift in the mindsets of some international leaders—away from the false assumption that nuclear weapons provide an insurance policy and toward an understanding that these weapons offer far more risks than benefits. But these changes stop far short of a “world government as necessary to maintain and secure a global order free of nuclear bombs,” as is often stated by those who oppose nuclear disarmament or see it only as a distant vision.¹⁰

Nor does nuclear disarmament mean a return to the period before 1945 when bloody conventional wars were sometimes fought among the great powers—another common charge made by opponents of nuclear disarmament.¹¹ While the transition to nuclear disarmament would no doubt be difficult and protracted, it can be achieved safely within the current international system. Indeed, that system has already been fundamentally transformed since the period of conventional wars among the great powers. The Austro-Hungarian, Ottoman, Nazi, Japanese, British, French, and Soviet empires have all disappeared—in the last three cases, despite the colonial government’s possession of nuclear weapons. Has there been peace in Europe (Yugoslavia aside) for the past 60-plus

years because Britain, France, and Russia have nuclear weapons, or because the national rivalries that led to the wars of the twentieth century have been replaced by a common understanding in that part of the world that the price of modern war, even with conventional weapons, is horrendous and that international cooperation and integration is by far the better course?

Certainly there are conflicts elsewhere in the world: legacies of World War II in East Asia, of the dissolution of the British Empire in South and Southwest Asia, of the Cold War in the Caucasus. But in all these cases, the interdependencies of the great powers make armed conflict between them extremely unlikely. Does anyone believe that the United States and China would deliberately go to war over the issue of Taiwan—whether or not they had nuclear weapons—with so much to be lost by both countries in terms of the basic economic welfare of their populations? Both states have already shown the lengths to which they would go to avoid such a conflict. A US-China war over Taiwan certainly could occur as a result of reckless or desperate actions by Taiwan and miscalculations by US or Chinese leaders, but the existence of nuclear weapons could only magnify the consequences of such miscalculations, not prevent them.

If new wars begin, they will likely be the result of reckless or desperate actions by smaller powers, deteriorating conditions in failing states, or attacks by extremist organizations. Nuclear weapons play no part in preventing or winning such conflicts. The United States discovered that in Korea, Vietnam, and Iraq, the Soviet Union in Afghanistan, and China in Vietnam. The British and French learned it countless times as their empires crumbled. At the same time, should nuclear weapons fall into the hands of reckless governments or extremist organizations, they could only add to the carnage.

Many technical issues would have to be resolved to achieve nuclear disarmament. They pertain to how the dismantlement and continuing absence of nuclear weapons and weapon facilities would be verified; how nuclear materials used for commercial purposes would be prevented from being diverted into covert weapon programs; how the disarmament treaty regime itself would be governed; how any apparent violations of the agreement would be investigated and adjudicated; and, when necessary, how a violator would be brought into compliance. Each of these issues is taken up in detail in the chapters that follow. Fortunately, nearly every technical and political step necessary to achieve nuclear disarmament has already been taken in other contexts or has the means of implementing it readily available. Although many of the technical issues are complicated, all can be resolved with existing science and technology. Most solutions have precedents in existing treaties, and key nations have long practice

in making them work. Others are well known, even if they have not yet been implemented.

Even if all the world's nuclear weapons disappeared tomorrow, the nuclear threat would not end, because the materials and knowledge used to build the weapons would still be available. Thus, a central characteristic of a nuclear disarmament treaty would be the degree to which nations would have to cooperate with one another and with the treaty organization to ensure that the treaty was verified and enforced. Each signatory would have to permit challenge inspections on its territory on short notice, for example.[†] Each would also have to cede certain authorities to the governing body: to conduct investigations, to adjudicate certain classes of potential violations, perhaps even to implement pre-agreed packages of sanctions and other measures to re-establish compliance following minor violations.

Most importantly, by signing and ratifying the treaty, all participating nations would agree that significant violations of the treaty could be corrected through the collective use of military power by the other signatories, and that no one state could veto such military action. This would be difficult for the permanent members of the UN Security Council to accept, as they now have such veto power, but the treaty would not be enforceable if a potential violator had the right to veto collective military action to enforce its own compliance.[‡]

In reality, should a major power violate the treaty and begin to rebuild its nuclear arsenal, other signatories would be unlikely to try to stop it with collective military force; more likely, many of them would rearm themselves as rapidly as possible, leaving the world no worse off than it is now. Still, the potential for such collective use of military power against any signatory would be essential to deter lesser powers from cheating, to enforce the treaty against noncompliance, and to ensure equality among all signatories—a prerequisite for its acceptance.

These departures from current international practices would be difficult for the major powers, in particular, to accept. There certainly would be spirited debates about these issues in all key countries, perhaps nowhere as spirited as in the

[†] The right to on-site challenge inspections has already been incorporated in treaties. The Chemical Weapons Convention, for example, includes such provisions; see Chapter 5 by John Freeman, "The Experience of the Chemical Weapons Convention." The Comprehensive Test Ban Treaty also would permit on-site challenge inspections on a strict timetable once it enters into force. The so-called Additional Protocol to the Non-Proliferation Treaty also would permit such inspections, but it has not yet been implemented by most states.

[‡] The Acheson-Lilienthal Plan to eliminate nuclear weapons, developed by the United States in early 1946 when it was still the only nuclear-weapon state, originally envisioned enforcement by the UN Security Council in a process in which the permanent members did not have their usual veto. However, by the time it was formally proposed in June 1946, that provision had been eliminated. U.S. Department of State, "The Acheson-Lilienthal & Baruch Plans, 1946," www.state.gov/r/pa/ho/time/cwr/88100.htm.

United States. All nations would only accept them fully if they came to recognize that the dangers posed by nuclear proliferation and nuclear terrorism are real and potentially catastrophic and that the total elimination of nuclear weapons on the basis of a verifiable and enforceable agreement is the only way to end this threat to humanity. One can only hope that it will not require a nuclear disaster for governments to come to this realization.

STEPS TO ZERO

Five separate but related tasks would have to be pursued to achieve complete nuclear disarmament:

1. Negotiate deep cuts in US and Russian arsenals.
2. Reach agreements to cease production of new weapons and weapon-grade fissile materials.
3. Erect stronger safeguards against the diversion of civilian nuclear materials to weapon uses.
4. Develop, test, and exercise means of verifying the dismantlement of nuclear weapons, warheads, and production facilities.
5. Negotiate a disarmament treaty.

Several of these steps could take place simultaneously. Even so, in this writer's view, it would likely take three or four decades before nuclear weapons could be completely eliminated.

Cut US and Russian Arsenals

At the time this chapter was written, the United States and Russia were still negotiating a treaty to replace START I (the Strategic Arms Reduction Treaty), which had expired in December 2009. As expressed by Presidents Obama and Medvedev in Moscow in July 2009, the new treaty was expected to make only modest reductions in strategic (long-range) delivery systems and their warheads.¹²

Implementation of the new treaty would still leave the United States and Russia with thousands of nuclear warheads, more than 90 percent of the world's total and more than ten times the size of the next largest nuclear arsenal. As a result, it would be incumbent upon these two nations to continue negotiating reductions as a prerequisite for reductions by other states. Immediately upon ratification of the new START pact, talks should begin for a more ambitious US-Russia treaty limiting all nuclear delivery systems and warheads in the two nations' arsenals—

short-range as well as long-range, tactical as well as strategic, reserve as well as operational. The two nations should bring their stockpiles to no more than 1,000 total warheads, and perhaps to as few as 500, through phased reductions, with each phase verified by on-site inspections, monitors, and technical safeguards.

Broadening the scope of US-Russian arms control will be difficult politically for both nations and could raise technical issues as well. As the weaknesses of Russia's conventional armed forces have become apparent, Russian military leaders have placed greater rhetorical emphasis on nuclear threats in their military doctrine, and short-range systems would be most relevant in the scenarios involving wars on Russia's periphery that those threats are intended to influence.¹³ For the United States, limits on reserve warheads would raise questions of verification, and there will be concern that verification could compromise weapon design secrets. Steve Fetter and Ivan Oelrich discuss these issues in their chapter, "Verifying Nuclear Disarmament," in this volume.

Reductions of this magnitude in US and Russian nuclear stockpiles would raise two additional issues: missile defenses and imbalance in conventional forces. Russia is likely to be concerned that if the United States continues to develop its missile defenses while the two powers cut their offensive weapons, it could be tempted in a crisis to attack Russia, counting on being able to ward off any Russian retaliation. To ease these concerns, the United States would either need to accept negotiated limits on its missile defenses or move to develop a global missile defense system in cooperation with Russia. Negotiations toward this end began during the George H. W. Bush administration and seemed to be making progress; they should be resumed.¹⁴

The question of conventional forces imbalance is more difficult. The United States maintains its conventional forces for reasons that have very little to do with Russia, and it is unlikely to be willing to negotiate limits on them. In spite of the heated rhetoric surrounding this question, and the NPT's unfortunate legacy of connecting nuclear elimination with "general and complete disarmament," the solution lies in negotiating broader political and security arrangements so that Russia no longer feels threatened by US conventional capabilities. The Cold War has ended, and the United States and Russia no longer consider each other adversaries. But the United States and NATO on the one hand, and Russia on the other hand, have not reached an accord on the security arrangements that should govern Europe. This is reflected in the continuing debate about NATO expansion and about Russian assertiveness in regions that previously were within the USSR's sphere of influence. The possibility of deep and comprehensive reductions in US and Russian nuclear weapons likely hinges on the two sides reaching a broader accommodation that leads to a new security arrangement in

Europe and incorporates Russia as a true partner, rather than retaining its status as a potential adversary. The Cold War has ended; the enduring peace has yet to be negotiated. Until that happens, deep and comprehensive cuts in the two sides' nuclear arsenals are likely to be difficult, if not impossible, to accomplish.¹⁵

Cease Production of Weapons and Weapon-Grade Fissile Materials

As long as the United States and Russia are still negotiating deep reductions, it is unreasonable to expect other states to dismantle their nuclear arsenals, but it is reasonable to expect that they refrain from building them up. China, India, and Pakistan continue to add to their weapon stocks; they should cease to do so. During the course of US-Russian negotiations and phased reductions, the smaller nuclear powers might also be expected to create greater transparency in their weapon programs, so that all countries could gain confidence that the nuclear buildup had ceased.

It also would be important to complete negotiations for the FMCT. This agreement for a verifiable cutoff of the production of fissile materials was tied up in the UN's Conference on Disarmament for more than 10 years and had been discussed for many years before that. President Obama called for completion of the FMCT in his Prague speech, and its negotiation in the Conference on Disarmament has begun to progress again. Assuming that the nuclear-weapon states, like the non-weapon states, are now willing to accept safeguards on all their nuclear reactors, thus making an FMCT verifiable, it may be possible to make rapid progress toward completion of the agreement.

In addition, although all the nuclear powers other than North Korea have observed an informal moratorium on nuclear tests for more than 10 years, it also would be helpful if the Comprehensive Test Ban Treaty (CTBT) entered into force, symbolizing and enshrining all nations' permanent commitment not to develop new types of nuclear weapons. Ratification by 44 nations named explicitly in the treaty is required for the CTBT to enter into force; 35 of them have done so already, including France, Russia, and the United Kingdom. President Obama has said that he will submit the CTBT for Senate ratification, and China has said repeatedly that it would ratify if the United States did so; so has Indonesia, another named country. If that happened, effective political pressure could be mounted against the remaining six holdouts—Egypt, India, Iran, Israel, North Korea, and Pakistan.

Finally, it is incumbent on the nations of the world to act together to ensure that North Korea fully implements its 2007 commitment to dismantle its nuclear weapons and infrastructure and that Iran is held true to its word that it is only developing a civilian nuclear energy capability and not nuclear weapons.

Prevent Diversion of Civilian Nuclear Materials

Eliminating nuclear weapons does not mean abolishing nuclear power; indeed, concerns about global warming and growing energy needs will likely result in an increase in civilian nuclear power plants and fuel enrichment and reprocessing facilities. Without tighter controls on these facilities, however, the risk would remain, even after nuclear disarmament, that a government could seize nuclear materials and quickly rebuild a small nuclear arsenal. Of course, all other nations with civilian nuclear capabilities could react and quickly rebuild or create their own arsenals, but the possibility of such a “race from zero” would make the nuclear disarmament regime less stable and secure.

To avoid this danger, the current safeguards on civilian nuclear fuels and facilities need to be strengthened. Hal Feiveson discusses this problem in broad terms in his chapter in this volume, “Safeguarding Peaceful Uses of Nuclear Materials.” Moreover, key elements of the fuel cycle, in particular enrichment and reprocessing facilities, need to be especially well protected, perhaps by being placed under multinational controls. This issue is discussed in detail by Alexander Glaser in the chapter in this volume called “Multinational Controls on the Fuel Cycle.”

In addition, all reactors should be safeguarded by the IAEA, including those in the nuclear-weapon states and in the three states that have not signed the NPT (the legal basis for those safeguards). Moreover, the so-called Additional Protocol, which gives the IAEA the right to inspect nonsafeguarded facilities to ensure compliance with the treaty, should be implemented by all countries.

Advanced nuclear powers that have refrained from acquiring nuclear weapons even though they have the capability to do so—like Brazil, Germany, and Japan—should play a key role in establishing these protocols. All these nations have economic interests in the nuclear industry and they need to be assured that their interests will be safeguarded within a disarmament regime.

Develop Means of Verifying Dismantlement

Concurrent with the three steps just described, the nuclear-weapon states and advanced nuclear powers should cooperate to develop and thoroughly test the means to verify adherence to a disarmament treaty. Some steps have recently been taken in this direction. France, for example, has already allowed nations to observe its dismantling of certain nuclear weapon facilities. The United Kingdom and Norway have announced plans to conduct verification experiments; they conducted a joint exercise simulating the verification of warhead dismantlement in June 2009.¹⁶

Ronald Reagan's dictum "trust, but verify" is essential for any nuclear disarmament treaty to ensure all nations' security and to be feasible politically. Precedents for most key elements of a verification regime have already been established, either in arms-control agreements or in verification of the voluntary dismantling of nuclear-weapon programs in Belarus, Kazakhstan, Libya, South Africa, and Ukraine. Additional measures have been the subject of US/Russian/IAEA experiments in recent years or have been developed by private organizations working cooperatively across national boundaries. Also, if the major nuclear-weapon states were willing to participate in joint experiments and exercises, they could draw on them to draft a model disarmament verification annex that could be used during negotiations for a disarmament treaty.

Essentially, any verification system would need to consist of four elements: (1) declarations by all countries of all nuclear and nuclear-related weapons, materials, components, and facilities on their territories, and the auditing of those declarations by an international inspection agency; (2) short-notice challenge inspections, not only of declared facilities but of any facility within a signatory state, to deter cheating and to find any hidden weapons or materials; (3) technical safeguards on declared facilities to ensure that no weapons, components, or materials were diverted or hidden; and (4) the verified destruction of all declared items according to the schedule specified in the treaty. Verification of a disarmament treaty is discussed in detail in the chapter in this volume by Steve Fetter and Ivan Oelrich, "A Comprehensive Verification System."

Negotiate a Disarmament Treaty

Once the steps described above were accomplished, or at least well under way, negotiation of the actual disarmament treaty could begin. All the nuclear-armed powers, as well as countries with advanced civilian nuclear technologies, should take part. These talks would establish the organization and processes that would govern the treaty regime; determine a schedule for phased, proportional reductions of all nations' arsenals; and spell out verification and enforcement mechanisms. They should also establish periodic reviews that would enable governments to pause during dismantling if they became concerned that verification or enforcement was not functioning effectively. While some of this will be new ground for governments, the necessary elements have been studied by experts for years, and various proposals are available for officials to draw on.

The most contentious subject in multinational disarmament talks is likely to be the governance and enforcement system. To be effective, enforcement of a disarmament treaty would likely require major departures from traditional state practices. The system's precise outline and details could only be established through official negotiations, but for the purpose of illustrating that it is indeed

possible to envisage a governing order that meets all necessary criteria, Alex Bollfrass has suggested the following regime in the chapter in this volume titled “Governance of a Nuclear Disarmament Treaty.”

The treaty could establish an Assembly of States Parties, consisting of all the signatories, which would meet periodically to review the agreement, amend it if necessary, and select the members of an executive Governing Council. The latter would include all the nuclear-weapon states as well as states with advanced civilian nuclear programs that have forgone nuclear weapons, and might also include regionally based representatives of other nations. This body would oversee the work of the director-general of the treaty’s implementing organization and his or her staff, and would make all key enforcement decisions, particularly those pertaining to the more severe penalties, such as the complete isolation of a noncompliant country and the collective use of military power against it. The director-general’s staff would have to be large, expert, and well resourced. It would be charged with auditing each country’s declaration of its nuclear weapons, components, and material stocks; overseeing implementation of the treaty’s dismantlement schedule; safeguarding warheads, components, and materials until they could be destroyed; conducting inspections to verify strict adherence to the treaty’s terms; investigating allegations of cheating or noncompliance; and even imposing preapproved penalties for certain minor classes of violations.

No verification system, no matter how intrusive, could absolutely rule out cheating or guarantee that a nation would not try to hide a small number of nuclear devices or the means to construct some rapidly. Intrusive verification could reduce the risk of cheating, and as implementation proceeded over the years, potential cheaters’ risk of getting caught would increase. Improvements in verification technologies also could be expected over time, and knowledge would be gained about countries’ practices. Still, the knowledge of how to build nuclear weapons could never be erased, and it would always be possible for a country to build a nuclear arsenal either surreptitiously or after openly withdrawing from the treaty. It is therefore essential that the treaty also include provisions to discourage cheaters, ensure that they would not gain from their misdeeds, and make clear that anyone who tried to break out of the agreement would soon be brought to heel. Enforcement of a disarmament treaty is discussed in Rebecca Bornstein’s chapter “Enforcing a Disarmament Treaty” in this volume. The risks of a nation breaking out of the agreement, the odds that it would be detected if it did so surreptitiously, and the means available to respond to any such attempts are discussed in Alex Bollfrass’ chapter “Breaking Out of Zero” in this volume.

Measures such as the following could help prevent cheating or breakout.

1. The treaty should include positive incentives to avoid cheating. Most states abide by the terms of virtually all the treaties to which they are parties because they benefit from their participation. The benefits of a nuclear disarmament treaty would be enormous, and most states could be expected to want it to succeed and therefore to abide scrupulously by its rules. In addition, the knowledge that all states, including the previous nuclear-weapon states, would have the option of withdrawing from the treaty and imitating any cheater by building their own nuclear arsenals would itself help to deter cheaters.
2. More specific positive incentives could be spelled out. One might be the guarantee of access to nuclear fuel, enrichment, and reprocessing for civilian purposes, at reasonable prices, in return for adherence to the treaty. A more important one might be security guarantees. Israel, for example, might be induced to give up its weapons if all the great powers guaranteed its security in a written treaty backed by peace treaties with all of its neighbors.¹⁷
3. Violation of the treaty could automatically trigger a full range of sanctions and international isolation. Total isolation of a country, as in the case of South Africa under the former apartheid regime, has sometimes proven to be a powerful weapon in ensuring adherence to international norms. Automaticity would prevent nations from manipulating the system as Iran has done with regard to its violations of the NPT—but it would require that signatories delegate in advance, to the Director-General or to the Governing Council, the authority to respond to such violations. The treaty would have to specify the precise triggering mechanisms for each level of sanctions, a monitoring mechanism to ensure compliance with the sanctions, and a means for the noncompliant state to appeal and to rectify the situation.
4. Treaty violations could justify the collective use of conventional military power to destroy weapons or facilities. The United States and other nations maintain precise, conventionally armed, long-range weapon systems that could be used under international authority to promptly destroy such facilities or materials. Other major powers are likely to have acquired similar capabilities by the time a disarmament treaty is implemented, since they will anticipate such enforcement scenarios. Collective military action could go further, unseating the violating regime and arresting its officials. This would be more difficult, but probably not impossible if the major powers were willing. The triggering mechanism, particularly for surreptitious breakout attempts, would be

difficult to negotiate—how sure would the international community have to be that a significant violation had occurred before it acted? No state could be permitted to veto collective military action (as is currently the case for UN Security Council decisions on NPT violations), because to do so would in effect make the treaty unenforceable against the Security Council’s permanent members. Rather, the decision to use force should be the result of a majority, or perhaps super-majority, vote by the treaty’s States Parties Assembly or Governing Council.

5. Violation of the treaty’s provisions could be declared a crime against humanity and relevant officials in the violating government could be held personally accountable before an international tribunal. This could encourage whistle-blowers and create an additional incentive for scrupulous adherence to the treaty’s terms by all officials.

What if, despite tough safeguards and against all reasonable expectations, a state was to break out of the treaty successfully? The chapter by Ward Wilson that concludes this volume, “Stable at Zero,” should prove to be a sobering read for the leadership of a government considering cheating. Not only would any nuclear monopoly achieved in that way be of limited duration, but it would be very difficult to translate it into significant short-term gains, let alone long-term security.

CAN NUCLEAR WEAPONS BE ELIMINATED IN A LIFETIME?

In his April 2009 speech in Prague, President Obama cautioned that it might not be possible to achieve nuclear disarmament in his lifetime. While the many steps necessary to achieve and implement a disarmament treaty make this a prudent statement, even a conservative estimate of the time required for those steps gives grounds for optimism.

The first four negotiating processes listed in the previous section could all be pursued simultaneously, and the means to bypass the roadblocks that have held up such agreements are well known. How much time it would take to complete them, however, is hard to predict, as it depends primarily on the resolution of political issues.

One time-consuming step would probably be negotiation of a US-Russian treaty for comprehensive and deep nuclear arms reductions, as it would require resolution of the thorny issues of missile defenses and a European security framework. During periods of détente, it has not been difficult for the United States and the Soviet Union to make rapid progress in arms talks; it took not much more than three years (1969–72) to negotiate the Anti-Ballistic Missile Treaty and the coincident Agreement on Offensive Forces, for example. How

long it might take to “reset” US-Russian relations, however, thereby making possible rapid progress in the comprehensive arms talks, is uncertain. There are deep suspicions about US motives in Moscow and no shortage of domestic and international political pitfalls to cause Washington to move cautiously as well. Conservatively, one might predict that the Obama administration could successfully redefine US-Russian relations in two presidential terms or by 2016. If so, a comprehensive deep-cuts treaty could be completed and ratified by 2020. It might then take another five years to reduce the two arsenals to the agreed 500 or 1,000 total warheads.

If US-Russian issues regarding European security arrangements and missile defenses could be resolved more quickly, the comprehensive treaty could be completed earlier. If US-Russian détente cannot be restored, then a comprehensive treaty, to say nothing of a disarmament pact, would almost certainly be off the table.

A second difficult negotiation would be the strengthening of safeguards on civilian nuclear facilities and the establishment of multinational controls on fuel enrichment and reprocessing facilities. Many advanced nuclear nations who have forgone nuclear weapons and accepted IAEA safeguards on their facilities resent efforts to place additional limits on their nuclear industries. They would certainly want to see substantial progress toward deep cuts by the United States and Russia before accepting any new constraints themselves.¹⁸ There are also significant issues pertaining to the economics and structure of multinational arrangements, as Alex Glaser makes clear in his chapter. As a result, one would expect that the necessary safeguards and ownership and management arrangements could not be put in place until some point in the mid-2020s. All the other prerequisites for multinational disarmament—such as the FMCT and CTBT—could probably be completed well before this point.

As for the multinational disarmament talks themselves, it is hard to estimate how long the negotiating process might take, but assuming the four preliminary steps had been completed successfully, the treaty could probably be completed within four years, especially if a model verification annex had been completed as a result of multinational experiments and exercises. This would be similar to the time required to complete the NPT, the Chemical Weapons Convention, and the CTBT—once the great powers had agreed on the need for, and basic outlines of, those treaties.

If a comprehensive US-Russian agreement was completed in 2020, the multinational talks might start two years later and be completed by 2026. It would then require two to five years for the key states to ratify the treaty and for

it to enter into force. Simultaneously, a preparatory organization could begin establishing the systems and processes necessary to govern, verify, and enforce the treaty. Once the treaty was formally in effect, the time needed to physically dismantle the world's nuclear arsenals would not be long. If the treaty entered into force by 2030, dismantlement could be completed by 2035. In all likelihood, however, the nuclear-weapon states would wish to proceed more slowly in order to assure themselves that the treaty was being implemented properly and that their security was not threatened by cheaters.

Realistically, implementation of the treaty would have to include pauses, so that signatories who perceived problems in the verification system, or saw that other states were not dismantling their stockpiles or facilities on schedule, could suspend their own activities until the problems were resolved and yet remain compliant. Such pauses would be most important before the final steps to complete nuclear disarmament. To be prudent, therefore, one might add another ten years to the schedule to allow any glitches to be resolved, in which case the world would not be nuclear-weapon-free until 2045, a symbolically important date, as it is the 100th anniversary of the bombing of Hiroshima and Nagasaki, so far the only use of nuclear weapons in warfare.

Conservatively, therefore, and permitting considerable time for the major issues to be worked out, it seems clear that if it proves possible to eliminate nuclear weapons, the task could be accomplished within 25 to 35 years, leaving the world nuclear-free no later than 2045 and perhaps as early as 2035. While he would no longer be a young man, we all hope and expect that President Obama will indeed live to see the world free of nuclear weapons.

CONCLUSION

Nuclear weapons are not military assets. They are not tools for war demanded by military leaders. There is good reason why nuclear weapons have not been used for more than 60 years despite the many wars involving nuclear powers—they are useless for military purposes.

Indeed, US military leaders find nuclear weapons to be burdensome diversions of personnel and financial resources that could be better used for conventional warfare and new technologies. They recognize the role nuclear weapons play in deterring use of similar weapons by others, but they would prefer to allocate scarce resources to weapons and equipment that could help them carry out the wars and operations they are actually required to conduct.¹⁹ In recent years, the Russian armed forces have appeared to place greater value on nuclear weapons, but this is a rhetorical compensation for the weaknesses of Russian conventional

military power. If Russia ever did use nuclear weapons in wars on its periphery, as its doctrine now states, the unintended consequences would be catastrophic for Russia itself, to say nothing of its neighboring countries.

The only problem conceivably addressed by nuclear weapons is the one that they caused in the first place—their possession by one country possibly deters their use by another. The United States extends this deterrence to protect its allies. Still, if every nuclear-capable state agreed to eliminate its weapons and weapons infrastructure, none of them would lose anything.

By not moving decisively to eliminate nuclear weapons, the world is running chilling risks. In today's world, the validity of the nuclear deterrence doctrine is uncertain. When our enemies are either unaccountable dictators with doubtful devotion to their citizens' welfare and distorted knowledge of the world around them, or terrorists with no return address, the threat of inflicting mass civilian casualties in response to a nuclear attack is neither practical, nor moral, nor likely to be effective. As the number of states possessing nuclear weapons threatens to multiply, the probability of these weapons' use will rise commensurately. It is a dangerous delusion to believe that nuclear war can be deterred indefinitely, and that nuclear terrorism can be completely controlled, in a world containing 40, 30, or even 20 nuclear arsenals.

Opponents of nuclear disarmament argue that there are risks to disarmament. But one must also consider the risks of the world in which we live now, and the even greater risks of the proliferated world to which we are heading. Does anyone doubt that Iran and Iraq would have used nuclear weapons, had they possessed them, during their conflict in the 1980s? After all, both governments were quite willing to use lethal chemical weapons against each other's armies, as well as to fire missiles at civilian targets. Would Israel or Syria hesitate to threaten nuclear use if either believed it was about to lose a conventional war? If a failing regime in Pyongyang confronted mass civilian unrest with bloody force and faced a threat of intervention by superior South Korean conventional forces, could we count on the clear communications and rational calculations required for deterrence to work? One hesitates to guess.

Did nuclear weapons prevent war between the United States and the Soviet Union from the late 1940s to the end of the Cold War, or were the superpowers just lucky? Former Secretary of Defense Robert McNamara has cited three crises that could have resulted in nuclear use during his tenure as secretary of defense.²⁰ For example, during the 1980s, the Soviet leadership was convinced that the United States was planning a preemptive nuclear attack, and an incident in 1983 in which a Soviet radar picked up what seemed to be the launch of three US

missiles could easily have led to massive retaliation.²¹ Many other incidents of near accidents or inadvertent launches have also been described.²²

Dr. Martin Hellman, a professor of engineering at Stanford University who has studied the problem for years, estimates the risk of nuclear deterrence failing to be one percent per year: “Each year that we delay in reducing the risk brings with it a 1% chance of disaster, and a decade’s delay entails roughly a 10% chance.”²³

There are nine (and there may soon be 10) nuclear powers with more than 20,000 weapons. The vast gulf between this world and a world without nuclear weapons will be difficult to navigate. Advocates of disarmament must be honest about the uncertainties involved and the changes in traditional state practices necessary to make nuclear disarmament happen. But let us not assume that the world we live in today is without its own risks, which will increase with proliferation. In this writer’s view, we must not hesitate to begin traveling the road toward zero—the risks of inaction are far too great. We know how to eliminate nuclear weapons technically; all that is needed is to summon the political will to do so.

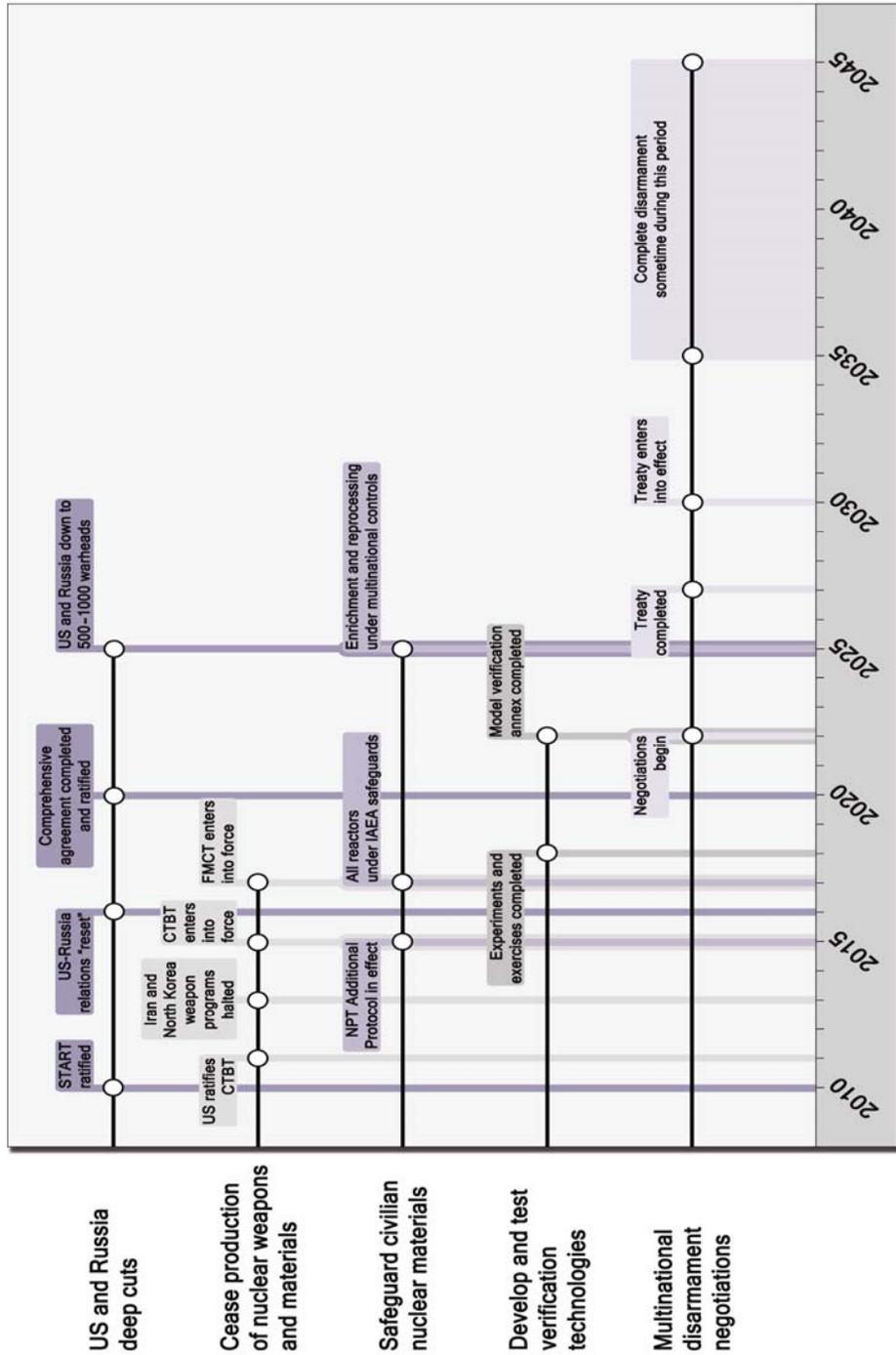


Figure 1. Notional Timeline for a Nuclear Disarmament Treaty

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