

THE NPT

Assessing the Past, Building the Future

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This article assesses the successes and failures of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) since its creation in 1968 by developing and applying a set of “metrics” to each of the NPT’s substantive articles as well as to its withdrawal provisions. In light of this analysis, the article also puts forward some specific proposals for strengthening the NPT and its implementation, with a view to the debate and decisions at the upcoming 2010 NPT Review Conference. A concluding section turns explicitly to the 2010 NPT Review Conference and proposes pursuit of agreement on three NPT Action Plans: one for nonproliferation, one for peaceful uses, and one for nuclear disarmament. Combining vision and practicable steps, these Action Plans would set out a roadmap for action between the 2010 and the 2015 NPT Review Conferences. They could provide a foundation for substantive exchanges—in this case, on progress toward their implementation—during the preparations for the 2015 conference.

KEYWORDS: Treaty on the Non-Proliferation of Nuclear Weapons; nuclear weapons; International Atomic Energy Agency; safeguards; nuclear disarmament; United States

Since its entry into force in 1970, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) has become the core of the global nuclear nonproliferation regime.¹ Today, only India, Israel, and Pakistan are not NPT parties; North Korea joined the treaty in 1985 but withdrew in 2003. In 2010, the parties to the NPT will hold a conference to review and strengthen treaty implementation. Against the backdrop of this upcoming conference, this article assesses the pluses and minuses of the NPT and sets out some ideas on how to use the 2010 NPT Review Conference (RevCon) to enhance the treaty’s contribution to global nonproliferation efforts. Specifically, the discussion assesses in turn each of the NPT’s most prominent “substantive” articles. Article by article, it puts forward and applies metrics for evaluating the nonproliferation impact—positive and negative—of these articles, offering a net assessment of each along with recommendations for strengthening it. Brief consideration is also given to one of the “procedural” articles, Article X, which deals with withdrawal from the NPT, a subject that has received considerable international attention since North Korea’s exit. A concluding section provides a summary of the article-by-article recommendations, as well as an overall treaty assessment.

One last introductory remark is warranted. Some metrics focus on the direct impact of a given article’s obligations on national behavior, while others focus on more indirect impacts in shaping nonproliferation decisions, institutions, and norms. Some metrics look backward to an article’s origins in the negotiation of the NPT. Understanding why certain articles became part of the treaty is valuable in light of some of today’s concerns, such as

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worries over the so-called peaceful uses loophole in Article IV. A few metrics highlight broader questions relating to the long-term health of the NPT regime, for example, whether greater progress on nuclear disarmament by the NPT nuclear weapon states (NWS) would strengthen international support of nonproliferation issues. Given the importance of such questions, they are included here.

Article I—No Transfers, No Assistance

Article I of the NPT obligates the NWS party to the treaty—defined as those states that had detonated a nuclear explosive device by January 1, 1967—“not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices, directly, or indirectly.”² It also obligates the nuclear weapon states “not in any way to assist, encourage, or induce any non-nuclear weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.”

Metric: Has the obligation “not to transfer” prevented the transfer of nuclear weapons to other countries?

By the time the NPT was negotiated in the early to mid-1960s, the Sino-Soviet split had ended Soviet nuclear weapon assistance to China. Earlier, Soviet leaders also had rejected a Chinese request to transfer a nuclear weapon to China. Moreover, given Soviet distrust of and control over its Eastern Bloc/Warsaw Pact allies, it is very difficult to envisage Soviet transfers of nuclear weapons to any of them.

As for the United States, in the early 1960s Washington had already deployed growing numbers of nuclear weapons to Europe, although under direct U.S. control. Some U.S. allies pressed for greater access to nuclear operations and decision making as a means to enhance the U.S. nuclear umbrella. One option that was being explored was the creation of a NATO Multilateral Force (MLF), which would have deployed nuclear weapons on ships manned by crews drawn from the United States and NATO countries, including West Germany. The possible transfer of direct peacetime control over nuclear weapons from the United States to its non-nuclear NATO allies was not inconceivable.

Soviet fears of U.S. transfers of nuclear weapons to NATO allies under the MLF proved a major stumbling block to negotiation of the NPT.³ Ultimately, the U.S. decision to drop support for the MLF as well as to accept the Article I obligation not to transfer (along with U.S. success in gaining West German acceptance of this provision as part of a nonproliferation treaty) brought about successful U.S.-Soviet cooperation in negotiating the NPT. From a U.S. perspective, these decisions were a price worth paying because of the expected NPT payoffs in preventing proliferation. Moreover, the interest of West Germany and other NATO allies in greater involvement in U.S. nuclear planning and decision making as part of the U.S. nuclear umbrella was successfully met otherwise: via a combination of continued deployment of U.S. nuclear weapons on European soil but still under direct

U.S. control; programs of cooperation that provided for allies' training to carry out nuclear missions in wartime; and consultations on nuclear issues among NATO's nuclear and non-nuclear members within the NATO Nuclear Planning Group.

With regard to NATO nuclear arrangements, during the U.S. Senate hearings on ratification of the NPT, U.S. officials repeatedly stated that existing nuclear obligations to non-nuclear NATO allies would not be impacted by Article I's obligation not to transfer. It was emphasized that direct control over U.S. nuclear weapons in Europe would be retained by the United States until wartime—at which point the NPT's "no direct transfer" obligation would cease to be binding.⁴ Also according to U.S. officials, the Soviet Union did not take issue with U.S. assurances to its NATO allies that "the NPT would neither interfere with existing NATO arrangements nor prevent allied consultations on nuclear matters."⁵

In part, the Article I obligation not to transfer legally codified U.S. and Soviet policies based on their perceived self-interest and realpolitik. Both countries had good reasons not to transfer nuclear weapons to non-nuclear weapon states. At the same time, without the overall negotiation of the NPT, U.S. pursuit of the MLF might not have been shelved, and conceivably more direct nuclear sharing could have gone forward. So viewed, negotiation of the NPT generally and the Article I obligation not to transfer specifically was an important catalyst in shifting U.S. policy. This shift closed the door on direct nuclear weapons sharing and narrowed the measures available to implement the U.S. nuclear guarantee to NATO allies.

Metric: Has the NPT ended deliberate weapons assistance to non-nuclear countries?

Before and during the beginning of the atomic age, witting assistance to other countries' efforts to acquire nuclear weapons was a continuing occurrence. Prior to the start of the Manhattan Project, the United Kingdom helped the United States by providing theoretical confirmation that an explosive chain reaction was possible; scientists of many nationalities, including France, Britain, and Canada, worked on the Manhattan Project; the United States assisted the British nuclear weapons program after the Atomic Energy Act of 1946 was amended in 1958; the Soviet Union assisted China during the 1950s; and in the late 1950s and early 1960s, the United Kingdom and France assisted Israel's pursuit of nuclear weapons. This last example may be the most striking: France sold Tel Aviv the Dimona research reactor (which Israel later used to produce plutonium for nuclear weapons) and plutonium reprocessing facility; French nuclear scientists reportedly transferred nuclear weapon design information to their Israeli counterparts, with the purported knowledge of the French government; both France and the United Kingdom supplied the heavy water needed to operate the Dimona reactor; and the French and Israeli governments reportedly made a secret agreement in 1957, later canceled, to cooperate in producing a nuclear weapon.⁶

By contrast, since 1968, no comparable cases have occurred of witting assistance by the United States, the Soviet Union/Russia, or the United Kingdom, all of whom signed the NPT when it opened for signature. This applies as well to France, which, though refusing to

sign the NPT at the start, also stated that it would act as if it were a party. France and Russia supplied enriched uranium fuel for India's Tarapur nuclear power reactor, but the reactor was under international safeguards and not linked to India's nuclear weapons program. Some critics also have alleged that the U.S.-India nuclear deal will indirectly aid India's production of nuclear weapons materials by freeing up Indian indigenous resources that otherwise would have had to be used to support India's nuclear energy program. Whatever the merits of the agreement, this contention goes beyond the intention of Article I's obligation not to assist and indeed could apply virtually to any type of military or commercial engagement.

China joined the NPT in 1992, and its record after joining has been subject to considerable debate.⁷ Chinese companies' assistance to Pakistan's nuclear weapons program in the mid-1990s resulted in periodic diplomatic Sino-U.S. confrontations.⁸ Perhaps the most prominent instance was the apparent 1996 sale of ring magnets by a Chinese company to Pakistan's centrifuge enrichment program. According to public reports, Chinese officials first denied that such a sale had taken place but then stated that the sale had been unauthorized. Ultimately, faced with the prospect of U.S. sanctions, a Chinese spokesman publicly stated that China would not "provide assistance to unsafeguarded nuclear facilities."⁹ Since the late 1990s, there have been no public reports of comparable Chinese assistance to Pakistan's nuclear weapons program. Chinese officials also have repeatedly stressed their ongoing efforts to put in place effective national systems of export controls. Presumably reflecting an overall "clean record," the United States also agreed to China's becoming a member of the Nuclear Suppliers Group (NSG) in 2004.

As with the "not to transfer" provision, Article I's obligation not to assist is best seen as legally codifying changes of policy that reflected realpolitik and self-interest. Each of the first NPT NWS appears to have concluded that any such transfers to a non-nuclear weapon state could backfire (as occurred with Soviet aid to China) or conflict with other foreign policy goals (as was the case of France under President Charles de Gaulle and Israel). Possibly the exception that proves the rule, lingering if circumscribed involvement by Chinese firms with Pakistan's nuclear weapons program in the 1990s reflected the special political relationship between these two countries. As for U.S.-U.K. cooperation, the language of Article I explicitly referred only to assistance to a non-nuclear weapon state, thereby not banning assistance from one NWS to another NPT NWS.

Looking ahead, however, the obligation not to assist could paradoxically potentially heighten nuclear insecurities. In particular, what assistance, if any, can be provided by an NPT NWS to enhance nuclear weapon and materials security and control in a newly nuclear state remains a matter of policy and legal debate. The case of Pakistan provides an example. After the September 11, 2001 terrorist attacks, the United States reportedly provided assistance to Pakistan to help ensure control over its nuclear weapons and materials. This assistance is said to have included information on nuclear security best practices as well as funding for improved physical security measures. However, assistance in developing "permissive action link" systems for enhanced security of individual weapons apparently was not provided because such technical assistance was reportedly considered a violation of U.S. national and international legal obligations, including the NPT.¹⁰ Nonetheless, a very strict legal interpretation on provision of assistance could result

in a heightened risk of loss of control over Pakistan's nuclear warheads, should the internal violence and instability there dramatically escalate; it also could heighten the danger of unauthorized access to nuclear weapons during a Pakistan-India military conflict.

Article I Net Assessment. By the early-to-mid-1960s, a combination of realpolitik and self-interest already was leading the first NWS to rethink the risks of helping other countries acquire nuclear weapons. By codifying that self-interest in a legal obligation, Article I's "not to transfer" provision reinforced that change. Moreover, pursuit of the NPT—and the need for Soviet support—catalyzed the U.S. decision to give up the MLF. Similarly, U.S. acceptance of the obligation not to transfer set a legal limit on future nuclear weapon cooperation with U.S. non-nuclear NATO allies, a limit that might or might not have emerged otherwise.

Somewhat similarly, Article I's obligation not to assist codified self-interest and realpolitik on the part of the United States, Soviet Union, United Kingdom, and France. That obligation in turn provided a legal basis for efforts to convince China, after it joined the NPT in 1992, to shut down any lingering involvement with Pakistan's nuclear weapons program. Perhaps running counter to realpolitik and self-interest, U.S. judgments about Article I NPT obligations appear to have significantly constrained U.S. support for enhanced nuclear weapons control in Pakistan after the 9/11 attacks.

Steps to Strengthen Article I via the 2010 NPT RevCon. Looking ahead, the conference should, at a minimum, reaffirm the Article I obligations. Doing so could become more important in light of the possibility that one or more Middle Eastern states could well seek direct access to nuclear weapons from one of the NPT NWS, should it prove impossible to prevent Iran from acquiring nuclear weapons.

Although the "not to assist" obligation is intended to constrain the five NPT NWS, the principal that it reflects increasingly applies to all countries. In recent years, the fact that virtually any country around the globe could become a safe haven, transshipment point, or an actual production hub for nuclear weapons-related assistance, components, and materials has been brought home by the so-called A.Q. Khan nuclear network. Under the direction of Khan, former head of Pakistan's nuclear weapons program, this network offered to provide aspiring proliferators with virtual turnkey nuclear weapons programs—components, technical assistance, bomb design, and on-call support.¹¹ With that in mind, the Article I debate at the 2010 NPT RevCon should be used as a jumping-off point to seek agreement that all countries—not only the NWS—have a legal obligation not to assist other countries, or non-state actors, to acquire nuclear weapons. To that end, the participants in the 2010 NPT RevCon could endorse UN Security Council Resolution 1540, which obligates all states to put in place necessary controls and regulations to prevent access to nuclear and other weapons of mass destruction by non-state actors. In so doing, they also could explicitly acknowledge that Resolution 1540 applies not only in the case of assistance to non-state actors, but also to assistance to states. Conference participants also could call for strengthened international cooperation to meet the goals of Resolution 1540.

Article II—No Receipt, No Manufacture, No Acquisition

Article II obligates the NPT non-nuclear weapon states “not to receive the transfer from any transfer or whatsoever of nuclear weapons or other nuclear explosive devices or of control over [them].” It also obligates these states “not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices,” as well as “not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.”

Metric: Has Article II directly influenced the decisions of non-nuclear weapon states about whether to pursue nuclear weapons?

In certain countries, the opening for signature and ratification of the NPT forced the issue of whether or not to give up the right to acquire nuclear weapons. Often after a prolonged political and bureaucratic debate, the decision was taken to sign and eventually ratify the treaty. Both West Germany and Japan stand out in this regard. There are other examples, including Switzerland, Sweden, and Australia. In all of these countries, the decision to give up the nuclear option reflected a mix of security, political, economic, leadership, moral, and other considerations as the underlying drivers. But the fact that the NPT was coming into existence helped crystallize these states’ decisions not to acquire nuclear weapons by making it necessary to choose.¹²

Metric: Has adherence to the NPT—and to Article II—significantly constrained pursuit of nuclear weapons by NPT parties?

Past experience indicates that if a country’s leadership decides to pursue nuclear weapons, the Article II “no manufacture and no acquisition” obligations will not be a significant constraint. Article II was violated by Iraq under Saddam Hussein, as well as by North Korea under both Kim Il Sung and Kim Jong Il. Indeed, in the internal Iraqi deliberations about how to resume Iraq’s pursuit of nuclear weapons after the Israeli 1981 attack on the Osirak reactor, Saddam Hussein was reportedly advised by Jaffar Dhia Jaffar, his top nuclear scientist, not to withdraw from the NPT but to remain an NPT member to better hide Iraq’s intentions.¹³ For its part, Libya sought to purchase a virtual turnkey nuclear weapons program from the A.Q. Khan network, even while remaining an NPT party.¹⁴ If Iran’s clandestine enrichment activities from the mid-1980s to 2002 were the initial step toward acquisition of nuclear weapons (as many experts believe), it would be another example of maintaining NPT membership while pursuing nuclear weapons.¹⁵ Syria could well be an additional case; it was apparently building a clandestine plutonium production reactor—closely resembling the one used by North Korea to produce nuclear weapons materials—until a September 2007 Israeli air strike destroyed the structure. Many experts believe Syria intended to acquire nuclear weapons.¹⁶

Metric: Does NPT adherence effectively limit nuclear hedging?

Nuclear hedging can range from a reluctance to give up capabilities that might later provide the basis for a nuclear weapons program to purposive efforts to move steadily closer to an option to produce nuclear weapons in a relatively short period of time.¹⁷ It is often difficult to state conclusively that a country is engaged in nuclear hedging because judgments must be made about intent. Both Sweden and Switzerland reportedly carried out nuclear weapons–related activities after ratifying the NPT. In Sweden’s case, the research was conducted as part of a so-called Protection Program—“yet the distinction between protection and weapons work remained as vague as ever.”¹⁸ By contrast, the adherence of Belarus, Kazakhstan, and Ukraine to the NPT as non-nuclear weapon states after the breakup of the Soviet Union reinforced and added momentum to their prior decisions to give up the Soviet nuclear weapons left on their territories.

Looking ahead, in a more uncertain regional political-military environment, some countries could intentionally hedge their non-nuclear bets. The effectiveness of “no acquisition and no manufacture” as a constraint on hedging is weakened by the lack of any agreed definition of what “manufacture” entails. Conceivably, a country could advance considerably toward a nuclear weapons capability—acquiring facilities to produce weapons materials; producing such materials; undertaking technical studies and assessments; acquiring dual-use diagnostic, production, and other equipment; and starting but then stopping nuclear weapons design work—all the while maintaining that its actions had not violated its NPT obligation not to manufacture.

Metric: Does NPT adherence provide a leverage point for outside influence and action to prevent proliferation?

NPT adherence clearly provides a point of leverage, although the nature of that leverage—and its likely effectiveness—could vary depending on the country. In Iran’s case, its adherence to the NPT has been most useful as a rallying point for outside efforts to pressure Iranian leaders to think anew about their goals. UN Security Council Resolutions 1737 (2006), 1747 (2007), 1803 (2008), and 1835 (2008) all reaffirmed the council’s support for the NPT, while Resolutions 1747 and 1803 both emphasized “the need for all States Parties to that Treaty to comply fully with all their obligations.” Moreover, some key European countries’ support for actions to stop Iran’s uranium enrichment activities has been linked to a belief—accurate or not—that Iranian acquisition of nuclear weapons would put at risk the overall NPT structure.¹⁹ Amid continuing tensions between the George W. Bush administration and other countries, Iran’s NPT obligations provided a ready basis to argue that the issue was not simply one of the United States versus Iran.

To use a hypothetical example, let us imagine that due to some combination of the most recent North Korean *volte-face* on giving up its nuclear weapons, tensions with China, and uncertainty about the U.S. security link, pressures grow in Japan to pursue nuclear weapons. In this case, outside powers could use Japan’s NPT adherence as a

leverage point to urge the Japanese leadership to think carefully about whether to take that step. Japan's NPT adherence—and the need for it to go through procedures to withdraw from the NPT—would also help buy time for new initiatives to deal with future Japanese security concerns.

Still another example of the leverage provided by NPT membership concerns possible action to be taken after a country has violated its obligations and broken out of the NPT. Iran may yet be a future case in point. Should Iran acquire nuclear weapons, the international community will need to take many actions to contain the regional and global spillovers.²⁰ Those actions could well include measures to make Iran pay a price for violating the NPT—to signal resolve to Iran, to its threatened neighbors, and to the wider NPT community. The fact that Iran would have violated its legal obligations under the NPT would provide a stronger foundation for any such international punitive actions.

Metric: Did widespread NPT adherence help reverse the perception that runaway proliferation was unavoidable?

In the early 1960s, there was a growing fear that widespread proliferation of nuclear weapons was possibly unavoidable. President John F. Kennedy warned in 1963 that a world with many dozens of nuclear weapon states might emerge. This fear of runaway proliferation gave urgency to the negotiation of a nonproliferation treaty, not least because of the belief that growing worldwide use of nuclear power would place access to nuclear weapons material in the hands of many countries.²¹ Such warnings of runaway proliferation, however, could well have become a self-fulfilling prophecy. Fearful of a world of nuclear powers, many countries might have sought nuclear weapons lest they be left behind.

Responding to such fears, the United States took actions to enhance the nuclear security of its European non-nuclear allies. In parallel, the United States, the Soviet Union, and many other countries joined together to create what became the nonproliferation regime. The NPT was and remains a key part of that regime. Steadily growing membership in the NPT after its opening for signature in 1968—including critical countries in Europe and Asia—provided a valuable symbol that demonstrated to many countries that runaway proliferation was not the wave of the future. So did the prospect of an international system of nuclear safeguards—run by a then-new International Atomic Energy Agency (IAEA)—to prevent diversion of nuclear weapon materials from peaceful nuclear uses. In effect, partly because of more traditional security mechanisms and partly due to the growing NPT membership, early fears of a world of runaway global proliferation became a self-denying prophecy.

Today, fears have again emerged that runaway proliferation could develop. It is often argued that the spread of nuclear weapons is at a “tipping point,” that there is a danger of “cascading” proliferation, and that we could be entering a “new nuclear age.”²² In this context, however, widespread adherence to the NPT alone will not suffice to counter fears of nuclear weapon proliferation. Rather, the NPT's contribution to countering

fears of runaway proliferation will depend heavily on whether there is a widespread perception that countries are complying fully with their NPT obligations.

Article II Net Assessment. The direct impact of Article II in preventing proliferation is mixed. Negotiation of the NPT with its “no manufacture, no acquisition” obligation forced a number of countries to decide whether or not to pursue nuclear weapons. Faced with that decision, important countries chose to renounce nuclear weapons. In deciding, states were motivated by a mix of considerations, and the NPT helped crystallize their decisions. By contrast, some prominent NPT parties have stayed in the NPT while pursuing nuclear weapons: North Korea, Iraq, and Libya—and quite possibly Iran.

The indirect impact of Article II may be more compelling. The “no acquisition, no manufacture” obligation provides a nonproliferation leverage point for rallying outsiders, for engaging in dialogue with countries rethinking their nonproliferation commitment, and for taking action after NPT breakout. Successful negotiation of the NPT and Article II contributed significantly to reversing earlier fears of runaway worldwide proliferation. Today, adherence to Article II still provides a potentially valuable means to counter renewed fears of such a world—assuming there is compliance with NPT obligations.

Steps to Strengthen Article II via the 2010 NPT RevCon. The lack of an agreed understanding of no “manufacture”—of what actions would violate Article II obligations—remains an oft-noted weakness of the NPT. First among the five NPT NWS, and then perhaps more widely, it may be time to seek an agreed understanding. Continued efforts to use the review process to create a consensus on what broad actions violate the “no manufacture” obligation could be pursued in parallel. Both sets of actions would make it harder for an NPT party to pursue nuclear weapons while claiming to meet its NPT obligations.

Close consultations among the great powers on how to make Iran pay a high price for NPT breakout would be another step. As argued above, how the international community responds to an Iranian bomb—should one emerge—would have a significant impact on the prospects for containing proliferation in the Middle East, negating the gains to Iran of acquiring nuclear weapons, and limiting the wider erosion of the NPT regime.

Article III—Acceptance of IAEA Safeguards, No Exports without Safeguards

Article III of the NPT obligates non-nuclear weapon members “to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency . . . with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices.” It also obligates all NPT parties “not to provide source or special fissionable material or equipment or material especially designed or prepared for the processing, use or production of special fissionable material to any non-nuclear weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article.”

Metric: Did the Article III obligation to require safeguards on nuclear exports result in strengthened export control and nuclear supply practices?

Absent the NPT's Article III obligation not to provide without safeguards, the export control and nuclear supply practices of the major nuclear suppliers could well have been considerably weaker and less effective as a means to constrain proliferation. At worst, without the NPT framework, exports without safeguards—if not of complete facilities then of important components and materials—might have become more widespread in the 1970s and early 1980s.

Exports to India prior to the NPT provide the starting point. In the mid-1950s, Canada supplied a nuclear research reactor to India, subject to a commitment from India that the reactor would be used for peaceful purposes only. Canada and the United States supplied the heavy water, also without any safeguards commitment. India later used this CIRUS reactor to produce the plutonium for its so-called peaceful nuclear test on May 18, 1974, maintaining that it had not violated any obligation.²³ By the early 1960s, U.S. officials recognized the need for tightened controls, including safeguards. Talks had begun on strengthened controls among the United States, the United Kingdom, France, Canada, and South Africa. These talks were ultimately superseded by the negotiation of the Article III “not to provide” obligation. Thus, at one level, Article III and the NPT again codified a policy change that already was taking shape on the part of critical supplier countries. On a different level, however, the Article III obligation made such tightened nuclear export practices mandatory for all NPT parties, thereby considerably expanding the countries covered.²⁴

Moreover, after the treaty entered into force in 1970, a group of NPT suppliers met to determine how to implement their NPT obligation to require safeguards and to decide which specific exports would be covered. The Zangger Committee, named for its first chairman, Professor Claude Zangger, addressed this question, seeking to develop so-called trigger lists. Four years later, agreement was finally reached in the aftermath of India's 1974 nuclear test. The NPT nuclear suppliers took steps to put in place or upgrade national controls and regulations governing their nuclear exports on the Zangger Committee trigger lists; in the 1980s the trigger lists expanded to cover additional items for heavy water, reprocessing, and enrichment. All of this activity was grounded in the basic NPT Article III obligation to require safeguards on exports. The creation of the NSG in 1978 also indirectly owes its origins to the NPT Article III obligation; part of its purpose was to find a vehicle whereby France's export control practices could be harmonized with those of the NPT nuclear exporters—though the NSG guidelines also went beyond the NPT “not to provide” without safeguards obligation.²⁵

After India's 1974 nuclear test, national legislation provided an independent impetus toward tightened nuclear export controls and practices, particularly in the United States. India's use of plutonium from the CIRUS reactor—and knowing that the United States had supplied its heavy water—was an important factor in congressional passage of the 1978 Nuclear Non-Proliferation Act (NNPA).²⁶ The NNPA tightened considerably procedures and oversight of U.S. nuclear exports, mandated the renegotiation of most existing U.S. agreements for nuclear cooperation to tighten their provisions,

required that U.S. supply be accompanied by the recipient's agreement to a U.S. right to consent to the reprocessing of U.S.-origin nuclear fuel, and required potential recipients to accept IAEA full-scope safeguards on all of their nuclear activities as a condition of supply.²⁷ However, the NNPA was widely condemned by other industrial countries that saw it as unilaterally changing the rules of peaceful nuclear cooperation. For them, the NPT Article III obligations remained determinative—and were the basis of U.S. efforts throughout the 1980s and into the 1990s to buttress global nuclear export controls.

Furthermore, within the context of discussion of Article III at the NPT Review Conferences, a consensus gradually emerged between 1980 and 1990 on the concept of requiring recipients to accept safeguards not only on the specific exports listed, but also on all peaceful nuclear activities, as a condition of supply. So-called full-scope (or comprehensive) safeguards further strengthened the overall system. (As argued below, their impact was to impede proliferation.)

Metric: Has the Article III obligation not to provide without safeguards—and the resulting systems of export controls—impeded pursuit of nuclear weapons?

Leveraging the Article III obligation and the associated trigger lists, diplomatic démarches urging other countries not to export certain items to countries of proliferation concern have long been a U.S. nonproliferation measure. Other NPT parties have frequently cooperated in these efforts or undertaken their own actions, and there have been both successes and failures.

Sometimes, the result of such démarches—even with other countries' support—has been to force a proliferator to find new and creative ways to circumvent international nuclear export controls; Pakistan's pursuit of nuclear weapons from the 1970s onward is a striking example.²⁸ At other times, however, the NPT-linked démarche process has been able to impede a program and to buy time with the hope that diplomatic and political actions could prevent acquisition of nuclear weapons; Iran is such an example. Over the past decade, the United States and other countries have repeatedly joined together to seek to slow Iran's uranium enrichment program, thereby impeding its access to nuclear weapons-usable materials. Most recently, UN Security Council resolutions added further international legal authority to these efforts. It remains to be seen, however, whether this bought time can be used to strike a political deal with Iran that would lead it to stop short of acquiring nuclear weapons.

Argentina and Brazil in the 1980s provide a different example, although neither country had decided to seek nuclear weapons. At that time, both countries were intent on acquiring sensitive nuclear facilities that would have given them access to unsafeguarded nuclear weapons materials. U.S. officials and outside experts worried that a dynamic of mutual suspicion could create pressure in each country to advance toward a nuclear weapons program. Export controls impeded that advance. Around the same time, governmental changes in Argentina and Brazil replaced military rule with civilian leaders, who began a process of wide-ranging political, military, and economic accommodation.

They also began expanding a set of nuclear confidence-building steps that led to a system of mutual inspections; to their adherence to the Treaty of Tlatelolco, which created a nuclear-weapon-free zone in Latin America; and ultimately to decisions to join the NPT. Had the sensitive nuclear programs in Argentina and Brazil been more advanced, it may have been more difficult for leaders to re-craft the nuclear relationship between the two countries.

Metric: Has the Article III obligation to accept IAEA safeguards indirectly shaped NPT proliferators' pursuit of nuclear weapons?

The obligation to accept IAEA safeguards (as well as the more fundamental Article II obligation) has reinforced other motivations in leading NPT proliferators to pursue nuclear weapons clandestinely. Iraq, Libya, and North Korea (before testing a nuclear device in 2006) all have pursued nuclear weapons covertly. Iran is widely believed to be doing so now, despite its protestations to the contrary. Syria appears to have been doing so as well, though Syrian officials reject all such charges.²⁹ One result of having to pursue nuclear weapons clandestinely may be to constrain the size, pace, and effectiveness of these programs. Here, too, buying time sometimes allowed other things to happen, whether Saddam Hussein's self-defeating decision to invade Kuwait in 1991 or Colonel Muammar Qaddafi's fundamental reassessment of Libya's national goals in 2003.

Metric: In implementing Article III, have IAEA safeguards provided early warning—or more usable public warning—of nuclear weapons activities?³⁰

The record of IAEA safeguards in providing early warning of clandestine activities has been poor. Noteworthy safeguards violations that were not detected include: undeclared separation in 1985 of very limited quantities of plutonium by Romania, declared to the IAEA in 1992; failure to detect Iraq's undeclared enrichment activities prior to the 1991 Gulf War; a series of enrichment and reprocessing experiments in South Korea dating back to the 1980s and revealed by officials in 2004; failure to detect Iran's undeclared enrichment activities prior to 2003; and Syria's construction of what is widely believed to have been an undeclared plutonium production reactor.³¹

In part, this record reflects the tools made available to the IAEA by its member states, including restrictions on its safeguards rights and their safeguards obligations. But the record also resulted from a safeguards culture that focused almost exclusively on monitoring declared activities in cooperation with member states and which only started to change after the revelations in the early 1990s of Iraq's clandestine nuclear weapons program.³² Moreover, the cases of Iran and Syria occurred despite initial upgrades of the IAEA's safeguards rights in the wake of its failure to detect Saddam Hussein's enrichment program. These included a reaffirmed right to conduct special inspections within and outside declared facilities; collection of environmental samples at certain facilities; a requirement that states provide design information as soon as a decision is made on a facility; and expanded use of unannounced inspections, within the routine inspection

regime. (These steps stopped short of the more comprehensive changes provided in the IAEA's Additional Protocol for safeguards, which neither Iran nor Syria has accepted.)³³

Metric: Have the Article III obligations to accept safeguards and not to provide without safeguards slowed proliferation?

Since the United States first acquired nuclear weapons in 1945, the time a country needs to produce a nuclear weapon has steadily increased—even taking into account the uncertainties in determining exactly when some programs started and when they came to fruition. (See Table 1, “Estimated Time Needed to Acquire the Bomb.”) The first five nuclear powers took between three and eight years to test a nuclear weapon, with China the outlier at eight years. By contrast, the next nuclear powers took on the order of between nine and fifteen years to acquire a nuclear weapon, if not longer, depending on whether North Korea had weaponized plutonium as of 1994. Aspiring proliferator Libya had been seeking nuclear weapons for nearly thirty years when Qaddafi decided to end the program; Iraq under Saddam Hussein had been pursuing nuclear weapons for almost twenty years when its program was ended by outside intervention; Iran, today's most threatening case, may well be nearly twenty years into its pursuit of nuclear weapons—or even longer, given speculation about interest in nuclear weapons on the part of the shah of Iran.

Many factors probably explain the relative lengthening of the time it takes to get the bomb, including limited technological and industrial capabilities, financial limitations, poor management, and uncertain political and bureaucratic commitment. Suffice it to propose, however, that by forcing countries to pursue nuclear weapons clandestinely, NPT Article II and III obligations (for its parties) and the NPT-based norm of nonproliferation (for non-parties) contributed as well. In both cases, the need to pursue a program clandestinely turned out to be an important impediment that caused problems with mobilizing resources, paying extra expenditures for middlemen, acquiring needed inputs, and carrying out the daily activities of clandestinely pursuing nuclear weapons. Perhaps equally important, by making it harder, more expensive, and time-consuming to assemble the necessary wherewithal for the bomb, international export controls linked directly to NPT Article III also played a part in slowing these proliferation programs. Over time, moreover, the impact of Article III in slowing proliferation probably grew thanks to the steady strengthening of nuclear suppliers' controls in the 1980s and 1990s.³⁴

In addition, this Article III-related contribution in slowing proliferation had three major benefits. First, as already suggested, it allowed time for “other things to happen.” Second, even in the cases in which it proved impossible to block eventual acquisition of nuclear weapons, slowing the pace of proliferation may have significantly contributed to avoiding a growing perception of runaway proliferation as unavoidable. (The fact that even those proliferators that openly tested a nuclear weapon did so only after a considerable further delay may also have helped lessen the resulting proliferation momentum.) Third, in many cases, having to covertly seek nuclear weapons constrained the scope of the country's nuclear weapons program, thereby posing a lesser threat.

TABLE 1Estimated time needed to acquire bomb.^a

Country	Est. start	Year	Years to the bomb
United States	1942	1945: first test	3
Soviet Union	1945 ^b	1949: first test	4
United Kingdom	1946	1952: first test	6
France	1954	1960: first test	6
China	1956	1964: first test	8
Israel	1957	1967: estimated acquisition	10
India	1964	1974: first test	10
Libya	1969	2003: program ended	—
Pakistan	1972	1987: estimated acquisition; 1998: test	15
South Africa	1973	1982: estimated acquisition ^c	9
North Korea	1979	1994: estimated acquisition; 2002: claimed possession; ^d 2006, 2009: tests	15
Iraq	1972	1991: program ended	—
Iran	1987 ^e	—	—
Syria	1997	2007: program ended?	—

^a There is unavoidable uncertainty in estimating the “time to the bomb.” The starting point is subject to differing interpretations, partly due to the original sensitivity of the information and partly to the ambiguity of many initial activities. For several countries, the decisions started under the guise of pursuing peaceful nuclear explosions. Similarly, with the exception of countries that clearly tested a nuclear weapon, the acquisition date is often debatable. The table presents estimates based on publicly available information. See generally, David Holloway, *Stalin and the Bomb: The Soviet Union and Atomic Energy* (New Haven: Yale University Press, 1996); Margaret Gowing, *Britain and Atomic Energy, 1939–1945* (London: Macmillan, 1964); Carey Sublette, “France’s Nuclear Weapons: Origin of the Force de Frappe,” <NuclearWeaponsArchive.org>; “China Profile—Nuclear,” Nuclear Threat Initiative, <www.nti.org/e_research/profiles/China/Nuclear/index.html>; Avner Cohen, *Israel and the Bomb* (New York: Columbia University Press, 1999); Federation of American Scientists, “Pakistan Nuclear Weapons,” <www.fas.org/nuke/guide/pakistan/nuke/>; Carey Sublette, “India’s Nuclear Weapons Development Program,” <NuclearWeaponArchive.org>; Jean du Preez and Thomas Maettig, “South Africa: From Pariah to Nuclear Poster Boy How Plausible is a Reversal?,” unpublished manuscript; “Libya Profile—Nuclear,” Nuclear Threat Initiative, <www.nti.org/e_research/profiles/China/Nuclear/index.html>; Larry A. Niksch, “North Korea’s Nuclear Weapons Program,” CRS Issue Brief, August 27, 2003; “Iraq Nuclear Profile—Nuclear Chronology,” Nuclear Threat Initiative, <www.nti.org/e_research/profiles/Iraq/Nuclear/2121_2122.html>; Federation of American Scientists, “Back-ground Briefing with Senior U.S. Officials on Syria’s Covert Nuclear Reactor and North Korea’s Involvement,” April 24, 2008, <www.fas.org/irp/news/2008/04/0dni0408.pdf>; “Nuclear Profile—Iran, Nuclear Chronology,” Nuclear Threat Initiative, <www.nti.org/e_research/profiles/Iran/Nuclear/1825_1857.html>.

^b The start date of the Soviet program could have been a year or so earlier.

^c Information from South African officials after the collapse of the apartheid regime dates acquisition at 1982.

^d Sufficient plutonium for one to two weapons is estimated to have been available by 1994.

^e First contacts between Iran and A.Q. Khan took place in 1987, predated by a decision to build a centrifuge enrichment capability.

Article III Net Assessment. Article III's "not to provide" without safeguards obligation had a significant, direct impact in shaping the export control laws, regulatory systems, and practices of the industrialized countries that were parties to the NPT from its early years. In so doing, it provided an important legal foundation for a continuing series of efforts by the United States and other countries to strengthen nuclear supply constraints on would-be proliferators. As a result, it likely contributed to an overall slowing of the pace of proliferation. The "not to provide" obligation and the related systems of export controls also came to provide a standard for late NPT entrants, including China, Argentina, and Brazil. (By contrast, with no comparable obligations, Pakistan provided a congenial environment for A.Q. Khan to sell nuclear weapons technology, equipment, and design information on the black market.)

In addition, both the requirements not to provide and, at least for the NPT parties, to accept safeguards, along with the more basic Article II obligation not to manufacture, helped to force problem country programs underground, thereby again contributing to a slowing of proliferation and a constraining of eventual programs. (For the non-NPT parties such as India, Pakistan, and Israel, the NPT's nonproliferation norm also created pressures to go underground.) This bought useful time.

In contrast, the safeguards system required by Article II has done less well in providing early warning or more usable public warning of clandestine nuclear weapons activities. In part, as IAEA officials are wont to contend, this record reflects the limited tools made available to the IAEA by its member states and the restrictions placed on it by the safeguards agreements that it negotiated with those states. But in part, IAEA failings reflect an internal culture that did not begin to change until after the 1991 revelations of Saddam Hussein's clandestine program. That culture placed its emphasis not on detecting undeclared activities but on evaluating state-supplied information about declared sites in order to confirm that there had been no diversion of nuclear materials from peaceful purposes to nuclear weapons. That internal culture also was unwilling to exercise the rights of access provided for in the IAEA Statute. (It remains to be seen whether the enhanced safeguards of the Additional Protocol, with their emphasis on detecting clandestine activities, will better provide early warning.)

Steps to Strengthen Article III via the 2010 NPT RevCon. Perhaps the most important near-term step to strengthen implementation of Article III would be to universalize adherence to the IAEA Additional Protocol. Even with its limitations, the Additional Protocol would provide the IAEA with significant new rights to use in detecting or deterring clandestine nuclear weapons activities.³⁵ The 2010 NPT Review Conference should endorse universal adherence.

Beyond the Additional Protocol, steps should be taken to create a new consensus to support exercise of the IAEA's right to conduct special inspections. As noted above, that right ultimately resides in Article XII of the IAEA's Statute, with its provision for "access at all times to all places and data and to any person who by reason of his occupation deals with materials, equipment, or facilities which are required by this Statute to be safeguarded."³⁶ It also is provided for in the basic NPT safeguards agreement, IAEA INFCIRC/153, "The Structure and Content of Agreements Between the Agency and States

Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons.” Moreover, when the INFCIRC/153 formulation was negotiated in the early 1970s, the intention was that special inspections would be a cooperative measure used to resolve anomalies and uncertainties. This never took place.³⁷ Today, empowering the IAEA director general to make greater use of special inspections, however, would require a significant change by the member states, who have taken a far more exceptionalist attitude toward special inspections. (Under INFCIRC/153 special inspections have been carried out only twice.)³⁸ Here too, the 2010 NPT RevCon would offer a forum to seek support for the IAEA to use all of its access rights, including Article XII.

Creating a consensus for new non-national approaches to enrichment (and reprocessing) would make the IAEA’s task considerably more manageable and technically feasible. Many proposals now are on the table for internationalizing or multilateralizing future enrichment and reprocessing activities.³⁹

Article IV—Peaceful Uses of Nuclear Energy

Article IV affirms the “inalienable right” of all countries to use nuclear energy for peaceful purposes “in conformity with Articles I and II.” It also calls for “the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy.” Parties are called on to cooperate in fostering the peaceful uses of nuclear energy “with due consideration for the needs of the developing countries of the world.”

Metric: Was the recognition in Article IV of an “inalienable right” to use nuclear energy for peaceful purposes a condition for the NPT, and has it contributed to NPT adherence?

In light of the current controversies over Article IV—and concern about an “Article IV loophole” under which countries can pursue nuclear weapons while claiming only to be exercising their Article IV right to peaceful uses—it is important to look back at the origins of the “inalienable right” obligation. The negotiating record shows that Article IV was one of the essential underlying bargains of the NPT, and, as stated by one U.S. negotiator, “In the course of the negotiations, a number of countries expressed the strong view that neither their renunciation of nuclear weapons nor the concomitant safeguards should prejudice their opportunity to share in the peaceful atom.”⁴⁰ Two sets of countries pressed hard on the peaceful uses issue: on the one hand, developed countries that needed to be reassured that the NPT would in no way prejudice their future access or use of nuclear energy (including countries in Europe as well as Japan, all of whose adherence was critical to the success of the NPT); and on the other hand, developing countries (thereby resulting in the specific reference in Article IV to “due consideration for the needs of the developing countries”). With today’s growing interest in nuclear energy, the importance of Article IV, in sustaining support for and legitimizing the NPT, is likely to increase.

Metric: Has the Article IV “inalienable right” to use nuclear energy for peaceful uses been used as a cover for pursuit of nuclear weapons?

The use of the Article IV right as a cover behind which a country can pursue nuclear weapons is the most glaring weakness of the NPT. Iran has used the language of Article IV to answer criticism of its uranium enrichment activities, to gain supporters among developing countries, and to generally make it harder to create an international consensus to block what is feared to be its pursuit of nuclear weapons. Looking ahead, it should be expected that other countries will use their asserted Article IV right to peaceful uses to divert international attempts to block their pursuit of nuclear weapons. This could well include those countries in the Middle East that could follow Iran in a regional proliferation cascade.

In part, successful use of Article IV to divert attention from activities of proliferation concern reflects a broader problem within the NPT community: the difficulty of generating widespread international support for the position that the Article IV inalienable right has to be viewed in the context of good-faith adherence to the other NPT provisions, including particularly Articles I and II. This difficulty exists even though Article IV explicitly links the “inalienable right” to its exercise “in conformity with Articles I and II of this Treaty.” Moreover, from the start, the nuclear supplier states have enunciated their right to deny supply if there is a question about the good-faith compliance of a non-nuclear weapon state party with its obligations. Lack of support for the position that Article IV needs to be read in the context of Article I and II partly reflects the wider North-South gap on economic and energy issues. Here, continued actions to support the peaceful nuclear activities of good-faith NPT adherents could help to lessen that opposition. But the difficulty selling the view that Article IV has to be seen in the overall NPT context is also tied to the unwillingness of many developing countries to adopt a stricter construction of Article IV when they believe that the NWS have not been prepared to do so for the nuclear disarmament obligations of Article VI.

Article IV Net Assessment. The “inalienable right,” “fullest possible exchange,” and “cooperate in contributing” provisions of Article IV all were necessary conditions for successful negotiation of the NPT. There has been, however, a continuing nonproliferation price for Article IV. The Article IV inalienable right has been, is being, and is likely to be used again as a cover for pursuing nuclear weapons.

Steps to Strengthen Article IV via the 2010 NPT RevCon. Perhaps the most important step to strengthen Article IV would be to create a consensus that the article’s rights are conditional on good-faith NPT adherence. That consensus might be pursued via the next UN Security Council resolution on Iran; it also could be pursued at the 2010 NPT Review Conference. Put simply: Article IV’s inalienable right can be alienated by bad-faith actions. The readiness of the non-nuclear weapon states to support that interpretation of Article IV, as suggested above, will be tied to the readiness of the NWS to make greater progress on the Article VI nuclear disarmament goals.

Article VI—Nuclear Disarmament

Article VI obligates all parties “to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.”

Metric: Was Article VI a necessary condition for successful negotiation of the NPT?

The negotiating record shows that without Article VI on nuclear disarmament, there would not have been an NPT.⁴¹ Neither the advanced industrial countries nor the developing countries were prepared to sign on to the proposition that forevermore there would be a small group of NWS.⁴² In practice, many countries recognized that movement toward nuclear disarmament would be slow; in principle, they wanted the goal of nuclear abolition to be set out in the NPT and steps taken to pursue it.

Equally important, the intent of the non-nuclear parties was not simply good-faith negotiations on measures to end the nuclear arms race, as has sometimes been argued by U.S. officials.⁴³ Results were expected. In that regard, as argued by two participants in the original negotiations, one American and one Russian, “The three such measures most often mentioned in the negotiating history and in the parties’ 1968 agreement on an agenda to implement Article VI were a ban on nuclear testing; a cut-off in the production of fissionable materials for nuclear weapons; and a prohibition on the use of nuclear weapons.”⁴⁴

Metric: Was a renewed commitment to Article VI a necessary condition for indefinite extension of the NPT in 1995?

Like the original Article VI bargain, the nature of the renewed bargain at the 1995 NPT Review and Extension Conference is also a subject of sporadic contention in debates about the treaty. Among some American disarmament skeptics, there often is a reluctance to acknowledge the linkage between the reaffirmation of Article VI (including a Comprehensive Nuclear-Test-Ban Treaty) and the indefinite extension of the NPT. By contrast, the record shows how critical this linkage was for creating the 1995 consensus.

At the 1995 conference, the U.S. goal was the indefinite extension of the NPT by consensus of the parties.⁴⁵ To achieve that goal, one of the key negotiations revolved around the readiness of the five NWS to reaffirm their commitment to the goal of nuclear disarmament in what came to be a resolution on “Principles and Objectives for Nuclear Nonproliferation and Disarmament.” This document also emphasized the importance of “the completion . . . of a Comprehensive Nuclear-Test-Ban Treaty [CTBT] no later than 1996.” Though definitely less than what many non-nuclear states likely wanted, these commitments were essential to achieve the result sought by the United States and many

others. Absent a reaffirmed commitment to Article VI (including a CTBT), it probably still would have been possible to round up a majority of votes for the indefinite extension decision. However, an extension by a contentious majority vote could have eroded the legitimacy of the NPT; it also could have been by a surprisingly slim majority. In the words of one of the U.S. ambassadors to the 1995 conference, Thomas Graham Jr., "Indefinite extension of the NPT depended on these political conditions [in the 'Principles and Objectives' document]. It might not have happened otherwise, or if it did, it would have been in a most divisive manner."⁴⁶

Metric: Have Article VI obligations directly shaped the policies of the five NPT NWS?

For the most part, the NPT NWS have made decisions about their nuclear forces policy, posture, and doctrine with very little, if any, reference to Article VI. The Article VI obligation has been occasionally cited in the preambles of arms control treaties, but as an afterthought. Since the end of the Cold War, there have been dramatic reductions in the numbers of U.S. and Russian nuclear weapons. These facts show progress in meeting Article VI obligations—and are often cited by U.S. and Russian negotiators. However, the impetus lies elsewhere than in a desire to meet Article VI obligations.⁴⁷

Yet there are several possible—and important—exceptions to the overall judgment that Article VI has had at best a limited impact on nuclear force decisions. Strenuous efforts by the United States and the other NWS to negotiate a CTBT in 1995 and 1996 originate in good part in the 1995 commitment to achieve a CTBT by the end of 1996. Indeed, one of the arguments used by U.S. officials in seeking Senate support for CTBT ratification (unsuccessfully) was that the CTBT "fulfills a commitment of the declared nuclear powers [at the 1995 NPT Review and Extension Conference] to conclude a CTBT."⁴⁸ Russian, French, and British ratification of the CTBT can also be partly linked to Article VI and the indefinite extension bargain. Some of the reductions in French and British nuclear forces also have been taken with an eye on Article VI obligations. Beginning in the late 1990s, France also began a program first to shut down and then to dismantle irreversibly its nuclear weapons plutonium production reactors at Marcoule, its associated military reprocessing plant, and its nuclear weapons enrichment plant at Pierrelatte. This project was completed by 2008. French officials state that irreversibly dismantling these facilities—rather than simply shutting them down—was undertaken to implement France's NPT Article VI obligations.⁴⁹

Further, the direct impact of Article VI in actually shaping nuclear force postures in the United States and other NPT NWS could be considerably greater in the years ahead. The argument that more vigorous pursuit of the nuclear abolition goal of Article VI would reinforce nonproliferation is increasingly heard from former officials, and not just nuclear disarmament advocates. In particular, it is argued that greater progress in meeting Article VI would engender more widespread support for new nonproliferation initiatives and for efforts to deal with today's proliferation problem countries.

Metric: Will perceived insufficient progress in meeting the Article VI nuclear disarmament obligation decisively impact decisions by other countries to pursue nuclear weapons?

This metric is included because the issue it addresses has been a continuing source of contention—and will be again at the upcoming 2010 NPT Review Conference. However, there is virtually no evidence to believe that a perception (or for that matter, a reality) of insufficient progress on nuclear disarmament has in the past or would in the future decisively impact national decisions to pursue nuclear weapons.

Looking backward, Table 2 lists the most important drivers of past nuclear proliferation; insufficient progress on Article VI does not figure in them. In different ways, security and status are the most prominent considerations. Unique leadership psychology also plays a part, especially in those regimes dominated by a single person, whether Josef Stalin's Soviet Union, Saddam Hussein's Iraq, or Kim Jong Il's North Korea. Other factors may have played a supporting part, for example, bureaucratic and technical momentum, as well as whether a country was inward- or outward-looking economically and politically. The role of key personalities inside a program also often stands out, from General Leslie Groves and J. Robert Oppenheimer in the U.S. Manhattan Project, to A.Q. Khan in Pakistan.

TABLE 2
Key drivers of past proliferation.

Country	Driver
United States	Military advantage and security; decisive weapon
Soviet Union	Power and leader psychology; decisive weapon
United Kingdom	Status; seat at the table
France	Status and security; seat at the table
China	Security; counter the United States
Israel	Security; "warm comfort on cold nights" from last-resort deterrent
India	Status; seat at the table
Pakistan	Security; existential survival
South Africa	Security; existential survival
North Korea	Security and leader psychology; survival
Taiwan	Security; hedge against U.S. disengagement
South Korea	Security; hedge against U.S. disengagement
Libya	Status and leader psychology; claim to influence
Iraq	Power and leader psychology; decisive weapon
Iran	Security, status, and regime psychology; shah to today

TABLE 3

Potential drivers of proliferation, to 2025.

Country	Driver
Iran	Security, status, and regime psychology; shah to today
Gulf countries	Security; fear of Iran
Egypt	Security and status; cannot be left behind Iran and Turkey
Turkey	Security; NATO guarantee no longer seen as credible
Greece	Security and status; cannot be left behind Turkey
Iraq	Security and status; cannot be left behind Iran
Japan	Security; vs. China, North Korea; U.S. loses credibility
South Korea	Security; vs. North Korea, Japan; break with United States
Poland	Security; U.S.-NATO guarantee loses credibility
Czech Republic	Security; U.S.-NATO guarantee loses credibility
Ukraine	Security; keeping out of Russia's grasp

Looking forward, Table 3 focuses on potential future proliferators to 2025. Once again, what stands out is the role of security and status motivations, again reinforced by other domestic, leadership, social, and economic factors. Progress in implementing Article VI has little direct nonproliferation impact.

There is one possible caveat to the preceding line of argument. Past experience strongly suggests that decisions to pursue and acquire nuclear weapons are not made simply on the basis of a cold, hard balancing of security and status costs and benefits. From this perspective, a perception of lack of progress on nuclear disarmament could become part of the overall political-psychological context for proliferation decision making. In some countries, the impact would likely be minimal at best, for example, the Gulf countries facing a nuclear-armed Iran. Yet in other countries, a perception that the world was not moving away from nuclear weapons, but that rather one or more of the five NPT NWS was increasing rather than decreasing reliance on nuclear weapons, could indirectly impact proliferation decisions, for example, in a Japan confronting heightened insecurity linked to decreased credibility of the U.S. nuclear umbrella.

Metric: Would greater progress on Article VI issues—and the perception of a more robust commitment to the goal of nuclear disarmament by the United States and other NPT NWS—result in strengthened international support on nonproliferation issues?

International support for U.S. nonproliferation initiatives is shaped by many factors, from the diplomatic style of U.S. officials to other countries' political, military, and economic interests. Nonetheless, there is significant evidence (though based mostly on one-on-one

interviews) that the answer to this question is probably yes. For instance, a linkage between perceptions of progress on nuclear disarmament by NWS and support for nonproliferation by non-nuclear weapon states was a recurrent theme from friends and allies of the United States in a recent assessment of “Foreign Perceptions of U.S. Nuclear Policy and Posture.” As one former senior official from a close U.S. ally put it, the attitude of European countries is: “If you want us to work your problem [nonproliferation], you need to work our problem [nuclear disarmament].”⁵⁰

Article VI Net Assessment. Article VI was a necessary condition for negotiation of the NPT initially, while its reaffirmation (including negotiation of a CTBT) was part of the bargain that led to the indefinite extension of the treaty. At one level, there has been considerable progress in meeting the broad goal of Article VI. The Cold War nuclear arms race has ended, while great progress has been made in rolling back the Cold War nuclear arsenals in the United States and Russia, as well as in France and the United Kingdom. (China alone continues to deploy growing numbers of nuclear weapons on increasingly sophisticated delivery systems—though with little if any condemnation from within the NPT community.)⁵¹ At another level, however, the most important specific actions long associated with successful implementation of Article VI remain unfinished, not least a treaty to end nuclear testing. Moreover, all of these actions were taken with relatively little reference to the Article VI obligations, which have actually had at best very limited impact on the nuclear weapon policies, postures, and doctrines of the five NPT NWS.

From a different perspective, no country has based its decision on whether or not to pursue nuclear weapons on the extent of progress made by the NPT NWS in fulfilling Article VI. Instead, security and status—as well as domestic economic, political, bureaucratic, and psychological factors—have driven the proliferation process. Looking at the “next wave” of potential nuclear weapon states, this lack of direct impact on proliferation decisions almost certainly will remain a constant. By contrast, there are good reasons to judge that depending on the extent of progress in meeting the nuclear disarmament goals of Article VI, it may be easier or harder for the United States to win international support, from developed as well as developing countries, for today’s nonproliferation agendas.

Steps to Strengthen Article VI via the 2010 NPT RevCon. In the context of the Obama administration’s readiness not only to reaffirm the goal of eliminating nuclear weapons, but also its pledge to take steps toward that goal, the 2010 NPT Review Conference provides an opportunity to significantly bridge the gap between nuclear and non-nuclear weapon states in the NPT. The payoffs from bridging that gap could range from greater legitimacy and effectiveness for the NPT to an enhanced cooperation among the NPT parties in confronting today’s nonproliferation challenges. Toward that end, four steps warrant consideration in the run-up to, or at, the 2010 NPT RevCon.

A first minimalist step would be for the NWS to reaffirm the “unequivocal undertaking by the nuclear-weapon States to accomplish the total elimination of their nuclear arsenals leading to nuclear disarmament to which all the States parties are

committed under Article VI.” Made at the 2000 NPT Review Conference, this commitment was not reaffirmed at the 2005 conference because of opposition from the George W. Bush administration.

Second, all parties should join again to define a practical “Action Plan” to guide implementation of Article VI over the ensuing five-year period. This, too, would be a return to the so-called Thirteen Practical Steps on implementing Article VI that were agreed at the 2000 NPT Review Conference. However, the goal should not be to readopt those steps, in toto or as revised, but to agree on the most important practical actions to be pursued in light of today’s strategic and political realities. In effect, doing so would create a precedent that one purpose of each review conference would be to identify a limited set of priority actions on Article VI for the five-year intervals between conferences. The most important such action would be to bring the CTBT into force, catalyzed by U.S. Senate ratification.

A third way to bridge the gap between the NWS and the non-nuclear weapons states would be for the parties to undertake some joint analytic work. Outside experts and governments, moreover, have already begun to explore this idea. Potentially promising areas abound, from the technical requirements for the internationally monitored elimination of nuclear warheads to assessing the technical and political conditions of nuclear abolition. Some projects could involve all concerned NPT parties; others would of necessity be limited to the nuclear powers because of their NPT obligation under Article I “not to assist.” The results could be discussed by the parties, both in the preparatory process for and at the 2015 NPT Review Conference.

Finally, taking the lead, the permanent five (P-5) members of the UN Security Council, who are also the five legally recognized NPT NWS, should seek agreement among themselves on a common template for providing information about their implementation of Article VI as well as their overall nuclear postures—and then use that template at the 2010 review. Agreement to such a shared set of transparency actions would meet persistent calls from non-nuclear countries for more systematized NPT “reporting.” In differing degrees and for different reasons, some of the P-5 countries may be reluctant to take this step. To overcome that reluctance, such a template could be viewed as an evolving document, beginning with the least-sensitive areas for transparency and then growing in scope over time.

Article X—Right to Withdraw

Article X recognizes that each party has the “right to withdraw” from the NPT based on a decision that “extraordinary events, related to the subject matter of this Treaty, have jeopardized [its] supreme interests.” Any such party also must “give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events.”⁵²

Metric: Does the existing “right to withdraw” on three months’ notice to other parties and the Security Council provide sufficient opportunity and legitimacy for the international community to try to influence any such national decision?

The negotiating record shows that without a withdrawal right it would not have been possible to negotiate the NPT. In particular, some of the most important industrial countries that were intended parties to the NPT all wanted a right to withdraw. Parties’ statements in the years since North Korea’s withdrawal from the NPT also show the continued importance of this right.

However, North Korea’s 2003 decision to withdraw from the NPT triggered a new look at Article X. Various proposals have been put forward, focused frequently on how to take advantage of the language of Article X to ensure a greater role for the Security Council in reviewing and influencing—if not seeking to roll back—decisions to withdraw. In turn, there are proposals to deal with what happens after a withdrawal. For example, how can international monitoring be maintained of facilities and materials transferred by other countries and previously subject to IAEA safeguards under the NPT Article III obligations? Can materials and equipment so transferred be removed from the state in question?⁵³ Here, too, actions by the Security Council would provide one mechanism to address these issues.

Article X Net Assessment. The language of Article X provides a basis for greater international involvement via the Security Council in decisions to withdraw from the NPT. What remains is to strengthen the consensus for such council actions and to identify specific responses that the council might consider. Skeptical views from some parties will also need to be addressed. Strengthening the council’s role takes on even greater importance given the possibility that Iran could withdraw from the NPT in the course of its pursuit of nuclear weapons, claiming that none of its pre-withdrawal activities violated its NPT obligations and that post-withdrawal it is free to use previously acquired nuclear expertise for weapons purposes.

Steps to Strengthen Article X via the 2010 NPT RevCon. Drawing on the proposals already on the table, the 2010 conference could support Security Council review of any decision to withdraw from the NPT. Such a review would be fully consistent with Article X, as well as the council’s broader nonproliferation responsibilities, most recently reflected in UN Security Council Resolution 1540. The parties could also call on member states to require, as a condition of exports, backup safeguards agreement in parallel with those of the NPT. This would ensure continuity of safeguards on previous supply even after withdrawal. In turn, the NPT parties could call on the Zangger Committee to seek agreement on procedures to govern how previously transferred materials and equipment would be treated after a country withdraws from the NPT.

Concluding Thoughts: Looking Ahead to 2010 and Beyond

There is less than one year to go before the 2010 NPT Review Conference. Following its mandate, the conference will both look backward at implementation of the NPT over the

preceding five years and look forward to identify actions to strengthen the NPT's implementation over the succeeding five years.

Looking backward, the participants in the 2010 RevCon will address in their own ways the specific issues explored in this analysis. As is to be expected, opinions will vary on how well the NPT has served its goals of preventing proliferation, fostering the peaceful uses of nuclear energy, and advancing toward a world without nuclear weapons. Suffice it to suggest: writ large, the NPT remains an essential part of global nonproliferation efforts but has come under increasing proliferation pressures in recent years and has specific nonproliferation mechanisms that need strengthening; the NPT provides an irreplaceable political-legal-cooperative underpinning for increased use of nuclear energy for peaceful purposes but also lends itself to misuse by countries seeking nuclear weapons under the guise of peaceful nuclear programs; and the NPT commits all of the world's nations to nuclear disarmament, but the progress that has been achieved so far in pursuing that goal falls far short of what the non-nuclear weapon states expected at the NPT's creation four decades ago.

Looking ahead, the upcoming NPT Review Conference offers an opportunity for the parties to join together to bolster the NPT's contributions to a safer, more secure, and more prosperous world. Doing so successfully is essential, as well, to ensure the credibility and legitimacy of the treaty in the eyes of all of its parties. With that in mind, the preceding discussion has put forward a variety of specific proposals for using the 2010 NPT Review Conference to strengthen different articles of the NPT and their implementation. Use of the RevCon in this manner would reflect a long tradition; the quinquennial conferences have helped to create an international consensus for action on issues ranging from physical protection of nuclear materials to full-scope safeguards. Table 4 summarizes the proposals set out above. Suggestions range from creating a consensus that all NPT parties have an obligation "not to assist," to identifying specific steps to move toward a fuller implementation of Article VI, to reaching a consensus on how best to strengthen Security Council oversight of withdrawal under Article X.

How best to proceed in reaching agreement at the 2010 conference on such actions to enhance implementation of the NPT? One possible way forward would be for the participants to agree on three separate but linked NPT Action Plans: one for nonproliferation, one for peaceful uses, and one for nuclear disarmament. Each Action Plan would on the one hand briefly set out and reaffirm the parties' vision in that area and on the other hand commit the parties to the pursuit of a limited set of practicable actions in the 2010–2015 period. These Action Plans would be developed in light of earlier NPT decisions, such as the 1995 "Principles and Objectives for Nuclear Non-Proliferation and Disarmament," as well as the consensus Final Documents from the 1975, 1985, and 2000 NPT Review Conferences. In effect, the purpose of each Action Plan, to use a metaphor derived from American football, would be to "look long but throw short."⁵⁴ Taken together, these Action Plans would provide a roadmap to guide the parties in the years that followed. They also could provide the basis for discussion on problems and progress in their implementation at each of the preparatory sessions for the 2015 NPT Review Conference. As such, they would help to realize the goal of the 1995 Review and Extension Conference of a more substantive overall NPT review process. Not least, agreement on

TABLE 4

Possible steps to strengthen the treaty at the 2010 NPT Review Conference.

Article I
<ul style="list-style-type: none"> • Reaffirm Article I's "no transfer" and "no assistance" obligations • Create consensus that all countries have an obligation "not to assist" state, non-state actors
Article II
<ul style="list-style-type: none"> • Seek agreed P-5 understanding on meaning of "no manufacture" • Seek consensus on actions that would violate "no manufacture"
Article III
<ul style="list-style-type: none"> • Encourage universal adherence to Additional Protocol • Seek consensus to make adherence to Additional Protocol a condition of nuclear supply to NPT parties • Affirm the IAEA Statute's Article XII right of access "at all times, to all places"
Article IV
<ul style="list-style-type: none"> • Create consensus that Article IV rights are based on good-faith NPT adherence • Continue to build support for new fuel cycle approaches; pending shock to tip the balance
Article VI
<ul style="list-style-type: none"> • Reaffirm the "unequivocal undertaking" to eliminate nuclear weapons • Develop a new Article VI Action Plan, including CTBT entry into force • Initiate joint assessments among and between NPT NWS and non-nuclear weapon states • Develop a joint template of transparency actions for providing information on implementation of Article VI and nuclear weapon postures
Article X
<ul style="list-style-type: none"> • Affirm Security Council role and responsibility to review NPT withdrawals, with specific action on "after withdrawal" issues • Ask Zangger Committee to agree on procedures for treating previously supplied equipment and materials in the event of NPT withdrawal

these NPT Action Plans would help meet today's challenge of recreating a common vision for the NPT among all of its parties.

There are other tasks ahead for the 2010 NPT Review Conference. The conference needs to address challenges of noncompliance and, at least in this author's view, help to send a strong signal to Iran's leadership that it needs to choose between valuable political, economic, and social integration into the world of nations, or international containment and isolation, should it go all the way to acquire nuclear weapons. The conference also should explore how to begin a process of engaging the non-NPT NWS—especially India, Pakistan, and Israel—and bringing them into the nuclear disarmament process. There is one final consideration in both looking back at the NPT's history and looking forward at its future. When negotiations began in earnest on the NPT in the mid-1960s, there was a widespread fear that runaway proliferation could become unavoidable. The negotiation,

implementation, and near-universal adherence of the NPT significantly contributed to making that fear a self-denying prophecy. Today, there are again growing fears of runaway proliferation. Renewed support, commitment, and practical actions toward all of the NPT's goals—and a readiness to stand up for the treaty in the face of noncompliance—will be essential parts of a broader set of nonproliferation efforts to make those fears once again a self-denying prophecy. In the final tally of the NPT's pluses and minuses, this potential future contribution to shaping perceptions of the proliferation future may well be the treaty's most important element. It also provides a compelling motivation to strengthen the treaty and buttress its legitimacy first by reaching agreement on an integrated set of NPT Action Plans at the 2010 NPT Review Conference and then working cooperatively to ensure those plans' effective implementation in the years that follow.

DISCLAIMER

The views contained in this article are those of the author and do not necessarily reflect those of Science Applications International Corporation or any of its sponsoring organizations.

NOTES

1. This paper draws partly on an earlier paper prepared for a workshop, "Challenges to the NPT Regime Instruments," organized by the U.S. Naval Postgraduate School, Monterey, CA, October 6–7, 2008. The author gratefully acknowledges the support of the Naval Postgraduate School and its sponsors for preparation of the initial paper.
2. For this and other references to the NPT, see Treaty on the Non-Proliferation of Nuclear Weapons, March 5, 1970.
3. See George Bunn and John B. Rhinelander, "Looking Back: The Nuclear Nonproliferation Treaty, Then and Now," *Arms Control Today* 38 (July/August 2008), <www.armscontrol.org/act/2008_07-08/looking-back>.
4. See Dean Rusk, "Hearings on the Treaty on the Nonproliferation of Nuclear Weapons before the Committee on Foreign Relations," U.S. Senate, 90th Cong., 2nd sess., July 1968, pp. 21, 27; Paul Nitze, *Ibid.*, pp. 55–56.
5. See Melvin Laird, "Hearings on the Treaty on the Nonproliferation of Nuclear Weapons before the Committee on Foreign Relations," U.S. Senate, 90th Cong., 2nd sess., February 18 and 20, 1969, p. 384.
6. On nuclear weapons assistance in the early years, see Richard Rhodes, *The Making of the Atomic Bomb* (New York: Simon and Shuster, 1986); Jenifer Mackby and Paul Cornish, eds., *U.S.-UK Nuclear Cooperation after 50 Years* (Washington, DC: CSIS Press, 2008); "China's Nuclear Weapon Development, Modernization and Testing," Nuclear Threat Initiative/James Martin Center for Nonproliferation Studies, <www.nti.org/db/china/wnwmdat.htm>; Warner D. Farr, "The Third Temple's Holy of Holies: Israel's Nuclear Weapons," Counterproliferation Papers, U.S. Air Force Counterproliferation Center, Air War College, Air University, Maxwell Air Force Base, September 1999; Reuters, "Peres Biography: Israel, France Had Secret Pact to Produce Nuclear Weapons," *Ha'aretz*, September 5, 2007; Wisconsin Project on Nuclear Arms Control, "Israel's Nuclear Weapon Capability: An Overview," July–August, 1996; Avner Cohen, *Israel and the Bomb* (New York: Columbia University Press, 1999); BBC News, "UK Helped Israel Get Nuclear Bomb," August 4, 2005.
7. It is widely believed publicly that in the mid-1980s, China transferred a nuclear weapon design to Pakistan. For a summary of earlier China-Pakistan ties, see "China's Nuclear Exports and Assistance to Pakistan," James Martin Center for Nonproliferation Studies, August 1999, <cns.miis.edu/research/india/china/npakpos.htm>.

8. See Shirley A. Kan, "China and Proliferation of Weapons of Mass Destruction and Missiles: Policy Issues," Congressional Research Service, Updated November 15, 2006, pp. 3–5.
9. "China's Nuclear Exports and Assistance to Pakistan," James Martin Center for Nonproliferation Studies, Archived Material: Resources on India and Pakistan.
10. See Paul Kerr and Mary Beth Nikitin, "Pakistan Nuclear Weapons: Proliferation and Security Issues," Congressional Research Service, June 20, 2008, p. 9; David E. Sanger and William J. Broad, "U.S. Secretly Aids Pakistan in Guarding Nuclear Arms," *New York Times*, November 18, 2007.
11. See David Albright and Corey Hinderstein, "The A.Q. Khan Illicit Nuclear Trade Network and Implications for Nonproliferation Efforts," *Strategic Insights* 5 (July 2006), <www.ccc.nps.navy.mil/si/2006/Jul/albrightJul06.asp>.
12. See Bunn and Rhinelander, "Looking Back: The Nuclear Nonproliferation Treaty Then and Now"; Wayne Reynolds and John Simpson, "Australia: A Potential Future Proliferator?" pp. 11–13; and Etel Solingen, "The Perils of Projection: Japan's Once and Future Nuclear Status," pp. 2–20, papers for "Forecasting Nuclear Proliferation Project," James Martin Center for Nonproliferation Studies, August 2008; Paul M. Cole, *Sweden Without the Bomb: The Conduct of a Nuclear-Capable Nation Without Nuclear Weapons* (Santa Monica, CA: RAND, 1994), pp. 96–112; Jurg Stussi, "Historical Outline on the Question of Swiss Nuclear Armament," English translation of Swiss Government report, April 1996, <nuclearweaponarchive.org/Library/Swissdoc.html>.
13. David Kay, "Iraqi Inspections: Lessons Learned," presentation at the Center for Nonproliferation Studies, Monterey, California, February 10, 1993.
14. See Joby Warrick and Peter Slevin, "Probe of Libya Finds Nuclear Black Market," *Washington Post*, January 24, 2004, p. A1; James Martin Center for Nonproliferation Studies, "Weapons of Mass Destruction in the Middle East: Libya," November 14, 2006, <cns.miis.edu/wmdme/index.htm>.
15. For a comprehensive analysis of the reasons for concern about Iran's nuclear weapon ambitions, see Mark Fitzpatrick, *The Iranian Nuclear Crisis: Avoiding Worst-Case Outcomes* (London: International Institute for Strategic Studies, 2008), Adelphi Paper 398.
16. See Richard Weitz, "Israeli Airstrike in Syria: International Reactions," James Martin Center for Nonproliferation Studies, November 1, 2007, <cns.miis.edu/stories/071101.htm>; Greg Miller and Paul Richter, "U.S. Offers Evidence of North Korea-Syria Nuclear Plant," *Los Angeles Times*, April 25, 2008.
17. For a discussion of the overall issue that concludes, inter alia, that the NPT has "more to do with encouraging [states] . . . to trade nuclear development for nuclear hedging," see Ariel E. Levite, "Never Say Never Again: Nuclear Reversal Revisited," *International Security* 27 (Winter 2002/03), pp. 59–88.
18. See Cole, *Sweden Without the Bomb: The Conduct of a Nuclear-Capable Nation Without Nuclear Weapons*, pp. 106–9; Stussi, "Historical Outline on the Question of Swiss Nuclear Armament."
19. This judgment reflects the author's discussions with various European officials and experts over the past several years.
20. For a discussion of responses to Iran's emergence as a nuclear weapon state in violation of its NPT obligations, see, Lewis A. Dunn, "After Iranian Acquisition, What?," paper prepared for the William S. Cohen Center, University of Maine and the National Defense University, July 9, 2007.
21. This fear of runaway proliferation—and the belief that the NPT would help to prevent such proliferation—recurs throughout U.S. officials' testimony in support of U.S. Senate consent to the ratification of the NPT. See "Hearings on the Treaty on the Nonproliferation of Nuclear Weapons before the Committee on Foreign Relations."
22. See, for example, Kurt M. Campbell, Mitchell Reiss, and Robert Einhorn, eds., *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, (Washington, DC: Brookings Institution Press, 2004).
23. Paul Leventhal, "CIRUS Reactor's Role in a U.S.-India Nuclear Agreement," prepared remarks delivered at the Center for Nonproliferation Studies, Washington, DC, December 19, 2005.
24. The early discussions were pointed out to the author in a personal communication from a former senior official of the U.S. Atomic Energy Commission.
25. For an excellent discussion of the origins of the nuclear supply regime, written by one of the participants in its creation, see Frederick McGoldrick, "International Nuclear Export Control Regimes: The Zangger Committee and the Nuclear Suppliers Group," unpublished report, September 2008.
26. See Leventhal, "CIRUS Reactor's Role in a U.S.-India Nuclear Agreement."
27. Nuclear Non-Proliferation Act of 1978, <www.nti.org/db/china/engdocs/nnpa1978.htm>.
28. See, for example, William Langewiesche, "The Wrath of Khan," *Atlantic Monthly*, November 2005.

29. Leonard Spector and Deborah Berman, "The Syrian Nuclear Puzzle," unpublished manuscript, James Martin Center for Nonproliferation Studies, August 2008.
30. Some readers may question the inclusion of a metric dealing with the effectiveness of IAEA safeguards in a paper assessing the pluses and minuses of the NPT; this metric has been included given the role of the IAEA in monitoring compliance with NPT safeguards obligations.
31. See, respectively, Malcolm Rifkind, "The Work of the United Nations Special Commission in Iraq," *Guardian*, June 28, 1996, <www.fas.org/news/iraq/1997/01/9701-fco-unscom.htm>; *Online NewsHour*, "Tracking Nuclear Proliferation—Romania," PBS, May 2, 2005, <www.pbs.org/newshour/indepth_coverage/military/proliferation/countries/romania.html>; Paul Kerr, "IAEA: Seoul's Nuclear Sins in Past," *Arms Control Today* 34 (December 2004); Fitzpatrick, *The Iranian Nuclear Crisis*, p. 15; Spector and Berman, "The Syrian Nuclear Puzzle."
32. On the IAEA's culture, see Lawrence Scheinman, "Assuring the Nuclear Non-Proliferation Safeguards System," Atlantic Council of the United States, October 1992, pp. 26–29.
33. See IAEA, "IAEA Safeguards Overview: Comprehensive Safeguards Agreements and Additional Protocols," <www.iaea.org/Publications/Factsheets/English/sg_overview.html>.
34. See, for example, McGoldrick, "International Nuclear Export Control Regimes."
35. See IAEA, "IAEA Safeguards Overview."
36. Statute of the International Atomic Energy Agency, Article XII, para. 6, July 29, 1957, <www.iaea.org/About/statute.html>.
37. Communication to the author from Lawrence Scheinman, distinguished professor, James Martin Center for Nonproliferation Studies.
38. See John Carlson and Russell Leslie, "Special Inspections Revisited," paper presented at the Institute of Nuclear Materials Management 2005 Annual Meeting, Phoenix, Arizona, July 2005.
39. See "Multilateral Approaches to the Nuclear Fuel Cycle: Expert Group Report Submitted to the Director General of the IAEA," February 22, 2005.
40. See Glenn T. Seaborg, prepared statement, "Hearings on the Treaty on the Nonproliferation of Nuclear Weapons before the Committee on Foreign Relations," p. 102. See also George Bunn, "The Nuclear Nonproliferation Treaty: History and Current Problems," *Arms Control Today* 33 (December 2003). For a comprehensive and widely accepted study of the NPT negotiating history, see Mohammed I. Shaker, *The Nuclear Non-Proliferation Treaty: Origin and Implementation 1959–1979*, three volumes (London: Oceana Publications, 1980).
41. See George Bunn and Roland M. Timerbaev, "Nuclear Disarmament: How Much Have the Five Nuclear Powers Promised in the Non-Proliferation Treaty?," paper prepared for the Lawyers Alliance for World Security, 1994, reissued June 1997. Bunn and Timerbaev were members of the U.S. and Soviet negotiating teams, respectively.
42. *Ibid.*, p. 12.
43. For a recent articulation of this position, see Christopher A. Ford, "Debating Disarmament: Interpreting Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons," *Nonproliferation Review* 14 (November 2007), pp. 401–28. In addition to Bunn and Timerbaev, a different assessment is provided in Thomas Graham Jr., "The Origin and Interpretation of Article VI," *Nonproliferation Review* 15 (March 2008), pp. 7–9.
44. Bunn and Timerbaev, "Nuclear Disarmament: How Much Have the Five Nuclear Powers Promised in the Non-Proliferation Treaty?" p. 24.
45. The following discussion draws partly on the author's participation in the 1995 Review and Extension Conference as an adviser to the U.S. delegation.
46. Graham, "The Origin and Interpretation of Article VI."
47. This judgment reflects the author's own experience—directly and indirectly—in this area.
48. Secretary of Defense William S. Cohen, "Hearings on the Comprehensive Test Ban Treaty," Senate Committee on Armed Services, 106th Cong., 1st sess., October 6 and 7, 1999, p. 12.
49. Statement made to the author by French officials during his visit in March 2009 to the facilities at Marcoule and Pierrelatte.
50. See Lewis A. Dunn, ed., "Foreign Perceptions of U.S. Nuclear Policy and Posture: Insights, Issues, and Implications," report prepared by Science Applications International Corporation for the Advanced Systems and Concepts Office, Defense Threat Reduction Agency, December 12, 2006, <www.dtra.mil/documents/asco/publications/ForeignPerspectivesUSNuclearPolicyCompleteReport.pdf>.

51. "China Profile—Nuclear," Nuclear Threat Initiative/James Martin Center for Nonproliferation Studies, March 2009, <www.nti.org/e_research/profiles/China/Nuclear/index.html>.
52. There are other more procedural NPT articles, including Article VIII on amendment process and Article IX on entry into force and definition of "nuclear weapon state." Due to space considerations, these are not discussed here. Suffice it to note that the amendment process makes it virtually impossible to amend the NPT. In addition, the definition of a NWS as "one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967" precludes entry to the NPT as such a state by India, Pakistan, and Israel. This definition has significantly complicated efforts to bring these countries into a wider nuclear disarmament dialogue and into the overall nonproliferation regime.
53. See on this issue, inter alia, George Bunn and John Rhinelander, "The Right to Withdraw from the NPT: Article X is Not Unconditional," *Disarmament Diplomacy* No. 79 (April/May 2005); "Working Paper on Article X," submitted by Australia and New Zealand, 2005 NPT Review Conference, April 28, 2005; "Withdrawal from the Treaty on the Non-Proliferation of Nuclear Weapons," European Union common approach, working paper submitted to the 2005 NPT Review Conference, May 10, 2005; "Strengthening the Implementation of Article X of the Treaty on the Non-Proliferation of Nuclear Weapons," working paper submitted by the United States to the 2005 NPT Review Conference; Pierre Goldschmidt, "Saving the NPT and the Nonproliferation Regime in an Era of Nuclear Renaissance," testimony to the House of Representatives, Foreign Affairs Subcommittee on Terrorism, Nonproliferation and Trade, July 24, 2008.
54. This phrase was coined by Alton Frye. It remains apt today.