

CHAPTER 3

Safeguards and the NPT: Where Our Current Problems Began

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Introduction

The advent of the nuclear age spawned the creation of an international system intended to spread the benefits of nuclear technology while preventing the spread of the bomb. The system includes organizations and rules that have evolved in an attempt to realize this difficult dual mission, but it has failed to prevent a growing number of nations from either producing nuclear weapons or putting themselves in a position to produce such weapons quickly. The nature of current commercial nuclear technology makes it feasible for a country to use a civilian nuclear power program to shield a weapons development program. This is not a surprise. The security and proliferation problems visible today in the nuclear area were foreseen by some scientists, but the extravagant visions of nuclear nirvana blinded the champions of nuclear energy to the fact that spreading the technology would allow more and more countries to increase their nuclear “latency” (their closeness to nuclear weapons capability). It is instructive to examine some early milestones in the mitigation of nuclear proliferation risks that unintentionally led to current proliferation problems and still have the potential to promote further increases in nuclear “latency.”

Atoms for Peace and the Cold War

The first successful controlled nuclear chain reaction, on December 2, 1942, not only brought the prospect of nuclear weapons closer to reality, but also the prospect of controlled nuclear energy for civilian purposes. The latter idea was set aside while World War II raged onward, but once the bombs were dropped on Hiroshima and Nagasaki and the war ended, the question of the future of nuclear energy, both military and civilian, was engaged. The Cold War began even before British Prime Minister Winston Churchill's famous "Iron Curtain" speech¹ at Fulton, Missouri in 1946, and the nuclear issue was as central to it as the question of post-war Soviet domination of Eastern Europe. Indeed, the issues were linked in the eyes of some policymakers, but there was hope that a post-war U.S.-Soviet confrontation could be avoided, with the internationalization of nuclear energy as the linchpin allowing the continuation of the wartime alliance between the two nations. Alas, it was not to be. Between Soviet Premier Joseph Stalin's distrust of the West—based in part on the history of the failed Western expeditionary forces sent to crush the Russian Revolution—and the abject fear of Communist ideology by Western reactionaries like U.S. Secretary of State James Byrnes, who saw the bomb as a potential instrument of coercion against the Soviets, there was little likelihood that the bomb would be anything other than an area of intense competition once the Soviets inevitably began constructing their own nuclear arsenal.

The group of scientists who designed and developed the bomb included many who saw nuclear energy as a potential boon to mankind that would eventually overshadow its provenance as a weapon of mass destruction and many who thought that international cooperation on development could make that happen. But the reality of a U.S. monopoly on the weapon, short-lived though it was destined to be, was too enticing to the United States and other Western pow-

1. Winston Churchill, "Sinews of Peace," Speech at Westminster College, Fulton, Missouri, March 5, 1946, available from www.historyplace.com/speeches/ironcurtain.htm.

ers and made the prospect of a U.S.-Soviet entente extremely difficult if not impossible. Nonetheless, even as the Soviets worked feverishly to build their first nuclear device, the United States was giving serious thought to the question of how international development of nuclear energy for peaceful purposes could be carried out. The question was given to a committee set up by then-Assistant Secretary of State Dean Acheson and chaired by David Lilienthal, the head of the Tennessee Valley Authority (TVA). Lilienthal appointed an advisory panel containing Robert Oppenheimer to do the analysis. The committee's report,² issued on March 28, 1946, was sobering. In essence, the committee said that the only way of developing nuclear energy for peaceful purposes without spreading bomb technology was to prohibit all national development and provide international ownership of and responsibility for all nuclear materials and advanced technology.

The Acheson-Lilienthal report did not sit well with the guardians of free enterprise in the West or with the Soviets, who wanted the bomb, so the notion of international ownership and control was scrapped and national nuclear rivalries began their rise. The U.S. nuclear monopoly was institutionalized by Congress via the enactment of the Atomic Energy Act of 1946, which formally declared U.S. government ownership of all nuclear materials under its control and placed research, development, and demonstration of nuclear energy in the hands of a new agency, the Atomic Energy Commission (AEC)—a five member board appointed by the President with the advice and consent of the Senate. A Senate-House committee, the Joint Committee on Atomic Energy (JCAE), was established to provide legislative and investigatory oversight over the nuclear enterprise, and strict rules were established limiting the sharing of nuclear information and technology, with severe penalties for violations.

2. *A Report on the International Control of Atomic Energy* (The Acheson-Lilienthal Report), report prepared for the Secretary of State's Committee on Atomic Energy, Washington, DC: Government Printing Office, 1946, available from www.learnworld.com/ZNW/LWText.Acheson-Lilienthal.html.

But U.S. secrecy did not prevent the Soviets from exploding a fission device of their own in 1949 and a thermonuclear device in 1953. When Dwight Eisenhower became President in January 1953 he was presented with a stark report about growing Soviet nuclear and conventional capabilities and a proposal to inform the U.S. public of the dangers of nuclear war.³ The report reflected the fear that without some restraint in the arms race the Union of Soviet Socialist Republics (USSR) might achieve a nuclear force level (believed by the authors to be about 600 fission weapons with a 40 kiloton yield) that, if dropped on the United States, could be sufficient to destroy the U.S. economy beyond recovery in a few years—a “knockout blow” in the parlance of the report.⁴ Even if the U.S. had more weapons, the report argued, the Soviets might be tempted to attack if they believed a knockout blow was feasible. The panel’s advice to Eisenhower was to inform the American people of the growing danger in order to obtain support for nuclear arms control, i.e., support for reducing and keeping the stockpile of weapons on both sides below the point where a knockout blow would be seen as not possible. This created a policy dilemma for Eisenhower, who intended to carry out a new program making nuclear weapons a central part of a greatly expanded military buildup. At the same time, he recognized the difficulty of negotiating an arms control agreement with the Soviets, which would require an intrusive inspection system that the national security apparatus of the USSR was predisposed to oppose.

President Eisenhower finessed this problem by seizing on the idea of the superpowers reducing, if not their weapons, at least their stockpile of fissile materials by contributing a certain amount for peaceful purposes. His hope was that the Soviets might find it difficult to match a U.S. contribution, in which case either the

3. Leonard Weiss, “Atoms for Peace,” *Bulletin of the Atomic Scientists*, Vol. 59, No. 6, November 2003, pp. 33-44.

4. Henry Sokolski, *Best of Intentions: America’s Campaign Against Nuclear Weapons Proliferation*, Westport, CT: Praeger, 2001, p. 26.

number of future USSR weapons would be reduced or the United States would gain a propaganda victory. This idea initially generated skepticism from the defense establishment, which saw it as possibly compromising the “new look” defense posture designed to increase U.S. reliance on nuclear weapons, but some advisors, including AEC Chairman Lewis Strauss, became supporters of the idea. Strauss foresaw the possibility of growing fissile material contributions for peaceful purposes becoming so large over time that a military fissile material production cutoff agreement might be possible.⁵ While protection of contributed material from theft was discussed, the danger of horizontal proliferation as a security threat once the contributed materials were distributed was given short shrift. This occurred partly because of the quaint notion extant that a country having only a small stockpile of weapons was not a security threat⁶ and mostly because of the apparent strategic and propaganda advantage the proposal provided the Americans over the Soviets. Accordingly, in December 1953, President Eisenhower went before the United Nations (UN) and laid out an attractive vision of peaceful nuclear development in which all nations could participate via a nuclear fuel bank into which the United States and the USSR would contribute equal amounts. The bank was to be administered by an international atomic energy agency, but the question of how the bank would operate to ensure peaceful use of the material was deferred. The Soviets were not blind to the proliferation consequences of Eisenhower’s proposal. After President Eisenhower’s speech, Soviet Foreign Minister Vyacheslav Molotov reportedly told U.S. Secretary of State John Foster Dulles that the proposal would spread bomb materials worldwide.⁷

Meanwhile, President Eisenhower’s vision triggered a demand by

5. Ibid, p. 29.

6. Ibid, p. 32.

7. Paul Leventhal, “Fixing Ike’s Flawed Nuclear Plan,” *Nuclear Control Institute*, December 8, 2003, available from www.nci.org/06nci/10/Fixing%20Ike%27s%20Flawed%20Nuclear%20Plan.htm.

Congress for an expanded program of nuclear development that industry contractors had been seeking. This required new legislation, and the Atomic Energy Act of 1954 (AEA) was enacted, which gave industry the ability to own nuclear materials and develop nuclear technology. Under the AEA, the United States began what was called an “Atoms for Peace” program involving the building of research reactors, fueled with highly enriched uranium (HEU), for export to many countries in the hope that this would lead to larger contracts for American companies as nuclear technology became commercialized.

Recognizing and Ignoring Safeguards Issues

The loosening of government controls was accelerated when the United States proposed an international scientific conference that took place in Geneva in 1955, which was designed to push nuclear development worldwide, including the idea of a uranium bank.⁸ The Soviets were not expected to participate in the conference. As indicated earlier, they had criticized the bank proposal—along with the notion of spreading nuclear technology for peaceful purposes—on the grounds that it could make the acquisition of nuclear weapons materials available to more countries. Americans were not entirely blind to this concern and required that spent fuel from research reactors provided by the United States be returned to the United States for reprocessing. But that was as far as any thoughts about safeguards went. However, when the Soviets, in a surprise move, agreed to participate in the conference and the development of the fuel bank, the American delegation—whose scientific head was I.I. Rabi—scrambled to come up with a proposal, for the Soviets to consider, on safeguarding the nuclear materials to be distributed by the proposed International Atomic Energy Agency (IAEA). At that point the IAEA did not have a recognized charter, which had to be negotiated and was not formally adopted by the UN until 1957.

8. Richard Hewlett and Jack Holl, *Atoms for Peace and War, 1953-1961*, Berkeley: University of California Press, 1989, available from energy.gov/sites/prod/files/2013/08/f2/HewlettandHollAtomsforPeaceandWarComplete.pdf.

Based on a late night discussion within the American delegation in their Geneva hotel, Rabi presented an ad hoc proposal to the Soviet delegation to safeguard weapons materials from theft or diversion by tagging the material with a highly radioactive element, uranium-232 (U-232), so that the path of the material could be traced from fabrication to reprocessing. The head of the Soviet delegation, Dmitri Skobeltsyn, along with his colleagues, studied the tagging proposal and then challenged it by pointing out that the decay chain of U-232 had a “dead period” during which it produced the daughter element thorium-228. The latter element was not a hard gamma emitter and thus presented no serious safety problem if chemically separated out at that point in the decay chain. It was only when the chain reached radium-224 that a sufficiently energetic gamma emission was produced that would provide protection against diversion of the material.⁹ The Soviets concluded that “spiking” was not an effective safeguards measure, and the Americans realized they had to go back to the drawing board.

Gerard Smith, the diplomatic head of the American delegation, was so chagrined by the ease with which the U.S. proposal was dismissed that he returned to Washington and raised the question of whether the United States should slow down its plans for nuclear transfers until safeguards were better understood, effective, and deployed. The answer by John A. Hall, the Director of the AEC Division of International Affairs, backed up by AEC Commissioner Willard Libby and Chairman Lewis Strauss, was an emphatic “no.”¹⁰ A safeguards system that would be fully effective was deemed too costly and too intrusive to be acceptable to nuclear recipients. The U.S. policy became “sell now, do safeguards later.” However, it was agreed that an engineering study of safeguards was needed, so an AEC contract was issued to the Vitro Corporation, which produced a report in September 1956 stating that even with a 90% probability of detecting an unauthorized diversion of nuclear mate-

9. *Ibid.*, p. 314.

10. *Ibid.*, p. 317.

rials, one could divert a bomb's worth of plutonium within 5 years without detection. That meant that an effective safeguards system would have to contain political and diplomatic elements, as well as technical ones. A task force created by the AEC to study policy issues regarding reactor development in the United States and abroad produced a report that said Atoms for Peace might be an engine for the proliferation of nuclear weapons to underdeveloped or small countries. Moreover, maximum assurance against diversion would require access to all facilities, areas, and records of the country, as well as intrusive methods of surveillance. But the task force did not consider diversion as the main proliferation concern. The greatest threat, they believed, came from the training of nuclear scientists and engineers in reactor technology and advanced nuclear technology such as reprocessing.¹¹ The idea that diversion was not a serious national security problem was shared by elements within the Eisenhower administration, including Special Representative for Disarmament Harold Stassen, who stated his belief in 1955 that small nuclear arsenals by non-weapons states were not a national security threat to the United States and could act "as an essential counterpoise to a growing USSR nuclear weapons threat."¹² This was echoed by high level personnel of the Department of Defense who believed proliferation could even work to U.S. advantage if France and Japan became weapons states while the Soviets restrained their unreliable allies in Eastern Europe.¹³ Later on, Stas-

11. Ibid.

12. Progress Report Prepared by the President's Special Assistant (Stassen), May 26, 1955, *Foreign Relations of the United States, 1955-1957*, Volume XX, Regulation of Armaments; Atomic Energy, Document 33, available from history.state.gov/historicaldocuments/frus1955-57v20/d33.

13. See, Shane Maddock, "The Fourth Country Problem: Eisenhower's Nuclear Nonproliferation Policy," *Center for the Study of the Presidency*, 1998, available from www.thefreelibrary.com/The+Fourth+Country+Problem%3a+Eisenhower%27s+Nuclear+Nonproliferation...-a053390297. Also see, Memorandum for the Secretary of Defense, November 18, 1955, Document 219, NSA, Non-Proliferation; Informal Notes of a Meeting of the National Security Council Planning Board, Washington, DC, December 21, 1955, 10 a.m.-12:30 p.m., *FRUS*, 1955-

sen elaborated his view, now totally discredited by historical fact, that the existence of nuclear weapons states “on various sides” was a deterrent to diversion of nuclear materials and the creation of more states with nuclear weapons.¹⁴

In 1956, negotiations on the IAEA charter began in Vienna, and U.S. diplomatic corps entrusted with the negotiations approached them with a more realistic notion of the serious national security risks posed by nuclear diversion. The head of the U.S. delegation to the negotiations, Ambassador James Wadsworth, recognized the security problems created by Atoms for Peace. In a speech before the Conference on the Statute of the IAEA on October 15, 1956, Wadsworth explained the need for safeguards and the danger of nuclear development without them:

Small amounts of material used or produced in the course of agency-supported peaceful projects can be adapted for use in weapons of destructive force almost beyond comparison with the most powerful weapons of the pre-atomic era, and more important still is the possibility that the explosion of only one such weapon in a local conflict might be enough to set off a worldwide conflagration.¹⁵

This notion was underscored during the so-called Yom Kippur War between Israel and Egypt in 1973 when Israel, which at one point was losing the war, had ostensibly armed its small nuclear arse-

1957, Vol. 20, pp. 245-250; Memorandum of Conversation among the President's Special Assistant (Stassen) and the Joint Chiefs of Staff, Pentagon, Washington, DC, January 24, 1956, 4 p.m., *FRUS*, 1955-1957, Vol. 20, pp. 276-279.

14. As quoted in Sokolski, p. 32. See also, “Statement by the United States Representative (Stassen) to the Disarmament Subcommittee: Nuclear Weapons and Testing, March 20, 1957,” in U.S. Department of State, *Documents on Disarmament 1945-1959*, Vol. 2, pp. 765-68.

15. See, U.S. Department of State, *Department of State Bulletin*, Vol. 35, November 19, 1956, p. 816.

nal and would have used the weapons had it faced an existential collapse.¹⁶ U.S. resupply of conventional weapons to Israel helped turn the military situation toward Israel's favor, and the Israelis were persuaded to show some restraint to ensure that the feared intervention on the Egyptian side by the Soviets did not materialize. The full story of these events is still classified, but all sides understood that the use of even one nuclear weapon by the Israelis could have had a catalytic effect in raising the threat of nuclear war between the United States and the USSR.

At the same time Ambassador Wadsworth was persuading the negotiators on the IAEA charter to adopt the requirement of effective safeguards for nuclear programs administered by the Agency or under its purview. He took great pains to assure the delegates that the "more basic purpose [of the IAEA] is the positive and creative development of the atomic era for human prosperity and welfare... there is much to be done, much to be learned before the atom can be widely and economically used for power. It is the duty of the Agency to hasten the doing and to hasten the learning."¹⁷ This was translated into the Agency's charter as a dual mission of promoting nuclear energy and safeguarding peaceful use, creating internal tensions in the Agency that have never been satisfactorily resolved and which affected the negotiations over the safeguards system.

For example, as the IAEA safeguards negotiations progressed, major questions concerning safeguards were resolved in a way to provide the least hindrance to national nuclear development. When the notion of safeguarding source materials was proposed, objections by France and India were enough to kill the idea. Likewise, the notion of whether safeguards should apply to all states was defeated

16. Seymour Hersh, *The Samson Option*, New York: Random House, 1991, p. 227.

17. "Opening of Discussions on Statute of International Atomic Energy Agency," *Department of State Bulletin*, Vol. 35, No. 902, October 8, 1956, p. 540, available from ia802307.us.archive.org/10/items/departmentofstat3556unit/departmentofstat3556unit.pdf.

in favor of requiring safeguards only for countries receiving nuclear assistance from the IAEA. This meant that rich countries with highly developed nuclear programs could keep inspectors away from them while requiring such inspections for lesser developed countries. This discriminatory practice was carried over in principle into the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), which divided parties to the treaty into weapons states and non-weapons states with different safeguards rules for each. To this practice, Homi Sethna, the head of India's nuclear program, issued a prescient comment: "This division into haves and have-nots will create lasting tensions that would only get worse with time."¹⁸

In dealing with the issue of stockpiling fissionable materials, Ambassador Wadsworth produced an agreement (contained in Article XII of the IAEA Charter) that enables the Agency "to require the deposit with the Agency of any excess of any fissionable materials recovered or produced as a by-product over what is needed [for peaceful purposes]...in order to prevent stockpiling of these materials." But the Agency has never produced a storage regime, so this article of the charter has never been implemented. Thus, the Agency has allowed Japan, for instance, to accumulate more than 9 tons of plutonium at home (and an additional 38 tons stored in England and France that will ultimately be returned to Japan) from which thousands of nuclear weapons could be manufactured.¹⁹ A recent proposal to deal with this problem would use a bookkeeping scheme to give the IAEA virtual custody of that part of Japan's plutonium that would not be specifically identified by Japan as needed for future peaceful use.²⁰ The Agency would give up parts of its

18. George Perkovich, *India's Nuclear Bomb*, Berkeley: University of California Press, 1999, p.29.

19. Henry Sokolski, "A Plutonium Rich Asia," *National Review Online*, September 24, 2014, available from <http://www.npolicy.org/article.php?aid=1261&rt=&key=a%20plutonium%20rich%20asia&sec=article&author=>.

20. Fred McGoldrick, "IAEA Custody of Japanese Plutonium Stocks: Strength-

custody as needed by Japan for specific peaceful use. The devil is in the details, and whether Japan would seriously consider this virtual barrier to full and immediate access to its materials is unclear. But it begs the question of why the Agency allowed such stockpiles to be created in the first place in the absence of the full implementation of Article XII of the charter.

The charter of the IAEA that was formally adopted in 1957, as mentioned earlier, gave the Agency the dual missions of promoting nuclear energy and safeguarding peaceful use. The earlier warnings that promotion of nuclear energy would spread bomb-making technology were buried under a drive for future power and the prospect of future profits. The insidiousness of the dual missions became explicit when, in 2005, the then-head of the Agency, Mohammed El Baradei—whose relationship with the George W. Bush administration had up to then been problematic—publicly endorsed the nuclear deal between the United States and India,²¹ despite previous UN resolutions passed in the wake of India's 1998 nuclear tests that called on India to adopt full scope safeguards and sign the NPT. One could be forgiven for concluding that the support of the IAEA for nonproliferation norms was conditional, depending on whose nuclear ox was being gored and who stood to gain from the expansion of nuclear power.

The NPT

By the early 1960s, it was apparent that more countries would make nuclear weapons besides the United States, USSR, United Kingdom (which exploded its first bomb in 1952), and France (whose first test came in 1960). It was understood that support for nuclear

ening Confidence and Transparency,” *Arms Control Today*, Vol. 33, No. 1, September 2014, available from legacy.armscontrol.org/act/2014_09/Features/IAEA-Custody-of-Japanese-Plutonium-Stocks_Strengthening-Confidence-and-Transparency.

21. “India-U.S. Nuclear Deal a Step Forward: El Baradei,” *The Hindu* (Chennai), June 15, 2006, available from www.thehindu.com/todays-paper/tp-international/india-us-nuclear-deal-a-step-forward-el-baradei/article3119546.ece.

disarmament among the states that had already made weapons was intimately tied to the prevention of weapons proliferation. In 1961, the UN General Assembly approved a resolution introduced by the Irish delegation calling on all states to refrain from the transfer or acquisition of nuclear weapons. This triggered more than 6 years of negotiations—led by the United States, USSR, and United Kingdom—that resulted in the NPT, which was opened for signature on July 1, 1968.²² On the first day, 62 countries signed on and the treaty ultimately became the core of an international regime for fostering nuclear nonproliferation.

The treaty's aim, like that of the IAEA charter, was to prevent or restrain nuclear weapons proliferation without impeding nuclear development and thus required further development of an effective safeguards regime for NPT parties. A general safeguards objective was stated as follows for non-weapons state parties to the NPT: "The timely detection of the diversion of significant quantities of nuclear materials from peaceful activities...and deterrence of such diversion by the risk of early detection."²³

In order for the IAEA to develop safeguards standards following the introduction of its safeguards system pursuant to the NPT, it was necessary to establish detection goals. Accordingly, in 1975, the Agency established the Standing Advisory Group on Safeguards Implementation (SAGSI), a group of safeguards experts from IAEA member states, appointed by the Director General, to advise on safeguards issues.²⁴ SAGSI developed the notion of a Significant Quantity (SQ) of fissile materials (the approximate amount

22. Federation of American Scientists, "Treaty on the Non-Proliferation of Nuclear Weapons (NPT)," available from www.fas.org/nuke/control/npt/.

23. "The Technical Objective of Safeguards," *IAEA Bulletin*, Vol. 17, No. 2, April 1975, pp.13-17, available from www.iaea.org/sites/default/files/17203401317.pdf.

24. John Carlson, "SAGSI: Its Role and Contribution to Safeguards Development," Barton, Australia: Australian Safeguards and Nonproliferation Office, 2007, available from www.dfat.gov.au/international-relations/security/asno/Documents/SAGSI_role_contribution_safeguards_dev.pdf.

of material needed for a nuclear explosion), established timeliness goals, and laid out the format for reporting on safeguards performance in the general IAEA Safeguards Implementation Report.

*Safeguards Standards*²⁵

In 1977, the formal detection goal of the Agency's safeguards system was stated as a 90-95% probability of detecting a diversion of one SQ of Special Nuclear Material (SNM), with a false alarm probability of less than 5%, and with a detection time less than or equal to the time needed to convert the SNM to a nuclear explosive device. The definition of one SQ of plutonium containing less than 80% plutonium-238 was set at 8 kilograms; the definition of one SQ of HEU was set at 25 kilograms of U-235. The conversion times were set at 7-10 days for metal; 1-3 weeks for oxides or nitrates; and 1-3 months for irradiated fuel.

There are a number of problems with these goals and their implementation: First, as to SQs, it is well known that nuclear weapons states have constructed working weapons that use much less than one SQ. Second, in a plant processing large amounts of material, the minimum detectable diversion will be much larger than one SQ. Third, the timeliness goals are unrealistic because they depend on the taking and analysis of material balances, which are normally done annually while a diversion can occur at any time. One can overcome this problem by increasing the number of inventory takings, but this is expensive and is resisted by plant operators. Finally, in practice the technical requirements or goals are almost never met, partly because safeguards agreements are negotiated, as is the facility attachment laying out the actual inspection schedule. Thus, the argument over discrimination by the nuclear haves against the

25. International Atomic Energy Agency, "The Present Status of IAEA Safeguards on Nuclear Fuel Cycle Facilities," *IAEA Bulletin*, Vol. 22, No. 3/4, August 1980, pp. 2-40, available from www.iaea.org/sites/default/files/publications/magazines/bulletin/bull22-3/223_403400240.pdf.

nuclear have-nots is played out in the negotiations over safeguards implementation, and plant operators (backed up by their governments) tend to resist effective safeguards agreements as intrusions into their domain. Indeed, the question of sovereignty hangs over the entire safeguards system.

Thus, the notion of inspectors roaming at will over the territory of a nuclear state to try to find clandestine materials or facilities has been resisted from the beginning, and safeguards were understood to be limited to declared materials and facilities. While some improvement has occurred thanks to the voluntary Additional Protocol introduced by the IAEA following the post-Gulf War revelations about Iraq's clandestine nuclear program, countries of high proliferation concern have not signed and ratified the Protocol. The Agency does have the right under its charter to undertake a special inspection to resolve safeguards ambiguities, but usually must first gain the cooperation of the inspected state. States also have the right to object to particular inspectors designated for it by the IAEA. Moreover, safeguards are not permanent under the NPT, so if a country leaves the treaty it is not obligated to continue inspections.

It should also be noted that NPT safeguards follow the nuclear materials in a country, so if a facility has no declared nuclear material in it, the facility is not subject to inspection unless the IAEA has reason to believe that materials are or have been present and the state involved agrees to the inspection. If there is a disagreement, the IAEA can go to the UN Security Council and attempt to obtain a resolution putting the state under threat of sanctions if it does not comply.

The bottom line on safeguards: They are useful and mandatory for providing some level of confidence that a peaceful nuclear program of one's neighbor is not a cover for a clandestine weapons program, but no country is likely to rely on it exclusively for that purpose. That is why restrictions on nuclear trade and development are important elements of a nonproliferation regime worthy of the name.

The Beginning of the NPT

The early history of the IAEA and the safeguards regime has led to weaknesses in protecting the world from the proliferation of nuclear weapons. Since the history of safeguards is intimately intertwined with the history of the NPT, it should not come as a surprise that the design of the NPT itself has occasionally been a source of grief for the nonproliferation that it was supposed to prevent.

Among the first steps toward the treaty was a unanimously adopted 1961 UN General Assembly resolution introduced by the Irish delegation that called on all states to conclude an international agreement to refrain from transferring or acquiring nuclear weapons.²⁶ In negotiating the agreement, the United States wanted language that would have allowed it to create a multilateral nuclear force (MNF) stationed in Germany.²⁷ The Soviets, however, made it clear that they would oppose creating any treaty that would allow the possibility of Germans being in command of nuclear weapons, but they could tolerate U.S. nuclear weapons in Europe, controlled and commanded by the Americans. Accordingly, the United States gave up on the idea of an MNF as long as the Soviets would cooperate on negotiating the NPT.²⁸

The negotiations began within the (then 11 nation) UN Conference on Disarmament meeting in Italy in July 1965. The non-nuclear nations demanded from the beginning that they would support non-proliferation only if it was coupled to progress in disarmament by the nuclear nations. Specifically, the eight non-aligned countries in the Conference demanded “tangible steps to halt the nuclear arms race and to limit, reduce, and eliminate stockpiles of nuclear weapons and their means of delivery.”²⁹

26. Arms Control Association, “Timeline of the NPT,” March 5, 2010, available from www.armscontrol.org/system/files/NPT_Timeline.pdf.

27. John Barton and Lawrence Weiler, eds., *International Arms Control: Issues and Agreements*, Stanford, CA: Stanford University Press, 1976, p. 296.

28. *Ibid.*, p. 297.

29. United Nations Conference of the Eighteen-Nation Committee on Disar-

Thus, the NPT would have to contain a grand bargain in which the non-weapons states pledge to give up their right to acquire nuclear weapons and the weapons states give up their right to retain them. The problems are, as usual, in the details.

Problems with the NPT

The treaty suffers from the same problem as the charter of the IAEA. It looks with approval on, and is intended to foster, the spread of nuclear development—including technologies that have both peaceful as well as weapons applications—as long as such development is “effectively” safeguarded. The preamble to the treaty affirms

the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties of the Treaty, whether nuclear-weapon or non-nuclear weapon States [and that]...all parties to the Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in cooperation with other States to, the further development of the applications of atomic energy for peaceful purposes.³⁰

This open door to advanced nuclear development, which can be interpreted in accordance with Article III of the treaty as including

mament, Final Verbatim Record of the Three Hundred and Thirtieth Meeting, ENDC/PV.330, September 14, 1967, p. 6, available from quod.lib.umich.edu/e/encd/4918260.0330.001?rgn=main;view=fulltext.

30. *Treaty on the Non-Proliferation of Nuclear Weapons*, July 1, 1968, entered into force on March 5, 1970, 21 U.S.T. 483, 729 UNT.S. 161.

safeguarded enrichment and reprocessing technology, is essentially locked open by Article IV of the treaty, which establishes “the inalienable right of all the Parties to the Treaty to develop research, production, and use of nuclear energy for peaceful purposes, without discrimination and in conformity with Articles I and II of the Treaty” (that is, for peaceful purposes and under safeguards).³¹

Article IV, Paragraph 2 underscores the Preamble by giving all parties to the treaty the right to participate in the “fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of atomic energy”; and puts all parties in a position to do so under obligation to cooperate in the “further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear weapon States Party to the Treaty...”³² It is this part of the treaty that is currently being cited by Iran in support of their claim that they have an inalienable right to enrich uranium for peaceful purposes, although a counter argument can be made that the Iranian centrifuge program is part of a weapons program and is therefore not legitimate under the NPT. This argument is likely to be settled ultimately by the jurisprudential adage that “possession is nine-tenths of the law,” and no one appears to be in a position to take an unwilling Iran’s centrifuges away from it by any means short of war.

On the other hand, Iran has suffered significant economic damage as a result of sanctions imposed on it for being in technical violation of its safeguard obligations (in not having informed the IAEA of the existence of its enrichment program for about 15 years prior to 2003) and for ignoring UN Security Council resolutions demanding that Iran suspend its enrichment operation.³³ This economic pres-

31. Ibid.

32. Ibid.

33. Arms Control Association, “UN Security Council Resolutions on Iran,” August 6, 2012, available from www.armscontrol.org/factsheets/Security-Council-Resolutions-on-Iran.

sure, among other things, induced Iran to enter into a years-long negotiation with six other countries (the P5+1) that ultimately resulted in the Joint Comprehensive Plan of Action (JCPOA) signed in 2015 and endorsed by all the negotiating parties plus the European Union. (See www.state.gov/documents/organization/245317.pdf)

The JCPOA will significantly reduce Iran's nuclear materials and production capabilities for at least the next ten years and provides for broad monitoring by the IAEA of Iran's compliance with the agreement. What will happen after the expiration of the agreement is unclear, but the need to have undergone this special effort to prevent further proliferation in the short term in the Middle East underscores the failure of the NPT and the IAEA to establish a tighter safeguards system in advance of the decisions to allow the sale of nuclear technology all over the world.

Even the fear of Improvised Nuclear Explosive Devices (INEDs), which would not exist were it not for the production of weapons-usable materials that are unneeded for peaceful applications, has been insufficient motivation for NPT parties to commit to stop such production. Instead, more controls (e.g., under UN Security Council Resolution 1540) are prescribed that depend on the same spotty implementation mechanisms that have been ineffective in preventing past proliferation. It is unclear what would enable nuclear states to stop producing more weapons-usable materials or to stop proliferating advanced nuclear technology that carries with it the threat of a weapons capability if not the weapons themselves. In that respect, the treaty's role in the promotion of nuclear energy, like that of the IAEA, can act as a spur to, as well as a blocker of, nuclear weapons proliferation.

The treaty also suffers from a problem inherent in many treaties: The failure to prevent a party from leaving the treaty without penalty (Article X simply requires three months notice and a statement suggesting a reason having to do with a possible nuclear threat). The lack of a penalty for leaving the NPT removes one disincentive for a non-weapons state using its treaty status to receive nuclear

technology assistance with the intent of then leaving the treaty so it can exploit its new knowledge for weaponry purposes. It is the case that safeguard violations may be referred to the UN Security Council (UNSC) for action, as was done in Iran's case, but the Council cannot effectively take action if the violator is an ally of a permanent member of the UNSC who, by such membership, possesses veto power. Thus, violations are ultimately left to coalitions of the willing, which would have been the enforcement mechanism to prevent proliferation if the NPT did not exist. In the end, therefore, it is alliances that matter, although the treaty provides a useful organizational principle and creation of an international norm around which the power of an alliance can be exercised. Unfortunately, and perhaps unavoidably, if one of the permanent members of the UNSC violates the treaty, power politics is the likely tool for mitigation, and so it is no surprise that nuclear weapons states continue to possess their nuclear arsenals nearly half a century after the treaty went into force.

Indeed, even though the NPT Article VI requires good faith negotiations among the weapons states toward eliminating their nuclear arsenals, progress in this direction has had little connection to the existence of Article VI and is more the result of changed political conditions among and within the weapons state parties themselves. Nonetheless, as an expression of world aspiration, Article VI remains a useful reminder of the reasons why the NPT came into existence in the first place. But no one should consider it a substitute for the difficult agreements that are required for long-term peace and safety. Such difficulty combined with the desire for profits from nuclear and other trade has enabled the countries that have eschewed becoming committed parties to the NPT (India, Pakistan, Israel, and North Korea) to make nuclear weapons and prosper via economic relations with NPT parties. Money and goods are fungible. An NPT party that provides trade and assistance to a non-NPT party allows the latter to devote resources to its nuclear weapons program. This is not considered a violation of an NPT obligation under Article I or II. Much of the cynicism and hypocrisy

that surrounds the NPT is traceable to the built-in discrimination and inequality in both the architecture of the treaty and the manner in which the treaty's provisions are interpreted and adjudicated.

Many of the issues raised by the treaty and the safeguards system were foreseen by some of the scientists who worked on the Manhattan Project. Their conclusion that proliferation was inevitable if national nuclear programs were allowed to exist and develop was prescient. The genie is indeed out of the bottle, and in a world where a majority of the American public would condone the use of nuclear weapons in war when they perceive a clear benefit over the use of conventional weapons,³⁴ putting the genie back is a daunting if not impossible task, even in circumstances where some former leaders who once argued for the construction and use of such weapons have belatedly changed their minds.³⁵ But to paraphrase a much quoted statement about armies and war, you fight proliferation with the nonproliferation regime you have, not with the regime you want. Until the world becomes as sensitized to the risks of nuclear commerce and expansion as it is to the threat of nuclear war, especially at a time when global warming has resulted in an evident need to reduce dependence on fossil fueled energy, a world free of nuclear weapons will continue to be little more than an aspiration.

34. Darryl Press, Scott Sagan, and Benjamin Valentino: "Atomic Aversion: Experimental Evidence on Taboos, Traditions, and the Non-Use of Nuclear Weapons," *American Political Science Review*, Vol 107, No. 1, February 2013, pp. 108-206, available from https://cisac.fsi.stanford.edu/sites/default/files/FINAL_APSR_Atomic_Aversion.pdf.

35. George Shultz, William Perry, Henry Kissinger, and Sam Nunn, "A World Free of Nuclear Weapons," *Wall Street Journal*, Jan. 4, 2007, p. A15, available from fcnl.org/issues/nuclear/world_free_of_nuclear_weapons.